



Maximizing Opportunities  
in Coffee and Cacao in the Americas



# Midterm Evaluation

*June, 2022*

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Foreign Agricultural Service,  
United States Department of  
Agriculture

Alliance



# **MOCCA Project Midterm Evaluation Report**

The United States Department of Agriculture (USDA) Food for Progress (FFPr) MOCCA project in Ecuador, El Salvador, Guatemala, Honduras, Nicaragua and Peru was implemented by TechnoServe (Consortium Leader) and partners Lutheran World Relief (Cacao lead), World Coffee Research, ISF Advisors from 2019 to 2023. MOCCA provide assistance to farmers to overcome the barriers that limit their capacity to effectively rehabilitate and renovate their coffee and cacao plants – increasing their productivity, while improving their marketing capacity, incomes, and livelihoods within these key value chains.

Agreement Number: FCC-596-2018/005-00

Project Duration: 7 years

Implemented by: TechnoServe (Consortium Leader) and partners: Lutheran World Relief (Cacao lead), World Coffee Research, ISF Advisors.

Evaluation Authored by: The International Center for Tropical Agriculture (CIAT)

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The opinions and comments in this document do not necessarily reflect the opinion of the Alliance Bioversity-CIAT, TechnoServe or Lutheran World Relief. Any errors are solely of the authors.

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## EXTENDED EXECUTIVE SUMMARY

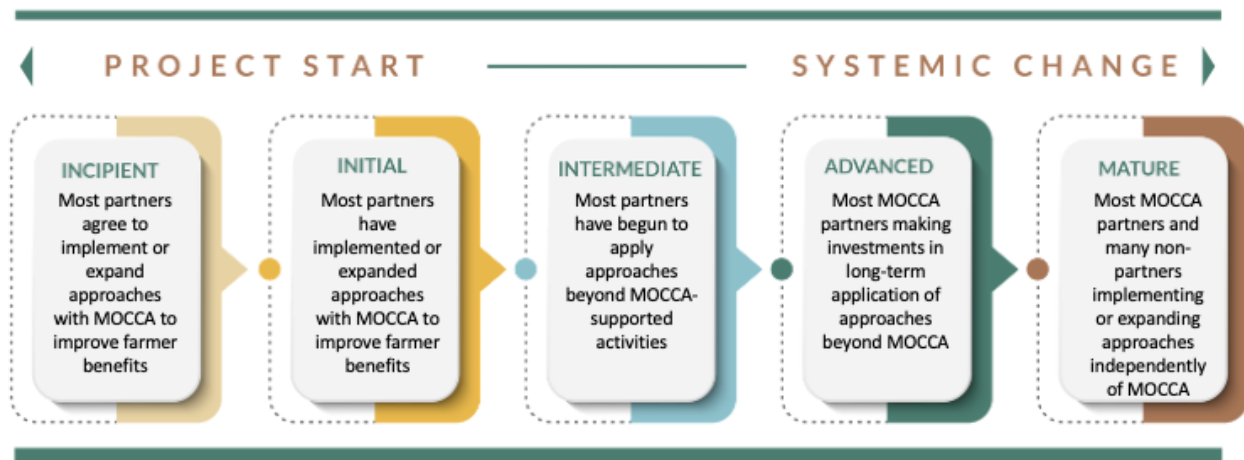
### Introduction

The mid-term evaluation analyzes progress made by the Maximizing Opportunities in Coffee and Cacao in the Americas (MOCCA) project, at both the market system and farmer level, to recommend actions MOCCA should take to maximize impact during the rest of its implementation. At the market system level, the objective is to evaluate the degree to which MOCCA partners have incorporated changes into their business models, practices, or work plans in response to the incentives provided by the project. At the farmer level, the main objective is to assess progress on the adoption of agronomy best practices and in reaching indicator targets.

### Methods

The overall framing for the market system assessment uses the Systemic Change Pathway developed by the Market Development Facility<sup>1</sup>, which defines stages of systemic change related to project implementation and helps to visualize the depth of the changes brought about by MOCCA so far.

#### Systemic Change Pathway



For each activity, we explored the changes being implemented by partners with support from MOCCA, their perceptions of the major achievements and challenges in implementing the models proposed, and the degree to which these changes were being taken up and implemented beyond the specific scope of agreements with MOCCA. Semi-structured interviews and focus groups were used to collect information from informants. Informants included all types of MOCCA partners (exporters, importers and other buyers, farmer organizations, research institutions, nurseries, financial institutions, national commodity

<sup>1</sup> See: [https://www.enterprise-development.org/wp-content/uploads/Case\\_8SystemicChangeMDF.pdf](https://www.enterprise-development.org/wp-content/uploads/Case_8SystemicChangeMDF.pdf)

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institutes, public institutions and NGOs) across all seven MOCCA activities. In all we engaged informants from 43 actors in coffee (47% of MOCCA partners) and 43 actors in cacao (41% of MOCCA partners).

At the farmer level, we sampled one-half of the planned baseline sample size, representing 1,059 coffee producers and 529 cacao producers as originally proposed in the Monitoring, Evaluation and Learning plan. We focused on comparing sample means for midline results to baseline results, and for key indicators, we constructed a panel dataset for analysis. The mid-line survey focused on crop practices and the plots where farmers grew the crops of interest. The year of reference for almost every question was the 2021/2022 agricultural year. We analyzed data using STATA® using descriptive statistics, panel data analysis (for some indicators, which we discuss in this executive summary) and multivariate regressions.

## Major findings - Coffee

**At the market systems level,** to date, MOCCA has partnered with 77 market system actors in coffee to either improve or increase access to key services for at least 42,370 smallholder farmers.

**Number of MOCCA partners by country and type of partner**

| Partners                     | El Salvador | Guatemala | Honduras  | Nicaragua | Peru      | Regional | Total     |
|------------------------------|-------------|-----------|-----------|-----------|-----------|----------|-----------|
| Exporters                    |             | 3         | 3         | 2         | 1         |          | 9         |
| Roaster/brand/ importer      |             | 2         | 3         |           | 2         |          | 10        |
| Producer organizations       | 7           |           | 5         | 7         | 9         |          | 128       |
| Research Institutions        |             |           |           | 1         |           | 1        | 2         |
| Financial Institutions       | 1           | 2         | 2         | 1         | 9         |          | 15        |
| NCIs and public institutions | 2           | 1         | 1         | 1         | 1         | 1        | 7         |
| NGOs/Projects                |             |           |           |           | 2         | 1        | 3         |
| Others <sup>2</sup>          | 1           |           | 1         |           |           |          | 3         |
| <b>TOTAL</b>                 | <b>11</b>   | <b>8</b>  | <b>15</b> | <b>12</b> | <b>22</b> | <b>3</b> | <b>77</b> |

### Activity 1: Farmer Training

Farmer technical assistance began in April 2020, just as the pandemic intensified in all MOCCA countries and restrictions on mobility and group gatherings were imposed. This required a major shift in MOCCA's coffee training model to incorporate virtual training tools and methods to support farmers during this complex period. Training began with 3500 farmers in 2020 and accelerated during the following semesters to reach over 47,300 farmers by the end of May 2022 (30% women).

Informants in all countries highlight numerous benefits of the technical assistance model introduced by MOCCA including:

- **In all countries -**

<sup>2</sup> Others include associations of women in coffee in El Salvador and Honduras and a global certifier.

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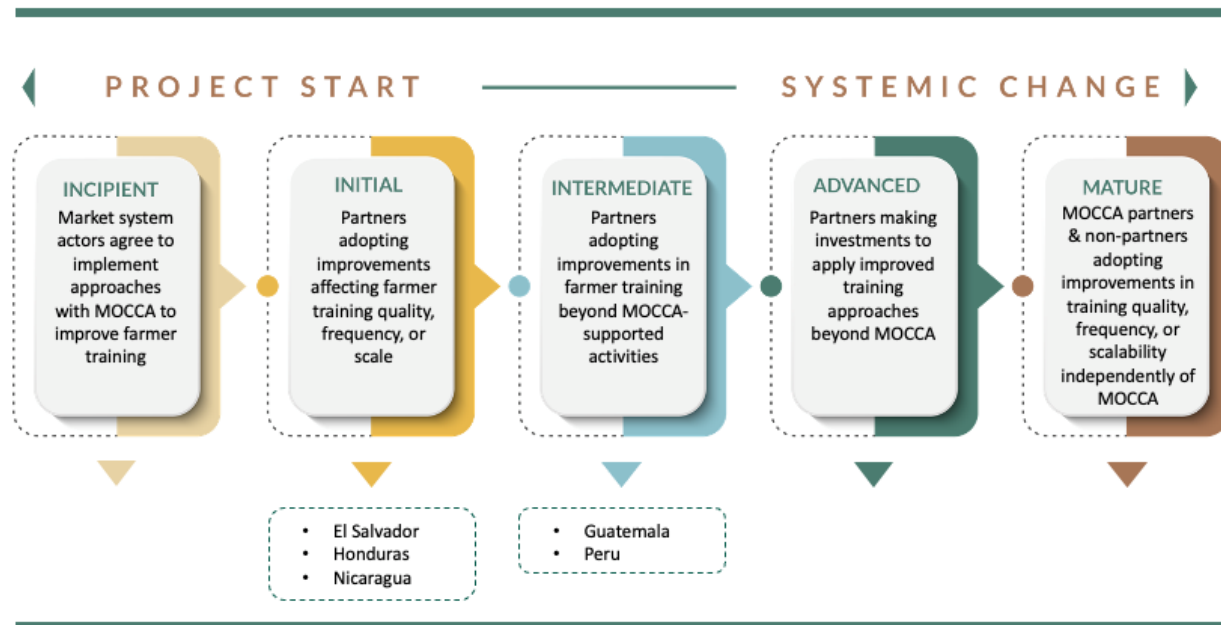
- As an adaptive response to the COVID pandemic, MOCCA developed content for WhatsApp and radio (via what it calls Comprehensive Remote Training Plans) to reach farmers remotely. These tools were not previously used by most partners co-funding technical assistance with MOCCA.
- Partners are adopting improvements in at least one dimension related to farmer training, including the quality, frequency and scale of the technical assistance provided.
- Partners cited that with support from MOCCA they were able to provide technical assistance to greater numbers of farmers, including more smallholder farmers.
- **In Guatemala and Peru**, partners improved their training approaches beyond what was agreed upon with MOCCA (e.g., applying the training approach to new target groups beyond MOCCA).
- **In El Salvador, Honduras and Nicaragua**, partners are adopting improvements in line with the MOCCA proposed technical assistance model including group rather than individual training, adult learning methodologies to make trainings more interactive, greater use of demonstration plots to promote improved production practices, and an increased focus on productivity.
- **In El Salvador:**
  - Informants highlight training on organic techniques, incorporation of gender equity themes and the incorporation of demonstration plots
  - Based on the experience of the Salvadoran Coffee Council with MOCCA's training curriculum, an IDB-funded project implemented by IICA and the Ministry of Agriculture will utilize MOCCA's training curriculum, including adult education methods, lesson plans, and Comprehensive Remote Training Plan content to train 7,500 coffee farmers in Western El Salvador
- **In Honduras**, anchor firm informants commented that their work alongside MOCCA has allowed farmers to build new relationships with cooperatives, which also has helped them sell more coffee
- **In Nicaragua**, One partner is using adult education best practices and structured lesson plans for the first time, as a result of their engagement with MOCCA. Partners cite increased frequency of training as an important improvement
- **In Peru**, informants highlighted the use of new training methodologies and improved use of wet-milling equipment as key changes in their training models, resulting in more consistent attendance by farmers.

Importantly, the majority of partners indicate that they believe it is likely that their technical assistance work will continue beyond MOCCA. For these reasons, we locate all countries in either the initial or intermediary stages of the systemic change pathway.

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## Systemic change pathway summary for Activity 1:



Some of the key challenges cited, from the most frequently cited to the least, include: farmers' lack of tools and financing necessary to implement some of the R&R techniques learned; the turnover in technicians interrupts the consistency of the TA work; the remoteness of some farms makes it difficult for some farmers to travel or for technicians to reach them consistently; and the need to incorporate more women and youth in trainings. A few actors cited the lack of resources as a possible factor that could make continuity challenging. Still, the trends are promising regarding the possibility for systemic change at the market systems level in relation to technical assistance.

**At the farm level,** the survey asked about farmers' opinion on the usefulness of the trainings received. Most reported they were very useful (53.7%) or useful (42.8%), and this ranking was consistent among Central American countries. In Peru most farmers (57%) reported these trainings were useful and nearly 40% ranked them as very useful. Since the majority considered the trainings useful, we can infer that farmers are benefiting from the MOCCA trainings.

**Regarding the adoption of best agronomy practices,** we discuss statistically significant differences between baseline and midline mean values, from the panel data analysis, which we show in the table below and illustrate (key results) in Figure A, and also simple mean comparison for some indicators.

On average, we found that over 60% of coffee farmers implemented at least one new agronomy practice recommended by MOCCA. It is worth mentioning that we also found that many farmers also seem to have stopped the implementation of some practices (e.g., they fertilized at a lower scale or did not implement renovation). These findings suggest that the input cost increases may have influenced farmers' decisions

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on what kind of nutrition practices they were able to implement. Also, since many plantations are younger than expected, farmers' may have not conducted renovation since it was not needed for their farms. For these reasons, in the adoption analysis for all practices combined, using descriptive (panel data) statistics, we only counted farmers who had implemented new practices they did not implement at baseline and excluded from the analysis whether farmers did not conduct an agronomy practice that they used to implement at baseline (i.e., disadoption).

Among the major findings disaggregating by type of practices we found:

### ***Renovation and rehabilitation***

- MOCCA trains coffee farmers to conduct a farm productivity assessment or diagnostic, through which they can determine renovation and rehabilitation needs. In general, the share of farmers carrying out the farm productivity assessment on their coffee plots increased from 24.4% at baseline to 31.1% at midline; except in Guatemala, where this percentage is lower than at baseline.
- The differences in the adoption rates of renovation practices were statistically significant only in Nicaragua and Peru, where we noticed a decrease in the share of farmers doing renovation at midline. This may be explained by the fact that farmers who renovated coffee after the baseline may not need to renovate more coffee (or fewer farmers need to renovate) at midline, or it may be that the plantations are young. At midline, the coffee plantations had an average maximum age of 7.6 years which suggests that the need for renovation may not be as high as initially thought. Another factor that may be affecting farmer adoption of renovation practices is the recent trend in prices, as prices are nearly 60% higher than what they have been in years past, so farmers may be unwilling to sacrifice short term yields from unproductive plants that need renovation.
- Rehabilitation practices promoted by MOCCA include: normal pruning (selective or descope), rejuvenation (skeletal and branches), and stumping. In contrast to renovation and when disaggregated **by type of rehabilitation**, we observe statistical differences in most countries for different rehabilitation practices. The share of farmers (all countries combined) doing normal pruning and stumping practices increased at midline.
- We also observed that the share of farmers doing stress formation pruning increased in Peru (although the proportion of farmers doing this pruning method is very small).

### ***Fertilization***

- **In El Salvador**, we observed an increase at midline in the share of farmers fertilizing the full amount required by the crop. We also observed a reduction in the share of farmers applying fertilizers, fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of the plant or using soil analysis results (for these two indicators, the share of farmers doing this at baseline was small), applying only organic fertilizers, or both chemical and organic fertilizers (probably due to price increase)

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- **In Guatemala**, we observe more farmers fertilizing based on visual deficiencies and doing it based on visual characteristics of the plant, and applying fertilizers.
- **In Honduras**, the share of farmers fertilizing the full amount required by the trees and applying only chemical or only organic fertilizers increased at midline. However, data suggests a reduction in the proportion of farmers fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of the plant.
- **In Nicaragua**, we observed an increase in fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of the plant, applying chemical or organic fertilizers.
- **In Peru**, the share of farmers fertilizing based on visual nutrition deficiencies of plant, applying only chemical or organic fertilizers increased at midline.

### ***Soil conservation***

- **In Guatemala, Nicaragua and Peru**, the share of farmers using soil conservation practices (e.g. dead covers, covering the space between rows with organic waste) increased compared to baseline. The differences found in the rest of the countries did not show statistical significance.

### ***Pest and disease management***

- **In El Salvador**, we observed an increase at midline in the share of farmers using at least one control method for each disease affecting their crop.
- **In Guatemala and Honduras**, the share of farmers implementing pests and disease monitoring systems seem to decrease while the incidence of insect pests increased at midline for Guatemala. This finding suggests that agronomy practices related to pest and disease management may need reinforcement in the field.
- **In Nicaragua**, we observed an increase in implementing pests and disease monitoring systems and a decrease in the application of methods to control pests (which may have to do with the increase in monitoring pests and the reduced incidence of insect pests)
- **In Peru**, the share of farmers using at least one method to control pests and diseases seem to have decreased at midline, more research is needed to understand this finding.

### ***Quality and Certifications***

- Regarding coffee harvesting practices, 76% of sampled farmers classified coffee cherries after the harvest, an increase from the 56% doing this at baseline. Doing this was less common in Nicaragua and Guatemala. Roughly 61% of farmers could name at least three physical factors affecting coffee quality, especially in Nicaragua, a sharp increase from the 49% who reported this at baseline.
- We also observed that the share of farmers that obtained farm certifications increased for all countries with the exception of El Salvador, where practically no farmer had certifications at baseline, and no farmer reported changes at midline.

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Besides the adoption of agronomy practices, we also assessed statistical differences regarding the key indicators in MOCCA: yields and coffee farm size. Only the coffee area was statistically significantly lower at midline (for all countries) and mainly driven by a sharp decrease in the coffee area reported in Guatemala and Honduras only, as in the rest of the countries, the differences were not statistically significant. We suspect that this finding could be due to data collection errors at baseline<sup>3</sup>, or due to poor recall data from farmers. The yields were statistically significantly higher at midline in all countries except Honduras, and for the countries with statistically significant differences, yields increased an average of 61% over the baseline values.

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<sup>3</sup> We suspect that data collection error occurred particularly at baseline, since training to enumerators were implemented remotely due to the COVID Pandemic. For the final evaluation, we will cross check baseline survey data with registration data (from MOCCA's monitoring baseline database), to confirm baseline areas.

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## Panel data analysis results of key coffee indicators

| Farmers (%)   | El Salvador |            |          | Guatemala  |            |          | Honduras   |            |          | Nicaragua  |            |          | Peru       |            |           | All countries |             |          |
|---|-------------|------------|----------|------------|------------|----------|------------|------------|----------|------------|------------|----------|------------|------------|-----------|---------------|-------------|----------|
|   | LB          | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value   | LB            | LI          | p-value  |
| Who renovated coffee trees  | 10.3        | 12.1       | 0.6114   | 17.3       | 24.1       | 0.0778   | 12.8       | 14.9       | 0.5588   | 42.7       | 34.4       | 0.0672*  | 33.1       | 18.5       | 0.0002*** | 24.4          | 21.3        | 0.0887*  |
| Who rehabilitated (pruned) coffee trees, and of these, % doing:                                     | 37.4        | 49.4       | 0.0231** | 55.0       | 55.9       | 0.8483   | 63.6       | 60.5       | 0.5325   | 74.4       | 71.8       | 0.5263   | 76.6       | 72.6       | 0.3033    | 62.9          | 63.0        | 0.9642   |
| Normal pruning  | 41.5        | 46.5       | 0.5456   | 34.7       | 53.7       | 0.003*** | 49.2       | 63.6       | 0.024**  | 40.8       | 54.6       | 0.012**  | 61.1       | 84.4       | 0.000***  | 47.1          | 63.0        | 0.000*** |
| Rejuvenation  | 0.0         | 2.3        | 0.2185   | 0.0        | 0.0        | n.a      | 11.3       | 13.6       | 0.5942   | 4.7        | 5.5        | 0.7457   | 4.7        | 5.6        | 0.7223    | 4.6           | 5.5         | 0.4594   |
| Stumping  | 40.0        | 39.5       | 0.9543   | 37.2       | 48.8       | 0.068    | 38.7       | 56.8       | 0.005*** | 44.4       | 55.8       | 0.037**  | 16.3       | 19.4       | 0.4334    | 33.6          | 42.8        | 0.000*** |
| Stress formation (formacion de agobio)  | 4.6         | 3.5        | 0.7277   | 0          | 0          | n.a      | 0          | 0          | n.a      | 0.6        | 0.6        | 0.9796   | 1.1        | 1.7        | 0.014**   | 0.9           | 1.0         | 0.7827   |
| Implementing dead cover in their coffee plots   | 67.2        | 45.4       | 0.000*** | 28.3       | 60.4       | 0.000*** | 66.5       | 57.4       | 0.062*   | 61.2       | 64.3       | 0.497    | 79.1       | 79.5       | 0.912     | 60.3          | 62.7        | 0.249    |
| Implementing live/green cover in their coffee plots   | 15.5        | 4.0        | 0.000*** | 17.0       | 11.3       | 0.082*   | 53.3       | 27.9       | 0.000*** | 23.8       | 34.4       | 0.013**  | 30.5       | 47.0       | 0.000***  | 27.9          | 26.3        | 0.3832   |
| Covering space between coffee rows with residues from weeding                                       | 84.5        | 64.4       | 0.000*** | 72.2       | 94.8       | 0.000*** | 86.3       | 87.8       | 0.653    | 55.5       | 75.3       | 0.000*** | 62.2       | 59.4       | 0.5214    | 70.9          | 76.3        | 0.005*** |
| Using herbicides  | 4.6         | 4.0        | 0.792    | 37.4       | 17.4       | 0.000*** | 19.3       | 10.7       | 0.016**  | 75.3       | 67.0       | 0.049**  | 0.0        | 4.4        | 0.000***  | 28.1          | 21.4        | 0.000*** |
| Applying fertilizer in the year of reference  | 87.4        | 79.9       | 0.060*   | 90.4       | 90.4       | 0.988    | 94.3       | 95.9       | 0.467    | 85.9       | 91.2       | 0.077*   | 81.5       | 83.5       | 0.6216    | 87.4          | 88.3        | 0.6673   |
| Fertilizing based on nutritional deficiencies   | 9.2         | 0.6        | 0.000*** | 9.6        | 11.7       | 0.461    | 52.3       | 33.5       | 0.000*** | 16.3       | 25.6       | 0.015**  | 21.4       | 27.3       | 0.117     | 21.4          | 20.4        | 0.596    |
| Fertilizing based on nutritional deficiencies and doing it based on visual characteristics of plant | 5.2         | 0.6        | 0.010**  | 2.2        | 5.7        | 0.054*   | 38.6       | 22.3       | 0.000*** | 13.7       | 23.3       | 0.007*** | 10.4       | 17.7       | 0.020**   | 13.6          | 14.4        | 0.619    |
| Fertilizing based on nutritional deficiencies and doing it using soil analyses                      | 4.6         | 0.0        | 0.004*** | 7.4        | 6.5        | 0.705    | 13.3       | 11.2       | 0.514    | 2.6        | 3.1        | 0.779    | 11.3       | 9.6        | 0.5484    | 7.9           | 6.3         | 0.1472   |
| <b>Number of households</b>   | <b>174</b>  | <b>174</b> |          | <b>230</b> | <b>230</b> |          | <b>197</b> | <b>197</b> |          | <b>227</b> | <b>227</b> |          | <b>249</b> | <b>249</b> |           | <b>1077</b>   | <b>1077</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

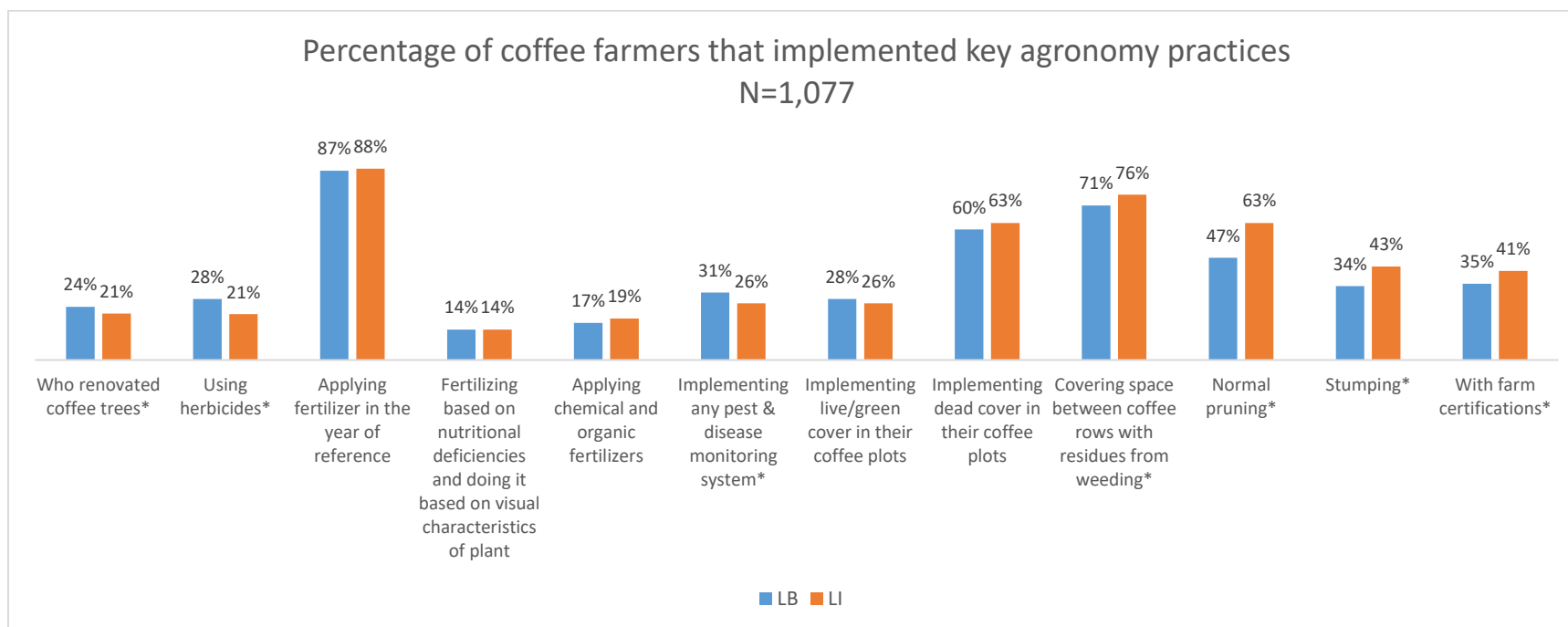
LB=baseline; LI=midline

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## Panel data analysis results of key coffee indicators (continued)

| Farmers (%)   | El Salvador |            |          | Guatemala  |            |          | Honduras   |            |          | Nicaragua  |            |          | Peru       |            |          | All countries |             |          |
|---|-------------|------------|----------|------------|------------|----------|------------|------------|----------|------------|------------|----------|------------|------------|----------|---------------|-------------|----------|
|   | LB          | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  | LB            | LI          | p-value  |
| Fertilizing the full amount required  | 43.7        | 55.7       | 0.024**  | 44.8       | 51.7       | 0.136    | 59.4       | 76.1       | 0.000*** | 54.2       | 53.7       | 0.925    | 24.5       | 24.1       | 0.917    | 44.6          | 50.9        | 0.003*** |
| Applying only chemical fertilizers  | 69.5        | 74.1       | 0.3418   | 78.7       | 87.8       | 0.008*** | 60.9       | 95.9       | 0.000*** | 82.4       | 90.3       | 0.013*   | 3.6        | 44.6       | 0.000*** | 57.4          | 77.6        | 0.000*** |
| Applying only organic fertilizers   | 12.6        | 5.7        | 0.026**  | 1.7        | 22.6       | 0.000*** | 7.1        | 18.3       | 0.008*** | 0.4        | 7.9        | 0.000*** | 40.2       | 80.7       | 0.000*** | 13.1          | 29.4        | 0.000*** |
| Applying chemical and organic fertilizers   | 5.2         | 0.0        | 0.002*** | 9.6        | 20.0       | 0.001*** | 25.4       | 18.3       | 0.013**  | 3.1        | 7.0        | 0.054*   | 37.8       | 41.4       | 0.410    | 16.9          | 18.7        | 0.284    |
| Implementing any pest & disease monitoring system   | 12.1        | 8.0        | 0.213    | 39.1       | 26.1       | 0.003*** | 44.7       | 26.4       | 0.000*** | 35.2       | 44.9       | 0.035**  | 22.9       | 21.3       | 0.666    | 31.2          | 26.1        | 0.009*** |
| Reporting insect pests affected their crop  | 37.9        | 36.8       | 0.825    | 17.8       | 24.8       | 0.068*   | 66.5       | 61.9       | 0.345    | 44.9       | 37.0       | 0.086*   | 67.1       | 57.0       | 0.020*** | 47.1          | 43.5        | 0.100*   |
| Using 1 method for each pest identified   | 25.3        | 24.1       | 0.804    | 16.5       | 13.9       | 0.437    | 54.8       | 39.6       | 0.002*** | 32.6       | 22.9       | 0.021**  | 56.2       | 39.4       | 0.000*** | 37.5          | 28.0        | 0.000*** |
| Reporting diseases affected their crop  | 68.4        | 69.5       | 0.817    | 90.4       | 90.4       | 1        | 87.8       | 92.4       | 0.129    | 96.0       | 95.2       | 0.643    | 59.8       | 77.1       | 0.000*** | 80.5          | 85.3        | 0.002*** |
| Using 1 method for each disease identified  | 42.5        | 53.4       | 0.041**  | 84.8       | 55.2       | 0.000*** | 72.1       | 59.4       | 0.007*** | 0.0        | 60.4       | 0.000*** | 77.5       | 55.9       | 0.000*** | 47.0          | 55.0        | 0.073*   |
| With farm certifications  | 1.7         | 0.0        | 0.082*   | 4.3        | 11.3       | 0.005*** | 41.1       | 43.1       | 0.6841   | 33.0       | 40.1       | 0.1195   | 81.9       | 96.0       | 0.000*** | 34.6          | 40.9        | 0.003*** |
| <b>Production, sales and income variables</b>   |             |            |          |            |            |          |            |            |          |            |            |          |            |            |          |               |             |          |
| Coffee area (ha)  | 1.17        | 0.98       | 0.174    | 1.27       | 0.94       | 0.011**  | 3.05       | 2.02       | 0.028**  | 3.58       | 3.51       | 0.808    | 2.70       | 2.56       | 0.311    | 2.40          | 2.06        | 0.006*** |
| Coffee production (kg green coffee)   | 281         | 568        | 0.000*** | 785        | 936        | 0.270    | 1,974      | 1,638      | 0.304    | 2,632      | 3,875      | 0.009*** | 1,813      | 2,408      | 0.000*** | 1,567         | 1,995       | 0.001*** |
| Coffee yields (kg green coffee harvested/ha)  | 303         | 555        | 0.000*** | 607        | 969        | 0.000*** | 795        | 864        | 0.219    | 744        | 1,133      | 0.000*** | 673        | 991        | 0.000*** | 642           | 930         | 0.000*** |
| Annual amount of coffee sold (kg green coffee sold/ha)  | 290         | 420        | 0.016**  | 801        | 934        | 0.057*   | 813        | 760        | 0.398    | 846        | 1,087      | 0.008*** | 778        | 969        | 0.000*** | 731           | 869         | 0.000*** |
| Value of annual coffee sales (US\$/ha)  | 1,033       | 1,464      | 0.022**  | 1,907      | 4,326      | 0.000*** | 2,218      | 6,943      | 0.004*** | 1,974      | 6,070      | 0.042**  | 2,558      | 4,308      | 0.003*** | 1,993         | 4,709       | 0.000*** |
| <b>Number of households</b>   | <b>174</b>  | <b>174</b> |          | <b>230</b> | <b>230</b> |          | <b>197</b> | <b>197</b> |          | <b>227</b> | <b>227</b> |          | <b>249</b> | <b>249</b> |          | <b>1077</b>   | <b>1077</b> |          |
| Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (*), 5% level (**) or 1% level (***) |             |            |          |            |            |          |            |            |          |            |            |          |            |            |          |               |             |          |
| LB=baseline; LI=midline   |             |            |          |            |            |          |            |            |          |            |            |          |            |            |          |               |             |          |

DISCLAIMER: The author's views expressed in this publication do not necessarily reflect the views of the United States Department of Agriculture or the United States Government.



**Figure A. Percentage of coffee farmers that implemented key agronomic practices at baseline (LB) and midline (LI)**

*\*Denotes statistical significance (10% level or higher) in observed differences*

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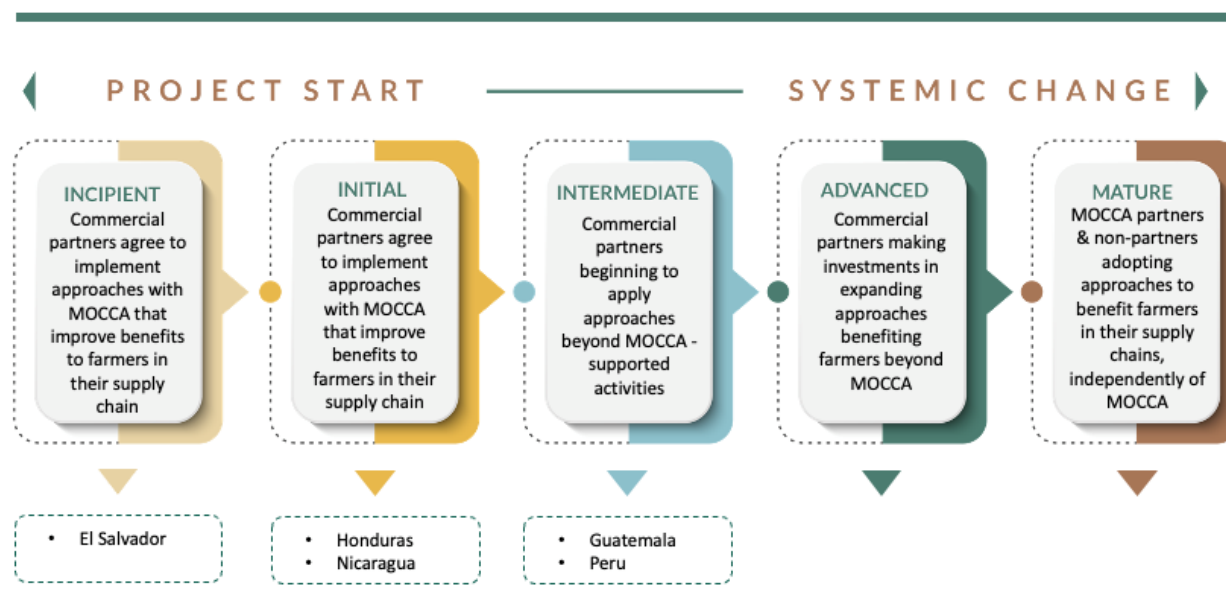
## *Activity 2: Market Linkages*

Inclusive Market Access as an activity has been strongly tied to Activity 1: Technical Assistance in MOCCA's agreements with partners, largely market system actors who purchase coffee from farmers or cooperatives. Under this activity, MOCCA prioritizes commercial benefits to farmers, but also seeks to improve other benefits offered to farmers as a part of commercial business models including access to more affordable financing and/or access to high quality genetic material for planting.

Most partners are currently in the initial phase of the MDF Pathway, indicating that they have begun to adopt approaches to improve benefits to farmers in their supply chain. Improved market access takes time. In the context of MOCCA, anchor firms are making changes to provide more favorable commercial terms, but farmers have existing (intermediary) buyers and other options, so progress is gradual. Still, important strides have already been made:

- **In Guatemala**, partners mention having established direct relationships with more farmers, two for the first time buying directly from farmers. Commercial partners mentioned improvements in quality, post-harvest practices, an increase in certifications, and the use of digital technology for purchase transactions.
- **In Peru** some partners applied new commercial approaches beyond what was agreed upon with MOCCA. One anchor firm, for example, reported replicating their quality improvement work with 6 cooperatives. Anchor firms reported an ability to procure larger volumes of better quality coffee as a result.
- **In Honduras**, three anchor firms have integrated hundreds of new farmers into their supply chain and are directly purchasing from them as part of their collaboration with MOCCA. These closer relationships help the anchor firm secure buyers. Some buyers are also offering or facilitating financing options for these farmers.
- **In Nicaragua**, new commercial approaches are making it easier for anchor firms to source from smallholder farmers, particularly as a result of combining technical assistance, financing and market access under a shared harvest model. One anchor firm expanded its Rainforest certification program to small-scale farmers for the first time (as opposed to solely working with medium and large-scale producers). This has involved negotiation with intermediaries such that they transfer the entirety of price premiums to farmers. Partners expect that these changes will endure beyond MOCCA, given the close relationships that have been established with these farmers.
- **El Salvador** has made the least progress in market access as anchor firms approached were unwilling or uninterested in making changes in their business models towards greater inclusion. However, MOCCA helped three cooperatives operate ecological wet mills received from the Salvadoran Coffee Council for the first time in the 2021-22 harvest. This will give them the capacity to process coffee themselves (lowering milling costs) and potentially direct market their coffee.

## Systemic change pathway summary for activity 2:



**At the farm level**, panel analysis results show that the amount of coffee sold was statistically higher at midline in all countries except Honduras, and the income from coffee sales was significantly higher in all countries, influenced by the yields increase and by the increase in coffee prices. Further, the data suggests that at midline, 42.6% of farmers sold coffee to a MOCCA anchor firm (up from 30% at baseline). The volume sold was quite small (accounted for roughly 6% of the total volume). This finding suggests that the project is making progress supporting closer relationships between buyers and farmers. Since farmers have existing (intermediary) buyers and other options, building trust with new buyers take time and may grow gradually in the remaining life of the project.

### Activity 3: Improved Research

MOCCA's research agenda in coffee has a major focus on varietal testing and breeding, building on MOCCA consortium member WCR's capacity in this area. MOCCA acted swiftly to engage the coffee institutes in the region, under PROMECAFE, to establish the Regional Plant Breeding Center, a collaboration between PROMECAFE member NCIs (including NCI's from countries outside of MOCCA's scope), and the breeding hub host, supported by MOCCA via WCR. Three NCIs competed to become the breeding hub host, and PROMECAFE members selected the Honduran Coffee Institute (IHCAFE). While the Project has made progress by successfully transferring 97 coffee accessions to the breeding hub, and developing the Hub's governance structure and bylaws, MOCCA claims that not all PROMECAFE members have been fully convinced that they should co-invest in the hub, which is important for its overall sustainability. MOCCA, together with PROMECAFE, is taking steps to address this issue.

In terms of the number of technologies in different phases of evaluation, the project to date has surpassed the target, via its work supporting variety and agronomic trials including On-farm trials in Nicaragua and Peru. The focus in the second half of the project might center on engaging additional institutions in each country and strengthening dissemination to farmers. Efforts underway to establish a fund to incentivize

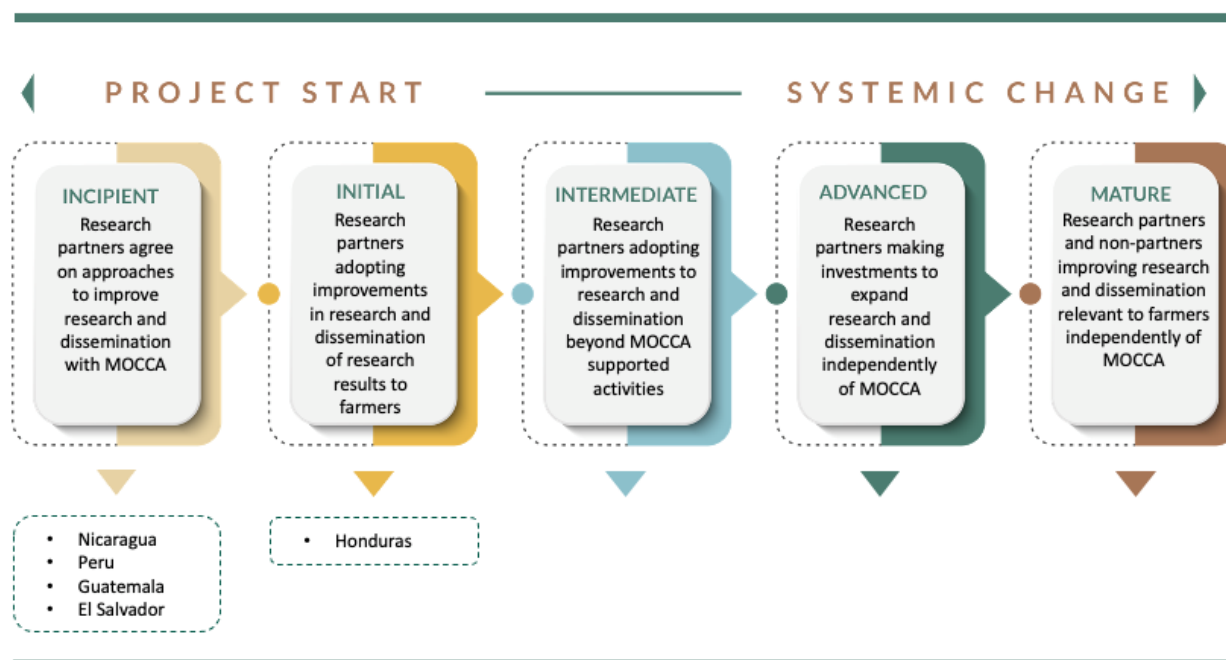


coffee research that is relevant for and reaches farmers will hopefully accelerate during the second half of the project to broaden engagement and results shared with farmers. Some of the reported challenges include that there are insufficient resources for research agendas and that findings need to be shared with farmers more systematically.

Even though there are few actors engaged in research in each country to date, there are key initiatives that will likely be sustainable beyond MOCCA:

- The **Regional Breeding Hub** will likely continue, as IHCAFE has the capacity to continue with this work. Ongoing trainings on the new technologies will continue to be necessary to make the process sustainable in the long term. Several other organizations are collaborating with the Breeding Hub, including CATIE and ANACAFE, however MOCCA should focus on convincing additional PROMECAFE members to commit to investments in long-term breeding research in coordination with the hub.
- **On farm trials**, currently being supported by MOCCA in Nicaragua and Peru, where private research partners invest in relevant research
- **International Multi-Location Variety Trials**, which were established prior to MOCCA, though WCR uses funds from MOCCA to analyze results. As these trials yield more data, their utility for country decision-makers around varieties to promote may generate support for the continuation of these trials.
- In **Honduras** (related to the Breeding Hub) and **Nicaragua** (related to the variety trials), research partners have agreed to implement improved research and dissemination approaches or have already begun to adopt improvements
- **WCR's work** with numerous partners will also continue to be relevant post MOCCA.

Systemic change pathway summary for activity 3:



**At the farm level**, we found the following evidence of change against baseline:

- Access to products of research improved, as receiving information about coffee research increased from 16.4% farmers having access at baseline to 35.4% at midline, and the most significant change happened in Peru and Guatemala. The primary source of this information was non-governmental organizations.
- Most of the surveyed farmers that received research information (92% out of the third of farmers accessing research) said they were able to use the information to make farming decisions, a considerable increase from baseline (88% out of 16% who said they had access to research findings at baseline).

#### *Activity 4. Strengthening Suppliers of Planting Material*

To date, MOCCA has implemented four interrelated activities to strengthen the supply of high-quality planting material for coffee. These include identifying sources of genetically pure seeds using DNA fingerprinting, support for larger nurseries to comply with WCR Verified standards, development and delivery of *Viverista de Oro* training for managers of smaller nurseries, and support for the development of national certification systems for coffee planting material (including regulations and mechanisms).

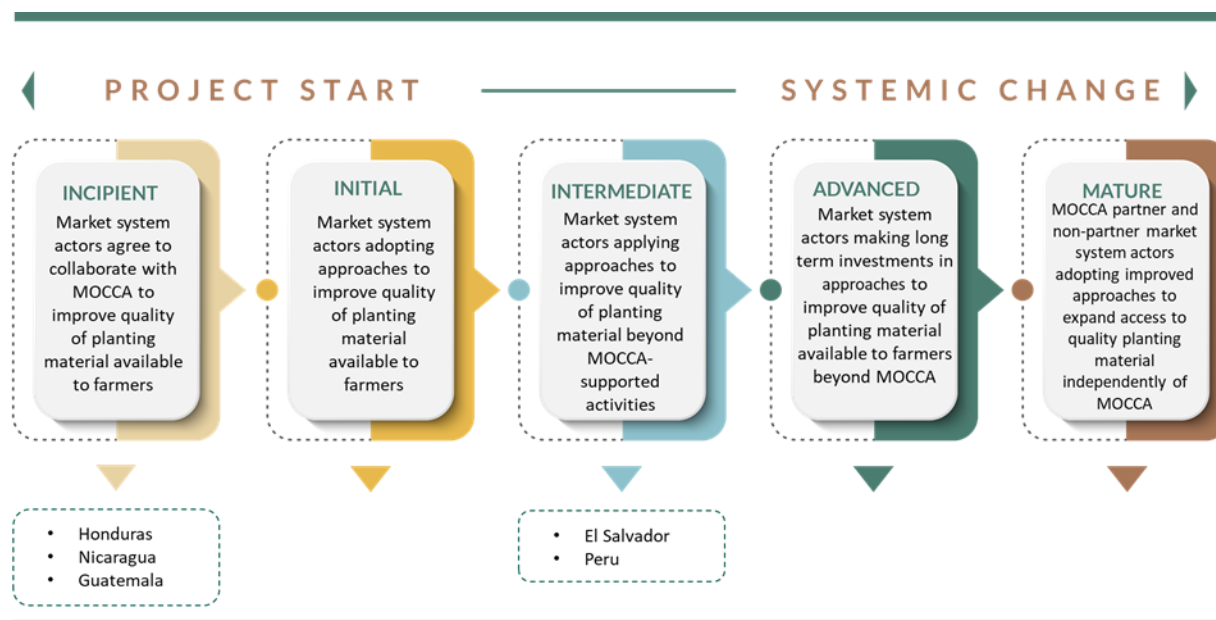
Out of the four activities described, MOCCA has made more progress with the first three, particularly on development and delivery of the training curriculum for nursery managers. WCR has led the work on genetically pure seed as well as the work with larger nurseries focused on building capacity towards meeting the *WCR-Verified* standard. Twenty commercial nurseries have been supported to date, of which 14 have been audited and five have received their certificates of verification. CATIE has complemented this work with a certificate course on nursery management for twenty-nine commercial nurseries. TechnoServe has led the work with smaller nurseries with over 558 nurseries in ongoing remote and in person training across all five countries. Since 2021, MOCCA has worked with PROMECAFE to engage member coffee institutes to lead the development of nursery certifications procedures for their country. SWOT analyses have been carried out in each country except Peru. El Salvador has advanced to the development of an action plan. Further support from MOCCA will be required to develop the regulatory framework in MOCCA countries for certified planting material for coffee that is accessible to small farmers.

A recurring concern shared by informants is that the sustainability of these initiatives will depend in large part on whether the changes end up being economically viable or not. Only 14 large nurseries have been audited for verification, and five *Verified* of the project target of 25. While smaller nurseries appreciate the training provided, resources to implement best practices remain a limitation from their point of view. In spite of the lingering challenges, most informants stated that they plan to continue working on improving the quality of genetic material in the sector:

In all Central American countries, market system actors including NCIs, Ministries of Agriculture, and plant health inspection services have participated in workshops to develop nursery certification requirements and mechanisms.

- **In Peru:**
  - Informants plan to carry forward the work with WCR on the identification of genetic profiles of coffee varieties in different parts of the country.
  - One large nursery was able to obtain WCR verification, for 150,000 plants of Marsellesa and Parainema varieties. This nursery imported seed from a WCR-verified nursery in Nicaragua.
- **In El Salvador:**
  - Two informants stated that their nurseries are now only interested in certified or verified seeds and genetic material, a preference that will purportedly continue post-MOCCA.
  - The IDB-funded project implemented by IICA and the Ministry of Agriculture, which plans on purchasing plants from nurseries, has decided to only purchase plants from high practice-adopting Nursery of Gold graduates recommended by MOCCA.
  - One large nursery obtained WCR Verification, for 50,300 plants of Bourbon and Sarchimor T5296 varieties, and two more have been audited with results to be revealed by July 2022
- **In Honduras,**
  - informants highlight improvements in the quality of plants produced in supported nurseries
  - two large nurseries, including IHCAFE's have been audited for WCR verification, with results pending.
- **In Guatemala:** 2 large nurseries obtained WCR Verification for 2,510,000 plants of H1 Centroamericano, Anacafe 14, and Marsellesa varieties, and 2 more have been verified with results pending.
- **In Nicaragua,**
  - work to identify genetically pure seedlots and the support for verification are appreciated by informants who also cite expanded client base including international clients as some of the results of MOCCA support for nurseries.
  - Important advances on registering new varieties, jumping from 11 in 2017 to 19 in 2022, an important step for certification which starts with registration of varieties in the country.
  - 1 large nursery has received WCR Verification for 1.5 million plants.

#### Systemic change pathway summary for activity 4:



#### Activity 5. Facilitating Access to Finance

The attempt to improve financial services for small-scale farmers has focused on trying to establish alliances with organizations that may be willing to finance the roughly 48,000 farmers MOCCA is working with in the region. This includes work to facilitate financing for farmers directly, for farmer organizations, and for anchor firms to invest in small farmers who supply them. MOCCA has signed agreements with fifteen financial institutions so as to improve access to finance for farmers. Ten of these partners have introduced changes in their products or services to better serve small-scale coffee farmers, including: reduced interest rates, shorter approval times; longer loan periods and adapted payment schedules.

As shared by MOCCA staff, one of the main achievements of the project to date is that over US \$25 million have been disbursed to 7,817 coffee farmers in the region; 49% of which has come from financial institutions in Guatemala, Nicaragua and Peru and 51% stemmed from anchor firms. Four financial institutions have granted financing for coffee farmers in MOCCA countries: two in Peru, one in Guatemala and one in Nicaragua.

MOCCA has also supported anchor firms in relation to the financial services they offer to the farmers they purchase coffee from. At least eight anchor firms, two each in Guatemala, Honduras, Nicaragua and Peru, have been directly engaged in providing or facilitating access to finance for farmers in their supply chains. Moving forward, MOCCA is hoping to continue collaborating with state banks in Peru, Ecuador and El Salvador to open additional credit opportunities for coffee farmers.

Informants in all countries revealed that some of the major challenges in relation to improving access to financial services include that many farmers are hesitant to request loans, in part because of the uncertainty generated by the Covid-19 pandemic, while many financial institutions are similarly unwilling to widen their credit offerings to farmers in times of crisis.

MOCCA's work is gradually contributing to changing business logics in relation to financing access for coffee farmers in three major ways:

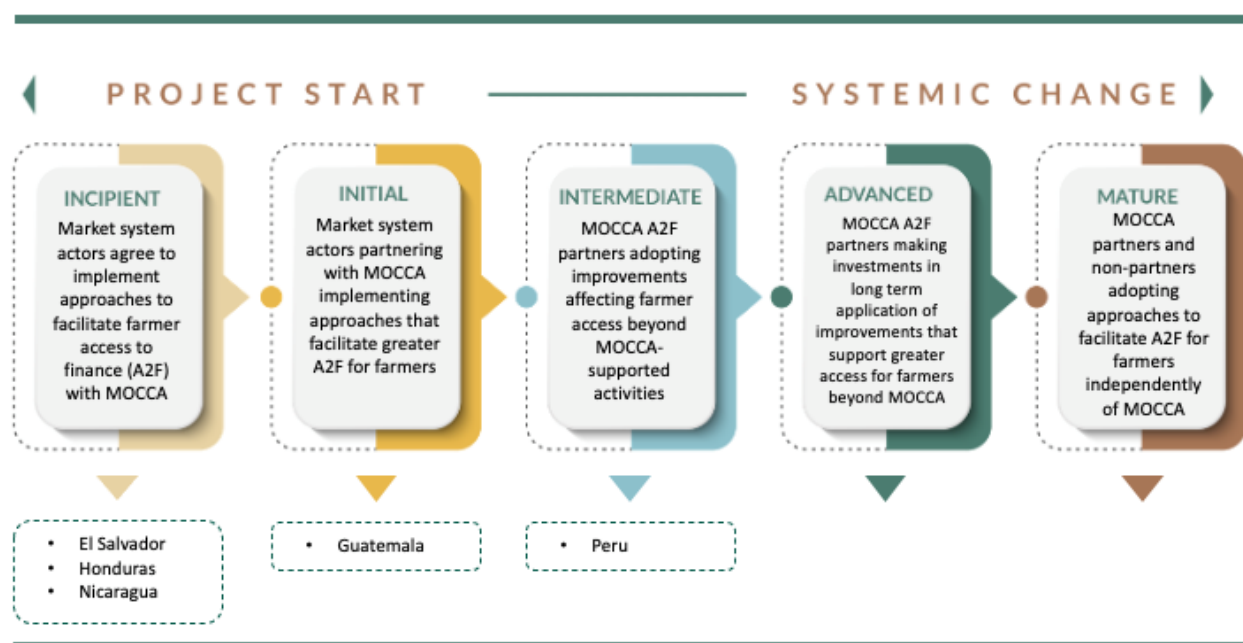
1. New financial products for MOCCA coffee farmers;
2. Changes in the models of both financial institutions and anchor firms for granting credit;
3. Improved credit conditions for farmers.

MOCCA's work with Agrobanco and MIDAGRI in **Peru** has been especially fruitful. MOCCA supported Agrobanco in the design and implementation of a model that uses financial advisors (*promotores financieros*) to provide advice and support to farmers directly on how to request credit for R&R. They work directly with farmer organizations as well.

In **Guatemala**, a financial institution added a new financial product specifically designed for coffee farmers with an interest rate ten percentage points lower than what was available before.

Despite the difficulty of opening up new financial opportunities for small-scale coffee farmers and the fact that there is much to be done in all MOCCA countries still, there is some evidence of progress towards systemic change, especially in Peru and Guatemala since partners in these countries are replicating their activities beyond MOCCA's target group, and plan to continue offering the newly created or modified financial services.

Systemic change pathway summary for activity 5:



**At the farm level**, data from the surveys with farmers revealed that few requested and obtained a loan (only 23.3% against roughly 27% at baseline), which may suggest that demand from farmers may be lower than originally thought, especially with the Pandemic. The only exception is in Nicaragua, where the percentage was higher than in all other countries (54.2% requested a loan), but lower than the baseline value (of 67%). Among farmers obtaining a loan at midline, only 3.3% of all farmers in the sample reported

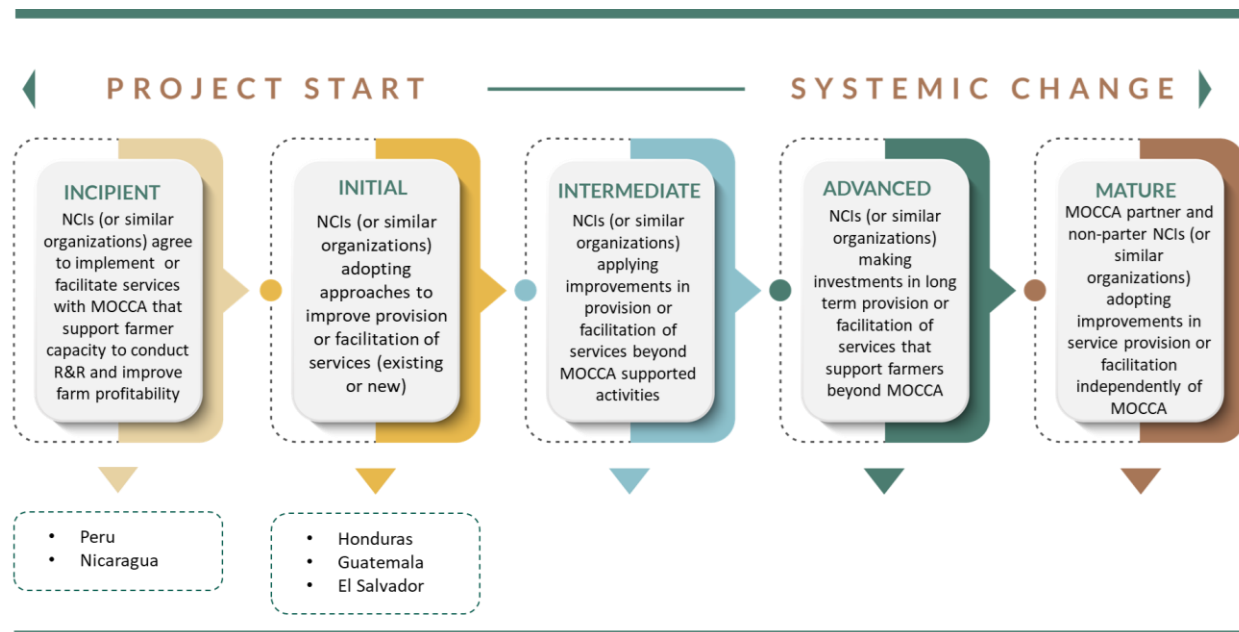
a MOCCA anchor firm as the source of this loan. Of farmers willing to provide additional information on the loans they obtained, we found that 87.5% (equivalent to 15% of all farmers) used the loan in the coffee crop, (equivalent to 10.2% of the complete sample of farmers), especially to purchase inputs for coffee (58.7% at midline).

#### *Activity 6. Supporting Trade Association Service Provision*

By strengthening national commodity institutes and trade associations, MOCCA hopes to contribute to long term institutional arrangements that ensure small farmers are represented and served by the sector. MOCCA's approach to strengthening NCIs includes strengthening their capacity to provide or facilitate support services for R&R, in addition to strengthening their capacity for coordination within the sector. Among the incentives MOCCA provided to actors in the sector are:

- **In Guatemala and Honduras**, where national coffee institutes are well established, MOCCA developed agreements with those entities to strengthen their role in promoting research and strengthening genetic material distribution systems, as well as to improve their capacity for technical assistance to farmers and to support access to high value markets. In the case of Guatemala, MOCCA provided support to reactivate training through radio programs.
- **In Honduras**, From the point of view of IHCAFE, the establishment of the Breeding Hub with MOCCA's support has been an especially helpful initiative that will make plant breeding techniques more modern and efficient. The hope is that it will allow for the release of new and improved varieties more quickly. IHCAFE has also been crucial for the development of a plan for nursery certification procedures. To the extent that MOCCA can convince other PROMECAFE-member NCIs to collaborate with and support the breeding hub, this effort can help more countries expedite breeding efforts.
- **In El Salvador**, MOCCA worked to support the emergent Consejo Salvadoreño del Café to further develop a proposal for a national coffee institute for El Salvador, ensuring its design incorporates lessons learned from other countries and ensures small coffee farmers are adequately served.
- **In Peru**, MOCCA collaborates with a multi-stakeholder working group that brings together private actors and public institutions interested in coffee related issues. Still, the hope of strengthening an NCI there hasn't made much progress so far and there isn't a consolidated NCI that is the obvious candidate to work with.

## Systemic change pathway summary for activity 6:

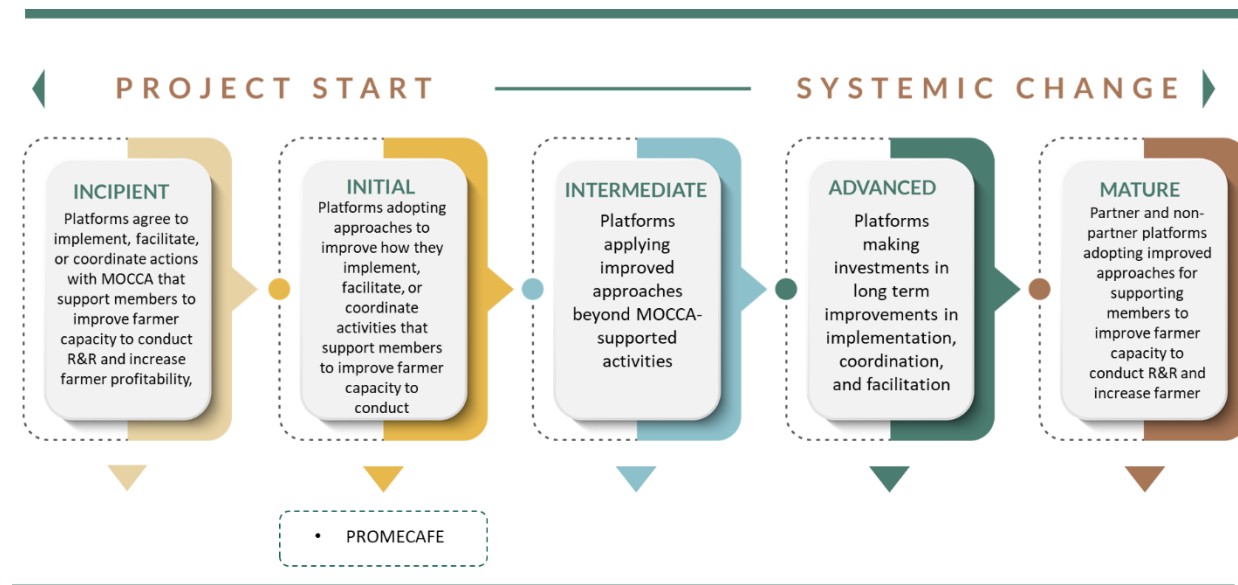


### Activity 7. Bolster Platforms

PROMECAFE is the regional platform relevant for the coffee sector in MOCCA countries. The objectives in relation to this activity are relatively disperse. In practice, the work so far has centered on the establishment of the breeding hub, and more recently including work on national regulations for genetic materials and the administration of small grants for research and dissemination. These latter two activities, while promising, have yet to show concrete results in terms of improved regulatory frameworks for genetic material and achieving broader engagement of research actors in support of R&R and dissemination of research to farmers. We anticipate MOCCA will focus on these in the second half of project implementation.



## Systemic change pathway summary for activity 7:



## Major findings - Cacao

**At the market systems level** in the cacao sector, MOCCA partners with 114 market system actors to increase access or improve the quality of services provided to cacao smallholder farmers.

| Actor Type                         | Ecuador   | El Salvador | Guatemala | Honduras  | Nicaragua | Peru      | Regional | Total      |
|------------------------------------|-----------|-------------|-----------|-----------|-----------|-----------|----------|------------|
| Exporters                          | 4         |             | 1         |           |           | 2         |          | 5          |
| Chocolatier/<br>Importer           | 2         |             | 1         |           |           |           |          | 2          |
| Producer<br>organizations          | 6         | 3           | 7         | 14        | 7         | 21        |          | 47         |
| Research<br>Institutions           | 2         | 1           | 2         | 1         | 1         | 3         | 3        | 10         |
| Financial<br>Institutions          | 6         |             |           |           |           | 2         |          | 9          |
| NCIs and<br>public<br>institutions | 2         | 1           | 2         | 2         | 2         | 2         | 1        | 6          |
| NGOs/<br>Projects                  | 1         | 5           | 1         | 1         | 2         | 2         | 1        | 6          |
| Others                             |           |             |           |           |           |           |          |            |
| <b>Total</b>                       | <b>23</b> | <b>10</b>   | <b>14</b> | <b>18</b> | <b>12</b> | <b>32</b> | <b>5</b> | <b>114</b> |

### Activity 1. Farmer Training

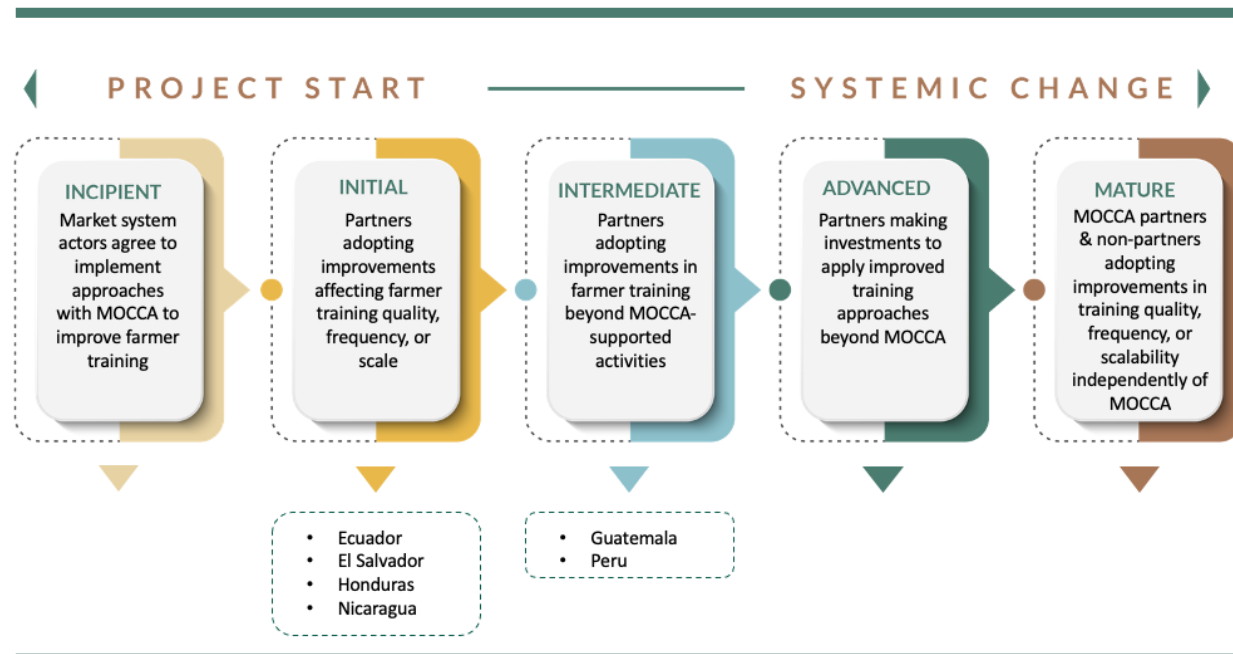
Technical assistance in cacao under MOCCA is carried out largely in coordination with farmer organizations, followed by exporters and NGOs, with research organizations supporting content development and training of technical assistance providers, including technicians and community

extension workers. The overall strategy for technical assistance is based on strengthening the capacity of technicians and community extension agents (including women and sons and daughters of farmers) to serve farmers. This is done through formal training in cacao through a Cacao Diploma course developed by CATIE and carried out in five MOCCA countries with six national partners, training 154 participants; as well as through a suite of mobile enabled information, training and extension tools called Cacao Móvil. MOCCA made significant investments in updating the content of Cacao Móvil resources to include recent research results, and in expanding the content to include more topics related to R and R as well as cadmium.

Most informants suggested that there's been important progress in relation to technical assistance thanks to MOCCA's work in the cacao sector, reaching 22,603 farmers to date.

- **In All countries** partners highlighted that technical assistance content is more updated, particularly vis a vis cadmium, and delivered in a more systematic way. Informants from five of the six countries indicated that R&R is highly prioritized in MOCCA's cacao curriculum.
- **In Ecuador**, partner organizations incorporated new content into their training curriculum, particularly cadmium management and R&R and cited the use of mobile technology as helping obtain information more quickly.
- **In El Salvador**, trainings became more continuous, frequent and better programmed. The training curriculum was expanded to include additional topics related to crop management.
- **In Honduras**, extension workers incorporated the use of *Cacao Movil* in their trainings.
- **In Nicaragua**, technical assistance was offered more regularly; more themes are now covered. The organizations are working with more youth and are reaching more farmers; some partners carrying out technical assistance for the first time
- **In Guatemala**, informants highlighted improved technical capacity of TA providers and applied training in demo plots. There was also a focus on post-harvest techniques for quality improvement.
- **In Peru**, partners are using new and updated knowledge with increased focus on agroforestry. They also expressed that closer relationships between anchor firms and farmers are developing.
- **In Guatemala and Peru**, all informants indicated that they were incorporating MOCCA-supported content and tools for TA into services for non-MOCCA farmers, supported by new partnerships developed under MOCCA, and that it was highly likely that improved technical assistance approaches would continue beyond MOCCA.

## Systemic change pathway summary for activity 1:



Some of the major challenges cited by informants in relation to technical assistance include: the lack of financing for farmers to implement R&R and to purchase inputs and tools; a relatively small technical assistance team; farmers that are reticent to implement R&R; many remote farms that are difficult to reach; and concern for how to continue funding TA after project end.

**At the farm level**, the survey asked farmers about their perception on training usefulness for improving their farm management. We found that 65.4% of farmers reported MOCCA trainings have been very useful, standing out Ecuador (70.1%) and El Salvador (78.9%). In Honduras, Guatemala and Peru, all farmers ranked the training as very useful or useful. The lowest perception of utility is in Nicaragua (45.3%), although 50.7% of the farmer in this country considered the training useful.

### Agronomy best practice results

**At the farmer level**, we next discuss statistically significant differences between baseline and midline mean values, from the panel data analysis which we show in the table below and illustrate (key results) in Figure B, and also simple mean comparison for some indicators.

On average, we found that over 70% of cacao farmers implemented up to 3 new agronomy practices recommended by MOCCA. It is worth mentioning that we also found that many farmers also seem to have stopped the implementation of some practices (e.g., they fertilized at a lower scale or did not implement renovation). These findings suggest that the input cost increases may have influenced farmers' decisions on what kind of nutrition practices they were able to implement. Also, since many plantations are younger than expected, farmers' may have not conducted renovation since it was not needed for their farms. For these reasons, in the adoption analysis for all practices combined, using descriptive (panel data) statistics, we only counted farmers who had implemented new practices they did not implement at baseline and

excluded from the analysis whether farmers did not conduct an agronomy practice that they used to implement at baseline (i.e., disadoption).

Among the major findings we found:

### ***Renovation and Rehabilitation***

- **Regarding grafting**, the share of farmers doing this in all countries was almost the same as at baseline (14.4% at baseline vs. 12.8%) which suggest that this practice may need reinforcement in the field.
- **Regarding renovation**, only in Peru and for all countries combined the adoption rates decreased (with statistical significance). Similar to coffee, this finding may be explained by the fact that plantations are younger than expected and renovation may not yet be as needed as initially thought.
- **Regarding rehabilitation, also only in Peru**, we found that, at midline, a higher share of farmers did four of the seven types of pruning methods evaluated. In the rest of the countries, the differences in the rate of adoption of rehabilitation practices were not statistically significant.
- When we disaggregate **rehabilitation** rates by type of pruning, we observe differences across countries and types of pruning: **in Ecuador** we observed an increase (from the baseline) in the share of farmers implementing all types of pruning except for rehabilitation pruning. In **El Salvador**, we observed an increase in the share of farmers doing pruning of height, but a decrease in the ones pruning misplaced branches.
- **In Guatemala and Honduras**, we observed an increase in farmers pruning buds, and a decrease in the share of farmers doing pruning of height. **In Nicaragua** we observed a decrease in the share of farmers pruning lateral branches and pruning misplaced branches at midline. Further qualitative research may be needed to fully understand why farmers adopted only certain types of pruning (different from Peru, where farmers seem to have adopted different types of pruning techniques).

### ***Fertilization***

- **In Ecuador, Guatemala and Honduras**, the panel analysis shows decrease in the number of farmers fertilizing based on nutritional deficiencies whereas **in Peru and El Salvador**, more farmers are fertilizing based on soil analysis.

### ***Soil conservation***

- **In Ecuador and Peru**, the panel analysis shows decrease or no change in the adoption of conducting soil conservation practices (e.g. using organic waste to cover cacao spaces between rows) where as in **El Salvador, Guatemala, Honduras and Nicaragua** some of these practices increased (results with statistical significance).

### ***Pest and disease management***

- **In Ecuador and Guatemala**, the panel analysis suggests a decrease in the share of farmers implementing pests and disease monitoring systems whereas in **Honduras and Peru** this seems

to have increased (with statistical significance). In Nicaragua and El Salvador, differences between baseline and midline did not show statistical significance.

- In **Nicaragua**, we also observed a decrease at midline in the share of farmers using at least one method to control pests (probably due to a reported lower incidence of pests) whereas in El Salvador this increased. In the rest of the countries, we did not find other changes with statistical significance.
- In the case of changes regarding the share of farmers using at least one method to control diseases, we did not find statistical significance for any country.

### ***Quality and certifications***

- **Harvest practices** seem to be adopted, especially selective cacao harvesting, which increased from 71.7% at baseline to 89.5% at midline. Data reveals that 77.4% of the farmers can identify at least three physical characteristics that affect cacao quality, an increase from the 57.2% who reported this at baseline; and knowing this at midline was more common in Honduras (82.1%) and less common in Guatemala (41.3%).
- **Regarding the share of farmers with farm certification**, data suggests that it increased in Honduras and Peru (with statistical significance). We did not find significant changes in the rest of the countries.

Besides the adoption of agronomy practices, we also assessed statistical differences regarding the key indicators in MOCCA: yields and coffee farm size. Only the cacao yields (mostly driven by El Salvador and Peru) was statistically significantly higher at midline. Although for all other indicators the differences were not statistically significant for the combined (all countries) analysis, we observed significant differences in some countries. The reported cacao area was significantly lower at midline only for Nicaragua. In contrast, the total production was significantly higher at midline in Peru and significantly lower in Honduras. More qualitative research may be needed to fully understand if the decrease in the cacao area in Nicaragua and the lower production in Honduras may have been influenced by the ETA and IOTA Hurricanes occurred between October and November 2020.

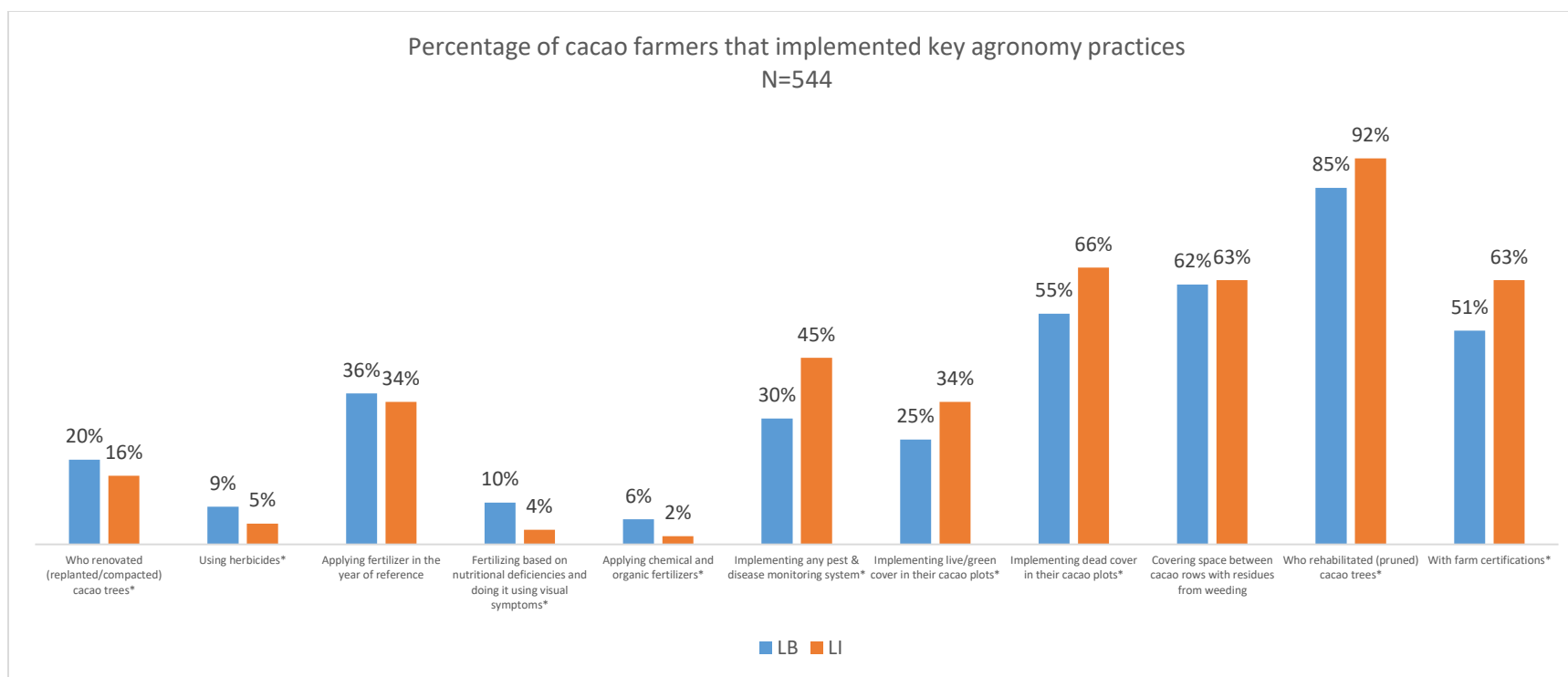
## Panel data analysis results of key cacao indicators

| Farmers (%)   | Ecuador    |            |           | El Salvador |           |           | Guatemala |           |           | Honduras  |           |           | Nicaragua |           |           | Peru       |            |           | All countries |            |           |
|---|------------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|-----------|---------------|------------|-----------|
|   | LB         | LI         | p-value   | LB          | LI        | p-value   | LB        | LI        | p-value   | LB        | LI        | p-value   | LB        | LI        | p-value   | LB         | LI         | p-value   | LB            | LI         | p-value   |
| Farmers (%) who renovated (replanted/compacted) cacao trees   | 13.7       | 16.7       | 0.5607    | 9.6         | 5.8       | 0.4666    | 13.0      | 10.9      | 0.7512    | 25.0      | 23.2      | 0.8271    | 18.7      | 18.7      | 1         | 26.8       | 17.4       | 0.0194**  | 20.2          | 16.4       | 0.0998*   |
| Farmers (%) who rehabilitated (pruned) cacao trees, and of these, % doing:  | 69.6       | 74.5       | 0.4378    | 88.5        | 96.2      | 0.1438    | 93.5      | 93.5      | 1         | 96.4      | 100       | 0.1563    | 88.0      | 86.7      | 0.8076    | 85.9       | 98.6       | 0.0000*** | 85.1          | 91.9       | 0.0004*** |
| Of buds (chupones)  | 69.6       | 83.9       | 0.055*    | 92.3        | 89.8      | 0.688     | 93.0      | 100.0     | 0.079*    | 92.59     | 100       | 0.038**   | 87.9      | 92.3      | 0.4005    | 72.9       | 77.6       | 0.2837    | 78.9          | 86.2       | 0.004***  |
| Of fake stems (tallos falsos)   | 17.4       | 37.1       | 0.011**   | 7.7         | 14.3      | 0.3386    | 46.5      | 41.9      | 0.6685    | 35.19     | 33.93     | 0.891     | 22.7      | 21.5      | 0.8711    | 37.0       | 65.7       | 0.000***  | 29.4          | 45.2       | 0.000***  |
| Of lateral branches (ramas laterales)   | 33.3       | 56.5       | 0.008**   | 61.5        | 55.1      | 0.5488    | 32.6      | 34.9      | 0.8221    | 81.48     | 80.36     | 0.882     | 74.2      | 50.8      | 0.005**   | 61.3       | 82.9       | 0.000***  | 55.5          | 67.8       | 0.000***  |
| Of dead branches (ramas muertas)  | 33.3       | 58.1       | 0.004**   | 53.8        | 42.9      | 0.3108    | 37.2      | 27.9      | 0.3632    | 48.15     | 32.14     | 0.088*    | 48.5      | 38.5      | 0.2506    | 50.8       | 66.2       | 0.002**   | 46.2          | 51.8       | 0.1027    |
| Of misplaced branches (ramas mal colocadas)   | 33.3       | 62.9       | 0.000***  | 43.6        | 18.4      | 0.001***  | 37.2      | 30.2      | 0.4996    | 51.85     | 35.71     | 0.090*    | 63.6      | 46.2      | 0.045**   | 40.3       | 57.6       | 0.000***  | 43.0          | 47.8       | 0.1486    |
| Rehabilitation  | 14.5       | 17.7       | 0.616     | 10.3        | 6.1       | 0.4822    | 7.0       | 4.7       | 0.6496    | 24.07     | 26.79     | 0.747     | 10.6      | 9.2       | 0.7943    | 27.6       | 21.0       | 0.1243    | 18.6          | 16.7       | 0.4627    |
| Of height (de altura)   | 29.0       | 51.6       | 0.008**   | 15.4        | 51.0      | 0.000***  | 58.1      | 18.6      | 0.000***  | 62.96     | 28.57     | 0.0002*** | 36.4      | 36.9      | 0.9475    | 55.2       | 50.0       | 0.3013    | 44.0          | 43.3       | 0.8417    |
| Implementing dead cover in their cacao plots  | 32.4       | 32.4       | 1.0000    | 55.8        | 92.3      | 0.0000*** | 41.3      | 73.9      | 0.0013*** | 71.4      | 94.6      | 0.0009*** | 24.0      | 56.0      | 0.0000*** | 76.1       | 69.5       | 0.1282    | 55.3          | 65.8       | 0.0004*** |
| Implementing live/green cover in their cacao plots  | 8.8        | 10.8       | 0.6397    | 7.7         | 21.2      | 0.0514*   | 13.0      | 93.5      | 0.0000*** | 42.9      | 51.8      | 0.3485    | 22.7      | 20.0      | 0.6926    | 35.7       | 36.2       | 0.9198    | 25.0          | 34.2       | 0.0009*** |
| Covering space between cacao rows with residues from weeding  | 70.6       | 57.8       | 0.058*    | 61.5        | 92.3      | 0.0001*** | 82.6      | 80.4      | 0.7910    | 78.6      | 73.2      | 0.5119    | 30.7      | 62.7      | 0.0001*** | 61.0       | 52.6       | 0.0786*   | 62.3          | 63.2       | 0.7541    |
| Using herbicides  | 14.7       | 6.9        | 0.0716    | 5.8         | 1.9       | 0.3125    | 0.0       | 0.0       | n.a       | 0.0       | 0.0       | n.a       | 6.7       | 4.0       | 0.4707    | 11.7       | 8.5        | 0.2613    | 8.8           | 5.3        | 0.0247**  |
| Applying fertilizer in the year of reference  | 23.5       | 23.5       | 0.7391    | 86.5        | 76.9      | 0.2083    | 26.1      | 39.1      | 0.1860    | 16.1      | 19.6      | 0.6254    | 20.0      | 33.3      | 0.0656*   | 43.7       | 32.4       | 0.0166**  | 36.4          | 34.0       | 0.4097    |
| Fertilizing based on nutritional deficiencies   | 20.6       | 7.8        | 0.0090*** | 23.1        | 26.9      | 0.6544    | 13.0      | 2.2       | 0.0500*   | 7.1       | 0.0       | 0.0421**  | 4.0       | 4.0       | 1.0000    | 11.3       | 9.9        | 0.6372    | 12.9          | 8.6        | 0.0244**  |
| Fertilizing based on nutritional deficiencies and doing it using visual symptoms  | 17.6       | 1.0        | 0.000***  | 23.1        | 11.5      | 0.1222    | 2.2       | 2.2       | 1.0000    | 3.6       | 0.0       | 0.1563    | 4.0       | 4.0       | 1.0000    | 9.4        | 3.8        | 0.0189**  | 10.3          | 3.5        | 0.0000*** |
| Fertilizing based on nutritional deficiencies and doing it using soil analyses  | 3.9        | 6.9        | 0.3549    | 1.9         | 17.3      | 0.0075*** | 10.9      | 0.0       | 0.0214**  | 3.6       | 0.0       | 0.1563    | 0.0       | 0.0       | n.a       | 1.9        | 6.1        | 0.0259**  | 2.9           | 5.3        | 0.0478**  |
| <b>Number of households</b>   | <b>102</b> | <b>102</b> |           | <b>52</b>   | <b>52</b> |           | <b>46</b> | <b>46</b> |           | <b>56</b> | <b>56</b> |           | <b>75</b> | <b>75</b> |           | <b>213</b> | <b>213</b> |           | <b>544</b>    | <b>544</b> |           |
| Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (*), 5% level (**) or 1% level (***) |            |            |           |             |           |           |           |           |           |           |           |           |           |           |           |            |            |           |               |            |           |
| LB=baseline; LI=midline   |            |            |           |             |           |           |           |           |           |           |           |           |           |           |           |            |            |           |               |            |           |



Panel data analysis results of key cacao indicators (continued)

| Farmers (%)   | Ecuador    |            |           | El Salvador |           |           | Guatemala |           |           | Honduras  |           |           | Nicaragua |           |          | Peru       |            |           | All countries |            |           |
|---|------------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|------------|------------|-----------|---------------|------------|-----------|
|   | LB         | LI         | p-value   | LB          | LI        | p-value   | LB        | LI        | p-value   | LB        | LI        | p-value   | LB        | LI        | p-value  | LB         | LI         | p-value   | LB            | LI         | p-value   |
| Fertilizing the full amount required  | 14.7       | 15.7       | 0.8463    | 69.2        | 63.5      | 0.5382    | 0.0       | 0.0       | n.a       | 3.6       | 0.0       | 0.1563    | 5.3       | 16.0      | 0.0345** | 22.5       | 15.0       | 0.0473**  | 19.3          | 17.1       | 0.3462    |
| Applying only chemical fertilizers  | 14.7       | 20.6       | 0.2727    | 50.0        | 71.2      | 0.0273**  | 0.0       | 0.0       | n.a       | 3.6       | 0.0       | 0.1563    | 18.7      | 22.7      | 0.5483   | 19.7       | 17.8       | 0.6207    | 18.2          | 20.8       | 0.2843    |
| Applying only organic fertilizers   | 1.0        | 1.0        | 1.0000    | 9.6         | 9.6       | 0.7304    | 26.1      | 0.0       | 0.0001*** | 10.7      | 19.6      | 0.1912    | 1.3       | 2.7       | 0.5628   | 18.8       | 18.8       | 1.0000    | 11.8          | 10.8       | 0.6325    |
| Applying chemical and organic fertilizers   | 7.8        | 0.0        | 0.0038*** | 28.8        | 3.8       | 0.0004*** | 0.0       | 0.0       | n.a       | 1.8       | 0.0       | 0.3195    | 0.0       | 0.0       | n.a      | 5.2        | 4.2        | 0.6478    | 6.4           | 2.0        | 0.0003*** |
| Implementing any pest & disease monitoring system   | 12.7       | 2.0        | 0.0056*** | 13.5        | 23.1      | 0.3454    | 21.7      | 0.0       | 0.0006*** | 26.8      | 50.0      | 0.0795*   | 41.3      | 45.3      | 0.7237   | 41.3       | 77.9       | 0.0000*** | 30.1          | 44.5       | 0.0005*** |
| Reporting insect pests affected their crop  | 2.0        | 3.9        | 0.4097    | 21.2        | 21.2      | 1.0000    | 13.0      | 0.0       | 0.0110    | 0.0       | 0.0       | n.a       | 13.3      | 4.0       | 0.0425** | 23.9       | 21.6       | 0.5645    | 14.7          | 11.8       | 0.1526    |
| Using 1 method for each pest identified   | 1.0        | 3.9        | 0.1760    | 3.8         | 13.5      | 0.0826*   | 2.2       | 0.0       | 0.3200    | 0.0       | 0.0       | n.a       | 6.7       | 1.3       | 0.0968*  | 17.8       | 15.5       | 0.5168    | 8.6           | 8.3        | 0.8277    |
| Reporting diseases affected their crop  | 96.1       | 100.0      | 0.0436**  | 36.5        | 42.3      | 0.5517    | 84.8      | 100.0     | 0.0055*** | 76.8      | 83.9      | 0.3459    | 90.7      | 90.7      | 1.0000   | 92.5       | 93.4       | 0.7057    | 85.3          | 89.0       | 0.0703*   |
| Using 1 method for each disease identified  | 1.0        | 3.9        | 0.1760    | 3.8         | 9.6       | 0.2445    | 2.2       | 0.0       | 0.3200    | 0.0       | 0.0       | n.a       | 5.3       | 1.3       | 0.1747   | 17.4       | 15.0       | 0.5120    | 8.3           | 7.7        | 0.7377    |
| With farm certifications  | 82.4       | 86.3       | 0.4437    | 0.0         | 0.0       | n.a       | 82.6      | 82.6      | 1.0000    | 60.7      | 83.9      | 0.0057*** | 62.7      | 64.0      | 0.8666   | 35.2       | 56.3       | 0.0000*** | 51.1          | 62.7       | 0.0001*** |
| <b>Number of households</b>   | <b>102</b> | <b>102</b> |           | <b>52</b>   | <b>52</b> |           | <b>46</b> | <b>46</b> |           | <b>56</b> | <b>56</b> |           | <b>75</b> | <b>75</b> |          | <b>213</b> | <b>213</b> |           | <b>544</b>    | <b>544</b> |           |
| <b>Production, sales and income variables</b>   |            |            |           |             |           |           |           |           |           |           |           |           |           |           |          |            |            |           |               |            |           |
| Cacao area (ha)   | 3.03       | 3.36       | 0.5447    | 1.27        | 0.96      | 0.2780    | 1.06      | 1.02      | 0.8772    | 1.53      | 1.62      | 0.6924    | 2.57      | 1.65      | 0.0289** | 2.40       | 2.14       | 0.5893    | 2.23          | 2.03       | 0.3954    |
| Cacao production (kg dry)   | 1,092      | 887        | 0.3686    | 120         | 122       | 0.9745    | 433       | 351       | 0.4665    | 308       | 213       | 0.0734*   | 803       | 436       | 0.1318   | 799        | 1,214      | 0.0014*** | 756           | 821        | 0.4379    |
| Cacao yields (kg dry/ha)  | 337        | 298        | 0.5229    | 64          | 128       | 0.0753*   | 420       | 511       | 0.3089    | 201       | 150       | 0.0897*   | 338       | 267       | 0.5253   | 352        | 565        | 0.000***  | 329           | 409        | 0.0059*** |
| Annual amount of cacao sold (kg dry/ha)   | 346        | 349        | 0.9731    | 27          | 110       | 0.0057*** | 454       | 463       | 0.9242    | 229       | 141       | 0.005***  | 354       | 277       | 0.5229   | 440        | 565        | 0.0062*** | 375           | 417        | 0.2199    |
| Value of annual cacao sales (US\$/ha)   | 838        | 580        | 0.0021*** | 60          | 505       | 0.000***  | 506       | 1,031     | 0.0059*** | 243       | 242       | 0.9958    | 364       | 500       | 0.0225** | 993        | 1,160      | 0.3658    | 673           | 795        | 0.1261    |
| <b>Number of households</b>   | <b>99</b>  | <b>99</b>  |           | <b>51</b>   | <b>51</b> |           | <b>44</b> | <b>44</b> |           | <b>46</b> | <b>46</b> |           | <b>75</b> | <b>75</b> |          | <b>213</b> | <b>213</b> |           | <b>528</b>    | <b>528</b> |           |
| Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (*), 5% level (**) or 1% level (***) |            |            |           |             |           |           |           |           |           |           |           |           |           |           |          |            |            |           |               |            |           |
| LB=baseline; LI=midline   |            |            |           |             |           |           |           |           |           |           |           |           |           |           |          |            |            |           |               |            |           |



**Figure B. Percentage of cacao farmers that implemented key agronomic practices at baseline (LB) and midline (LI)**

*\*Denotes statistical significance (10% level or higher) in observed differences*

## *Activity 2: Market Linkages*

Market access for MOCCA in cacao is focused on improving opportunities and returns to farmers from participation in global specialty, fine and flavor cacao markets. A first component works to strengthen the relationships between cacao farmers, their cooperatives and their buyers, through quality price differentials, and access to supporting services (e.g. technical assistance, finance, and/or genetic material). A second component aims to improve shared understanding among farmers and their buyers around cacao quality. Activities in this component include supporting the development of global harmonized cacao quality assessment protocols for Latin America, capacity building for cacao quality evaluation, post-harvest management for flavor differentiation, and supporting participation in national and international cacao quality competitions.

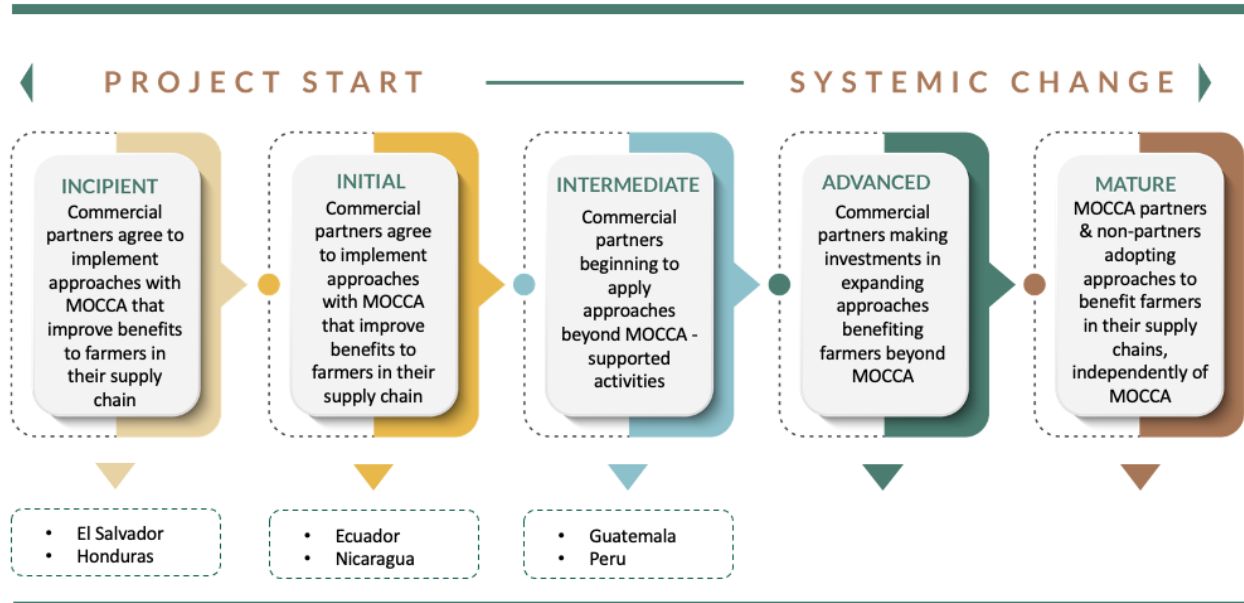
Informants highlight that with MOCCA's support they have introduced changes in how quality is managed post-harvest as well as how it is used to establish commercial relationships. Major changes cited include:

- **In Ecuador** informants mention improvements in post-harvest practices, particularly fermentation protocols, leading to new clients. They also mention more direct buying relationships (without intermediaries) and greater use of quality as the basis for commercial agreements.
- **In El Salvador**, price differentials based on quality are now used in some transactions and infrastructure for processing cacao has improved.
- **In Guatemala**, collaboration with buyers for purchasing wet cacao of better quality and consistency as well as support for positioning of cacao for export markets. Informants also cite more transparent and fair pricing as important improvements in their commercial relationships under MOCCA.
- **In Honduras**, informants commented that market access and improved quality was not prioritized, mostly because many MOCCA farmers already have a relationship with one large exporter with established quality protocols.
- **In Nicaragua**, the Flavor Map developed by MOCCA has opened new market opportunities with international buyers. MOCCA has also supported improvements in post-harvest and certifications processes.
- **In Peru**, one anchor firm mentioned that is now purchasing better quality product. Informants also cited more stable and loyal client relationships.

### **Across all countries,**

- of 21 cacao buyers interviewed, all are now providing technical assistance as part of their business model and more than 60% are also facilitating access to other services including quality genetic material and access to finance.
- 22 different specialty chocolate makers have purchased 36,616kgs of cacao of 14 distinct cacao flavor profiles from 11 different cacao producers as a result of MOCCA's support under the Cacao Flavor Map
- All informants except one commented that they plan on continuing directly purchasing cacao from farmers and supporting improved quality initiatives beyond MOCCA.

## Systemic change pathway summary for activity 2:



At the farm level, while the cacao volume produced by farmers and the value from sales slightly increased from baseline, we did not find significant differences in the combined analysis. However, we found that the amount sold (kg/ha) increased at midline in El Salvador and decreased in Honduras, directly driven by the yield changes observed in these two countries. Further, we found that the value of annual cacao sales (estimated as US\$/ha) was significantly lower at midline in Ecuador, and significantly higher in El Salvador, Guatemala and Nicaragua. Results also revealed that 55% of sales went to anchor firms partnering with MOCCA at midline, which suggests that the project is making progress in promoting closer relationships between cacao farmers and buyers co-funding technical assistance.

### Activity 3: Improved Research

MOCCA's research agenda in cacao is focused on germplasm conservation related to the two international cacao collections at CATIE and CRC, and on cadmium mitigation. While MOCCA has a relatively small number of in country partners for research (2 per country), the project has engaged key regional and global research partners to support both the research agenda and capacity building at the national level, as well as building networks and connections between cacao researchers in different countries through scientific events, forums, and research activities. Regional research partners include CRC, CATIE, Bioversity and a FONTAGRO-funded project led by ESPOL.

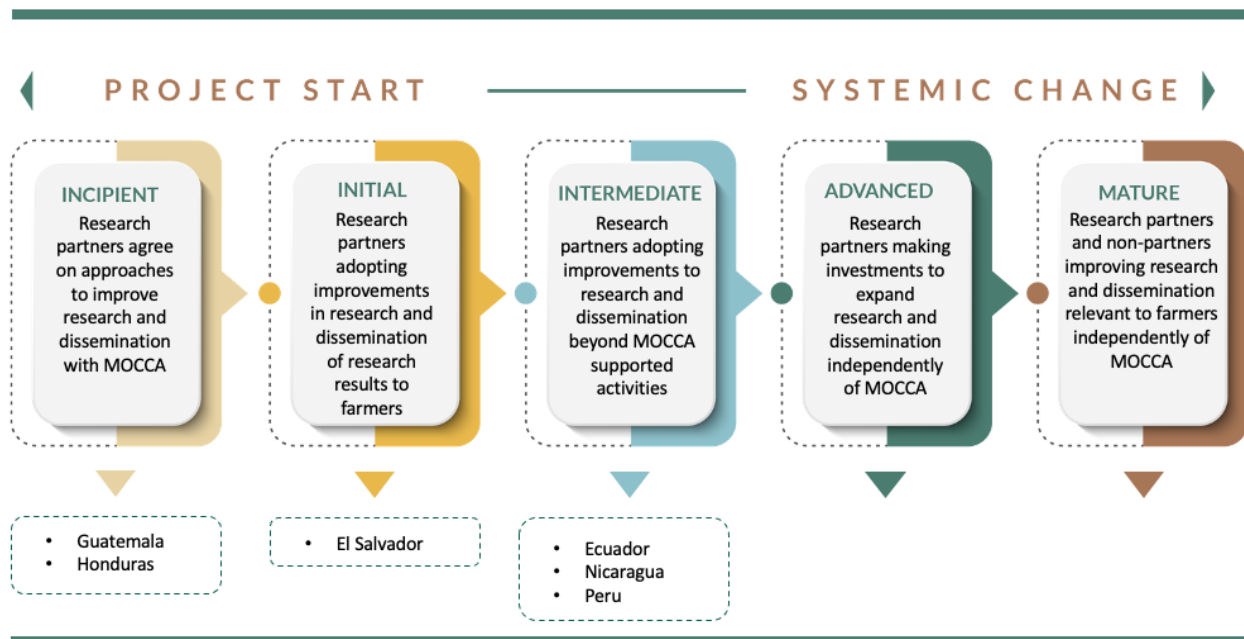
Cacao research in the region at the start of MOCCA was very limited, as was the dissemination of findings to farmers. As a result of MOCCA's work, informants from all countries highlighted the following achievements:

- increased knowledge about cadmium in cacao and improved understanding of cacao varieties that exist in each country as important achievements of MOCCA's work to support research and dissemination

- increased access to research findings for farmers and partners as a result of MOCCA developed visual materials, the suite of *Cacao Móvil* tools, and the cadmium newsletters
- Diverse market system actors are better around research results, and the symposiums, newsletters, and *Cacao Móvil* tools have engaged actors from beyond MOCCA countries in the exchange of information, harmonization of research protocols, and coordination of research.
- Gap analyses and strengthening plans were developed with six national research organizations in every country except Nicaragua. This assessment served to inform activities aimed at strengthening their capacity for research and dissemination in cacao.

Progress towards systemic change is most evident in **Peru, Nicaragua and Ecuador**. Important new relationships with research centers, development organizations, government entities, and universities have been established as a result of MOCCA's work. These new ties are part of the reason that much of this work will likely continue after MOCCA.

Systemic change pathway summary for activity 3:



Challenges mentioned by informants include the need to share findings with farmers more systematically and to guarantee funding for the continuity of the research agendas.

**At the farm level**, data suggest that nearly 40% of farmers reported receiving information about cacao research, representing directly a positive change from the baseline where this percentage was 22.7%. It is El Salvador (63.5%) and Nicaragua (62.7%) where we observed the highest percentage and Peru the lowest (16.9%). Similar to the baseline, the main source of information about cacao research products was through non-governmental organizations (NGOs) (44.8%) or the government (23.2%).

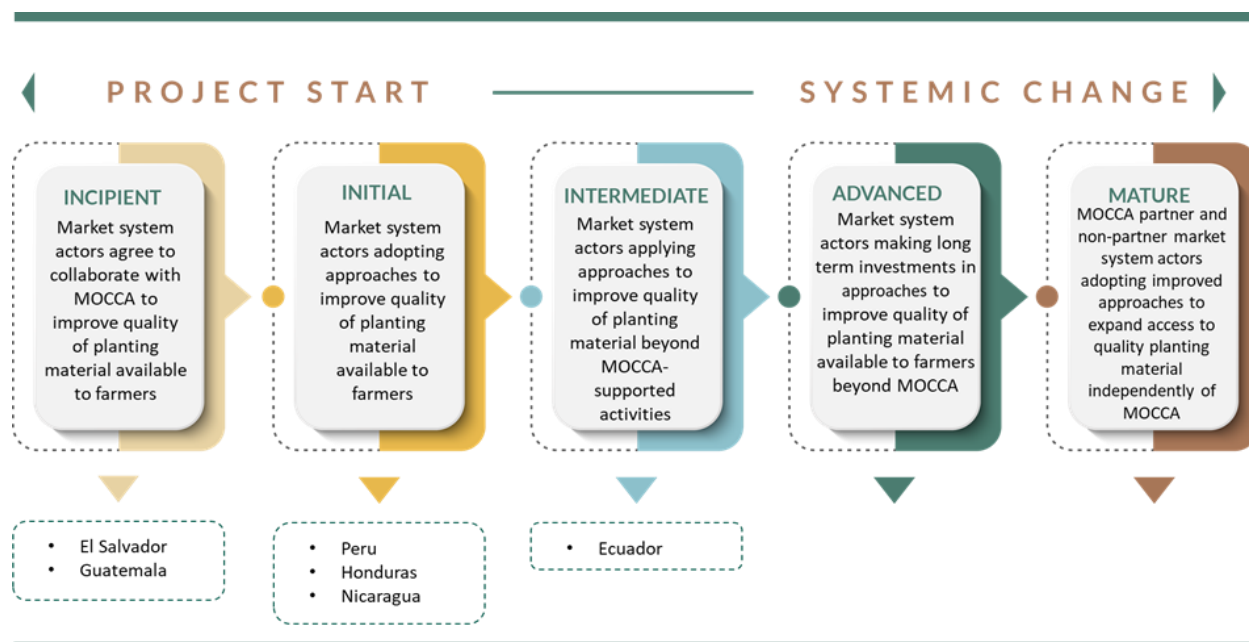
#### *Activity 4. Strengthening Suppliers of Planting Material*

The major actions to strengthen suppliers of high-quality genetic material for cacao include: a) an assessment of the capacity of clonal gardens and nurseries in each country, b) the development of a curriculum for cacao nursery operators, c) training of 230 cacao nurseries, and d) direct support including TA and co-investments in infrastructure and inputs for 58 nurseries and 26 clonal gardens.

Major changes in services cited by informants include:

- **In Ecuador**, it is important to highlight that some actors mentioned they are working on this issue for the first time and hence, they acquired better knowledge about varieties and their suitability for different contexts. Informants cite improved availability of high-quality plants and that more farmers understand the importance of genetic profiles.
- **In El Salvador**, a new nursery was established that is multiplying three different varieties from the national germplasm bank. The varieties still need to be registered, but once that is done, they plan on sharing with growers.
- **In Honduras**, partners have been supported to comply with existing regulations for certified genetic material providers in cacao. Informants cite MOCCA as having contributed to increased awareness among producers of the importance of high-quality planting material.
- **In Nicaragua**, providers have made improvements to nurseries and/or clonal gardens including expansion of capacity and inclusion of new genetic materials.
- **In Peru**,
  - there have been important advances in relation to the identification of fine flavor ecotypes and the maintenance of clonal gardens, nurseries, and demonstration plots for R&R to ensure availability of locally adapted genetic materials together with visual examples of R&R best practices to inform investments moving forward.
  - MOCCA partners have shifted their vision vis a vis provision of genetic material from one of simply conserving local materials in poorly managed clonal gardens to seeing these clonal gardens as a resource to position their organization vis a vis the market by providing members with high quality genetic materials. Integrating this with the work to better understand flavor profiles has helped understand the value of local materials in improving the flavor profiles of their cacao. While informants expressed their intention to expand this work, we did not find evidence yet of autonomous action

## Systemic change pathway summary for activity 4:



### Activity 5. Facilitate Access to Finance

The attempt to open up new financing opportunities for cacao farmers has been generally less successful than for coffee farmers. One key challenge is that in most MOCCA countries the cacao sector is small and financial products for cacao farmers were largely non-existent at project start. Ecuador and Peru offer more options than do Central American countries, where the cacao sector is comparatively younger and undeveloped. MOCCA has identified eight financial institutions in Ecuador and Peru interested in supporting access to finance for cacao farmers, yet only two in Ecuador have actually provided finance. The challenge for private financial institutions in Ecuador and Peru stems from the fact that state banks generally offer loans at lower interest rates, though they tend to be slower and more bureaucratic. Several financial institutions have developed products for cacao farmers or added cacao to their portfolio but have not yet been able to place a loan. Despite the challenges, roughly USD \$2 million have been granted as financial services for cacao farmers in MOCCA countries.

Progress on systemic change with regard to improving access to financial services has been limited. While MOCCA has established collaboration with financial institutions in Ecuador and Peru which have improved the offer of credit for the cacao sector, there are still challenges from the demand side in organizing and motivating farmers to access credit. Structural barriers include lack of credit histories among cacao farmers and low presence of financial institutions in cacao producing areas. Changing perceptions of both financial institutions and farmers with regards to credit is a slow process. Still, a few success stories exist:

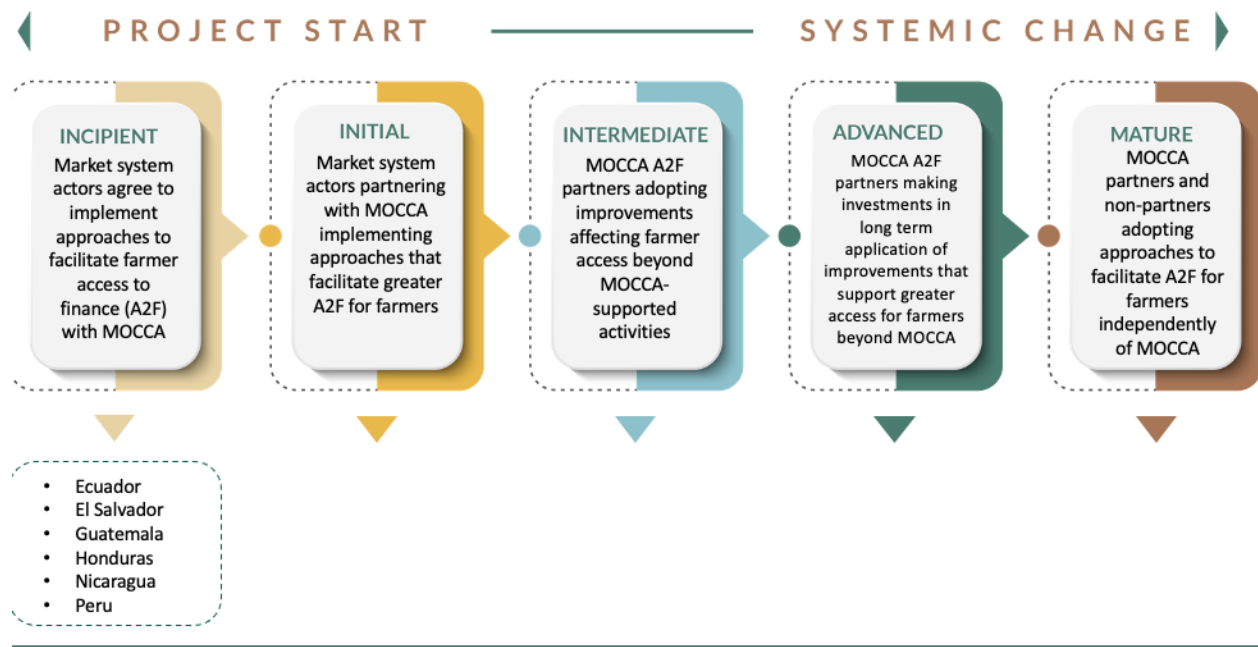
- **In Peru**, an important MOCCA achievement is that AgroPeru/MIDAGRI has now included funds for financing R&R in the cocoa sector as part of its financial products portfolio for the first time in its history. As a result, US \$1 million is now channeled to cocoa farmers and cooperatives to implement



R&R. In addition, an anchor firm in Peru reported that farmers now have better access to financial services offered by the anchor firm itself as a result of the collaboration with MOCCA.

- **In Ecuador**, five out of six partners have modified financial services to better serve cacao farmers due to collaboration with MOCCA and two of these partners already provided over USD 1 Million in finance to 245 cacao farmers.

Systemic change pathway summary for activity 5:



**At the farm level**, we found that during the 2020-2021 agricultural year, only 13.5% of farmers requested a loan, representing a slight decrease from the baseline (18.2%). Data suggests that there may be a demand problem, since farmers seem less keen to request financial services.

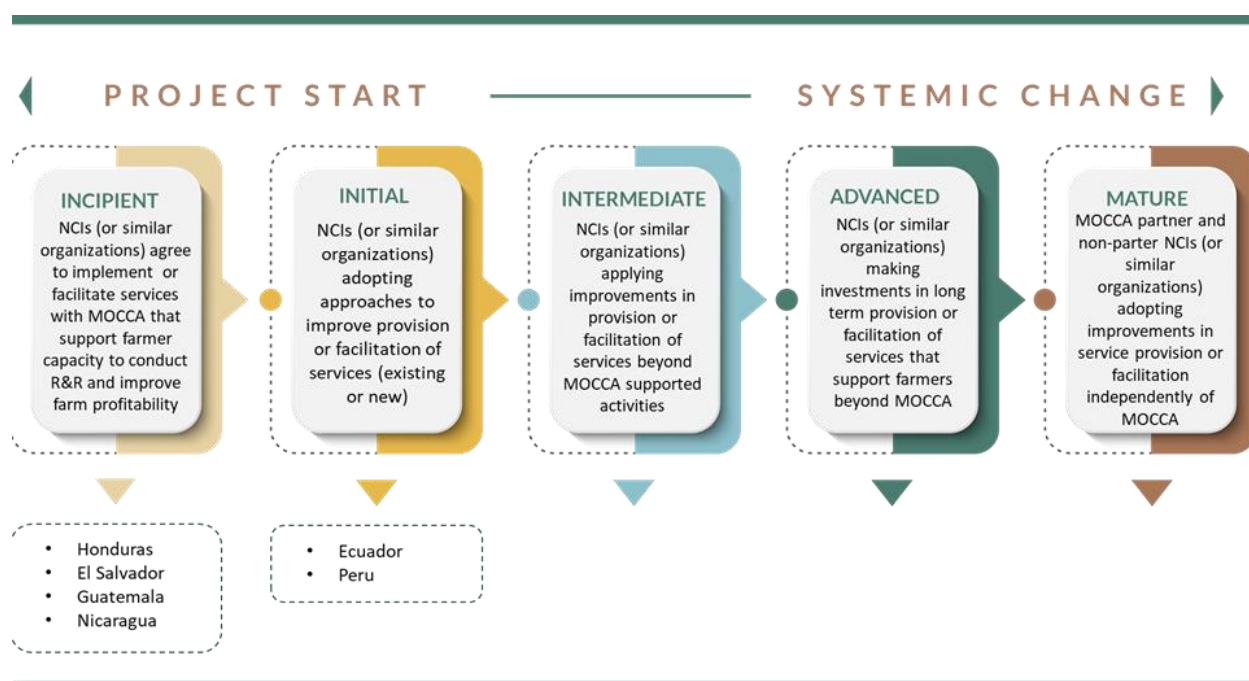
#### *Activity 6. Supporting Trade Association Service Provision*

Given that there are no consolidated National Commodity Institutes in the cacao sector in MOCCA countries, the project took a relatively flexible definition of NCIs and included multi-stakeholder platforms focused on cacao, national-level farmer organizations, exporter associations, and public institutions. MOCCA's approach has centered on strengthening the organizational capacity of key sector actors, and in particular strengthening their capacity to provide or play a facilitative role in the provision of technical assistance, market access, research, genetic material and finance for small cacao farmers. Challenges cited, logically, relate to the fact that the national institutional framework for the sector is weak and as a result national coordinating entities are weak and have little independence from international development funds.

Following are the main changes at the markets system level identified:

- **In Honduras, El Salvador, Guatemala and Peru**, MOCCA has collaborated with public sector entities to strengthen sector coordination by participating in and supporting national cacao coordination groups that bring together actors from across the sector.
- **In Ecuador, ANECACAO has been strengthened**. Their technical assistance work has much improved as a part of MOCCA, which is seen as a direct benefit by private companies. According to informants in Ecuador that there is a need for the creation of a cacao institute dedicated to supporting the sector.
- **In Peru** MOCCA supported an organizational assessment of APPCACAO, a national cacao farmers' association, to inform further support to improve their logistical, administrative and organizational capacities. MOCCA also collaborated with MIDAGRI on a National Cocoa Plan to support the strengthening and growth of the cacao sector.
- **In Nicaragua** it has not been possible to promote collaboration in this regard given the political environment.

Systemic change pathway summary for activity 6:

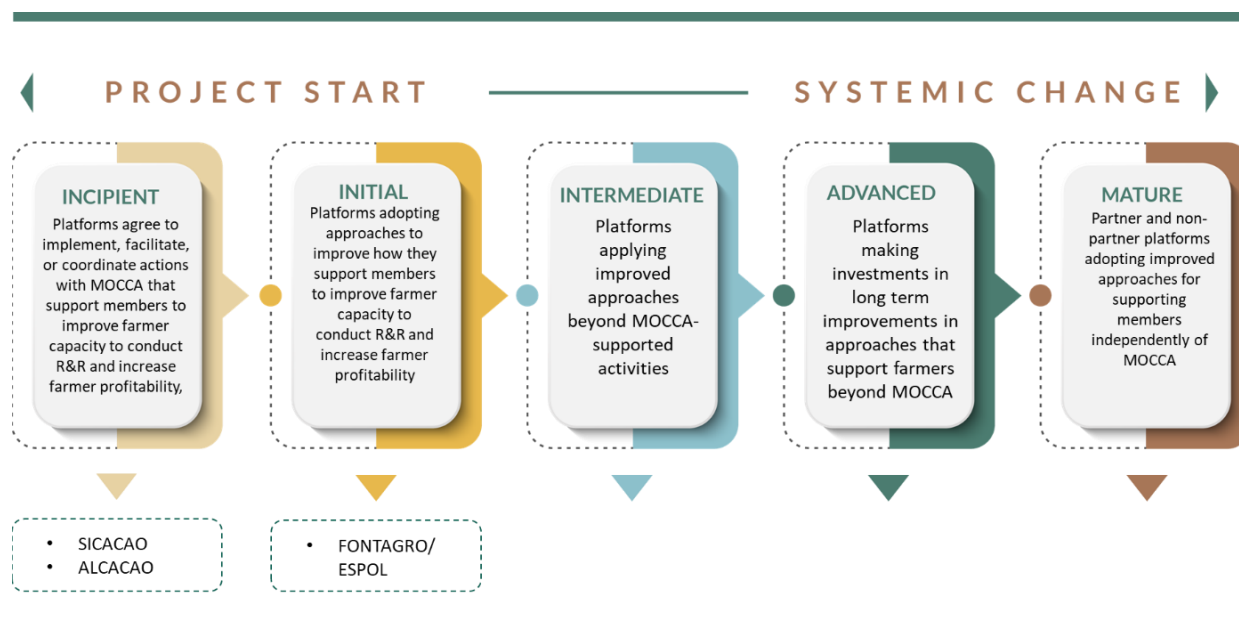


### Activity 7. Bolster Platforms

In the cacao sector, there is not a single, universally recognized regional cacao platform in Latin America, like PROMECAFE for coffee. There are, however, a number of initiatives that function as regional platforms, bringing multiple countries in the region together around different issues, including MOCCA itself. These include the *Asociación Latinoamericana de Organizaciones de Pequeños Productores de Cacao* – ALCACAO, which brings together cacao farmer organizations across four countries, a FONTAGRO-funded research project led by Ecuador with participation of Costa Rica and Colombia serves to facilitate collaboration in research related to cadmium, and SICACAO, a multi-stakeholder platform for coordination within the cacao sector among SICA member countries (Central America and the DR). MOCCA has made efforts to connect these initiatives to MOCCA partners and agenda with varying levels of success. The

most important achievement thus far has been engaging the FONTAGRO-led project to support cadmium research and dissemination. In addition to engaging existing regional platforms, MOCCA's support for the organization of regional scientific conferences and technical forums have brought together up to 300 researchers, technical experts and buyers from MOCCA countries and beyond, creating in a way a regional platform for sharing research and technical expertise on cacao. We tentatively place these 'regional cacao platforms' into the systemic change pathway below, anticipating that MOCCA's approach for strengthening regional cacao platforms, and these partnerships may change in the second half of the project.

Systemic change pathway summary for activity 7:



## Project-level conclusions

Overall, despite the complexity of the project as well as challenges in the operating environment, namely the COVID-19 pandemic and hurricanes in Central America, MOCCA has made important progress towards achieving project targets, particularly for reaching farmers with technical assistance, market access and research. By March 2022, MOCCA reached three and a half years (of five) of implementation. Considering start up activities, including putting in place a large number of partnership agreements plus the completion of baseline studies, field activities actually began after April 2020 such that March 2022 marks just 2 years of field activities of a total of 3.5. Despite the important challenges posed by the pandemic, MOCCA was able to initiate and ramp up activities with market system actors and farmers quite quickly, accelerating through 2021 to reach 82% of proposed farmers with technical assistance and 49% of proposed volumes of sales. If the current acceleration trend continues and MOCCA is able to continue to expand reach, together with market system actors, we anticipate that most project targets will be reached by project end. In line with MOCCA's market systems approach and theory of change, MOCCA has successfully engaged a broad range of market system actors across the cacao and coffee sectors in the six

countries. The technical and financial inputs and collaborative approach introduced by MOCCA is considered relevant by partners, the majority of whom report some level of changes in their business practices in response to the technical inputs and incentives provided by MOCCA. Many claim that these practices will be sustained as part of their business model post MOCCA, despite how incipient many of these collaborations still are. This is particularly true for technical assistance, market access and research activities. Proposed targets for value of new USG commitments and new public and private sector investment leveraged by USDA to support food security and nutrition, and numbers of seedlings acquired from strengthened seed lots, nurseries, and clonal gardens do not look on track to achieve by project end and may require adjustments. Extending project end through mid-2024 would allow for capturing results from the 2023/2024 coffee harvest.

Key recommendations emerging from coffee informants:

- to extend the duration of MOCCA's work to continue consolidating the various activities they are engaged in;
- create opportunities for different MOCCA partners to be able to share their experiences with each other;
- establish mechanisms to make it more viable for farmers to access high quality genetic material;
- research findings need to be disseminated with farmers more widely;
- continue working to improve farmers' market access opportunities and opportunities for access to financial services;
- promote organic production more and establish more demonstration plots.

From the point of view of cacao informants, the most frequently cited recommendations for MOCCA were:

- widen the technical assistance coverage and establish additional demonstration plots;
- provide opportunities for farmers from different places to share their experiences and knowledge on R&R;
- support farmers with infrastructure to improve post-harvest practices;
- continue supporting the various initiatives attempting to strengthen something like an NCI so that public policies that support the cacao sector are prioritized;
- continue to support commercial relationships with new buyers to diversify market options for farmers;
- strengthen the organizational capacity of farmer associations for providing access to markets and finance for small farmers;
- continue work to improve traceability of cacao genetic material to improve productivity and quality of cacao.

**At the farm level, in coffee** while data suggests progress in the adoption of different types of pruning, the use of organic waste (residues from weeding) at the farm, the use of organic fertilizers as well as an increase of farmers controlling diseases, there is still room for improvement, particularly since farmers have received at 12-18 months of training at the Project's mid-point – with continued training adoption is expected to increase. Findings on renovation is worth to mention, since it is one of the main objectives of MOCCA. Data suggests that only one out of five farmers renovated coffee trees. Further, the average maximum age of the coffee plantations was 7.7 years and in no country this average was higher than 10

years. According to informants, governments and other actors may have also given coffee plants to farmers in recent years. Hence the future need for renovating coffee may be modest and not as needed as originally thought. Another factor that may be affecting farmer adoption of renovation practices is the recent trend in prices, as prices are nearly 60% higher than what they have been in years past, so farmers may be unwilling to sacrifice short term yields from unproductive plants that need renovation.

We recommend that MOCCA continue with its integral approach of promoting many practices aimed at increasing productivity, which include evaluating the performance of current genetic materials (i.e., may be the plantations are young but under a rust-susceptible variety that may require renovation if other practices are not successful). While renovation should still be promoted, more emphasis may be needed in other practices that will contribute to increase productivity in current coffee plantations.

Regarding yields, these were statistically significantly higher at midline in all countries except Honduras, and for the countries with statistically significant differences, yields increased an average of 61% over the baseline values.

**Regarding cacao**, since the average age of cacao trees is older than in coffee (10.4) years we recommend MOCCA continues to continue efforts to promote renovation in all countries, perhaps with greater emphasis in Ecuador and Honduras (countries with the older cacao trees on average). If grafting cacao is a key indicator for the project, we suggest finding ways to increase the adoption of this practice, as the adoption rates of this practice have not yet changed since the baseline.

Although yields increased for the full sample, this was driven by an increase in El Salvador and Peru. Thus, it becomes necessary to continue efforts to strengthen the adoption of practices that directly positively affect yields in all countries. One reason why yields have not increased at midline may be related to the low use of fertilizers in the 2021-2022 agricultural year. This could have been influenced by the uncertainty farmers face in post-pandemic markets, and the cost of this input. Although this will require identifying a strategy to make fertilizer affordable and accessible, which will be challenging, it will also require MOCCA teaching farmers how to use this input efficiently, given that the share of farmers who fertilized based on nutritional deficiencies is still low. Finally, more access to improved (MOCCA) markets is necessary to maximize the benefits farmers could receive, as in all countries except Ecuador and to a less extent Nicaragua, most of the volume was sold to other types of buyers.

#### **Exploratory econometric analysis of the effect of training model and number of training sessions on the number of practices adopted and yields: coffee in Nicaragua and cacao in Peru**

After the submission of this report, CIAT conducted an exploratory analysis of the effect of the training model used to train farmers and the number of training sessions received by farmers, on two outcome variables: the number of practices adopted and yields. We did this using panel data for coffee in Nicaragua and cacao in Peru. While three of these variables are self-explanatory, the training model refers to the MOCCA-promoted training model, for which we provide more details in the document. In this variable, we compare the MOCCA model with other models used by anchor firms to train farmers. We expect that

the MOCCA model will have a positive significant effect on outcome variables as it allows for higher interaction between project implementers and beneficiary farmers.

This analysis shows that the training model used has a statistically significant positive effect on the number of practices adopted (but not on yields): farmers trained with the MOCCA model adopted (on average) 5.4 more coffee and 1.5 more cacao practices than farmers trained with other models. This is encouraging, as it demonstrates that training models that allows for more interaction between beneficiaries and implementers positively affect adoption of practices promoted.

### **Actionable project-level recommendations based on overall results**

Considering the results of the midterm evaluation including interviews with MOCCA partners and surveys of farm households, as well as conversations with MOCCA team, we propose the following recommendations for consideration in prioritizing investments for the remaining project funds or potential additional funding. More details on each recommendation are provided in the final section of the full report:

1. Extend project length to ensure achievements of MOCCA results.
2. Focus technical assistance (TA) on a smaller list of prioritized productivity practices and consider complementary investments to support adoption where necessary.
3. Increase support for or engagement with TA models with lowest levels of practice adoption to improve results and understand the relationship between TA models and farmer benefits.
4. Research dissemination to farmers should be accelerated, particularly in coffee.
5. Continue to strengthen NCIs in each country as well as national and regional platforms and might consider broadening the agenda to include emergent issues.
6. Work on market access should continue with a focus on improving price incentives for quality and strengthening market linkages for farmers to high quality markets.
7. Continue to support access to finance by nurturing existing partnerships, but end of project targets should be adjusted.
8. Complement continued work on certification systems to encourage supply of quality genetic material, while expanding understanding and work on the demand for quality genetic material.
9. More intentionally promote peer learning and the creation of peer learning spaces across project contexts, commodities, and partners in support of system-level change.

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## ACRONYMS

|          |   |
|----------|---|
| ABC      | Alliance Bioversity International and CIAT  |
| CIAT     | Centro Internacional de Agricultura Tropical or International Center for Tropical Agriculture |
| FL       | Farmer level  |
| ha       | Hectares; 1 ha=10,000 square meters   |
| ISF      | Initiative for Smallholder Finance  |
| LWR      | Lutheran World Relief   |
| m.a.s.l. | Meters above sea level  |
| MOCCA    | Maximizing Opportunities for Coffee & Cacao in the Americas project                           |
| MS       | Market Systems  |
| mz       | Manzana; 1 mz=7,000 square meters   |
| n.a.     | not applicable (only used in tables)  |
| qq       | Quintal; 1 qq=100 lb  |
| R&R      | Renovation and Rehabilitation   |
| TA       | Technical assistance  |
| TNS      | TechnoServe   |
| USDA     | United States Department of Agriculture   |
| WCR      | World Coffee Research   |

# **1 Introduction and objectives of the midline evaluation**

The Maximizing Opportunities for Coffee & Cacao in the Americas (MOCCA) project seeks to help farmers overcome barriers that limit their capacity to renovate and/or rehabilitate (R&R) their coffee and cacao plants by increasing their productivity while improving their marketing capacity, incomes and livelihoods (TechnoServe, 2019). TechnoServe (TNS) is leading the Consortium, and leading coffee activities, while Lutheran World Relief (LWR) leads activities in cacao. Other members of the Consortium include Initiative for Smallholder Finance (ISF) and World Coffee Research (WCR). The project, which is funded primarily by the United States Department of Agriculture (USDA) in addition to contributions from The J.M. Smucker Company, JDE, Keurig-Dr. Pepper, Peet's, Nespresso, McDonald's, and Kellogg, will implement cacao activities in Ecuador, El Salvador, Guatemala, Honduras, Nicaragua and Peru, and coffee activities in all countries with the exception of Ecuador.

The International Center for Tropical Agriculture (CIAT) is leading the MOCCA project evaluation, which focuses on project impact at two levels: the market systems level to test systemic changes in the coffee and cacao market systems, and the farmer level to evaluate the effect among beneficiary households and at the aggregate project level. The main objective of this report is to present an overview of the project's progress since its start, midlife into its life cycle. In particular, we evaluate the project strategy implementation, focusing on the interventions with market systems actors and farmers. Further, we provide midline (non-representative) results about practices promoted by the project that farmers are adopting and although we provide yield estimations, we do not place too much attention to this indicator, as several years need to pass to observe a significant change on it when farmers adopt renovation practices. The rest of this document presents the methodology in section 2, project-level progress on performance indicators in section 3, the results for coffee in section 4, for cacao in section 5, and conclusions and recommendations in section 6. Sections 7 and 8 present the references and annex tables.

We implemented the baselines in 2019 for the market systems level and in 2020 and 2021 for the farmer level. In 2022, CIAT implemented the midline evaluation at these two levels. This document presents the results of this assessment for both the market systems and the farmer levels. While the market systems evaluation focused on the interventions with market systems actors, the farmer level evaluation focused on key indicators of interest to USDA and other key indicators related mostly to adoption of MOCCA-promoted practices. The overall MOCCA evaluation uses a mix of qualitative and quantitative approaches that draw from monitoring, household survey, focus groups, and key informant data.

MOCCA's theory of change postulates that if farmers understand the benefits of R&R, possess the knowledge and skills, and have access to high-quality inputs and affordable financing, they will implement low-cost R&R practices. This will allow an increase in their profitability and catalyze a cycle of R&R investments that will lead to a more secure and sustainable supply of coffee and cacao for U.S. and other regional and international markets (TechnoServe & Lutheran World Relief, 2018). MOCCA is implementing seven major activities: 1) farmer training, 2) market linkages, 3) improved research, 4) strengthening suppliers of planting materials, 5) facilitate access to finance, 6) supporting trade association service provision, and 7) bolster platforms. We present results considering these aspects.

This midterm evaluation report is primarily intended for two key audiences. First, the internal audience of TechnoServe Head Office and MOCCA program leadership and collaborating international organizations

and in-country collaborators (anchor firms, research centers, etc.) These key internal stakeholders will be able to use these findings to learn in which outcome and impact indicators the MOCCA interventions are on target, ahead of target, or off target, and why. Further, these stakeholders can make strategic decisions about areas they should adjust during the second half of the program, to reach its goals and intended impacts. This may require shifting efforts (and possibly resources) from certain activities to others or identifying strategies to accelerate its progress on key indicators for which progress has been slow by midline. Second, the donor audience (USDA), which will receive this report and the intended changes to the program resulting from these findings, as well as having the opportunity to advise on adaptive management or course corrections that they perceive are necessary or appropriate for MOCCA to achieve its goals.

## 2 Methodology

### 2.1 Key evaluation questions and evaluation limitations

This midterm evaluation addresses the following key questions:

- **Relevance:** Does MOCCA target appropriate objectives, host country governments, and intended beneficiaries?
- **Effectiveness:** Is MOCCA being implemented successfully, and is its theory of change relevant to the achievement of its objectives?
- **Efficiency:** Are MOCCA's financial and resource expenditures economical and appropriate for the realization of its objectives? Are there areas of excess or insufficient expenditure whose adjustment would increase returns on money being spent?
- **Sustainability:** What elements in the MOCCA strategy inhibit or increase its effects' sustainability potential?
- **Impact:** Is the project realizing its intended results to date, and is it likely to achieve its targeted higher-level results and goals?

The limitations of the evaluation can be summarized at three levels:

*Overall:* the midline evaluation activities (design, review of instruments, data collection, analysis and reporting) were implemented in a short period of time (about six months), which rushed most of the activities (e.g., limited time to prepare for field activities, for analysis) and limited the degree of integration between the market- and farmer-level results, as data from each of these components were analyzed simultaneously, and were only available when the report was being finalized. Despite this, we were able to integrate part of the results, but not to the desired extent.

*The market systems midline evaluation has the following limitations:*

- The number of actors interviewed was not as large as expected, which may have limited capturing information about changes caused by MOCCA, or challenges faced in the sectors. Further, we would have liked to include actors external to MOCCA that are key to the sector, to have their perspective about the program and the sector in general. The limited time to



- implement the evaluation also limited interviewing actors identified during the interviews (thru snowball sampling) as we were not able to set new interviews while in the country.
- In some countries, we could not conduct interviews with country managers before the interviews with sampled actors. This limited the extend of our knowledge about the context in the country and that was relevant to the evaluation before going to the field to conduct the interviews (we could have arrived better prepared to the interviews).
  - Our dependence to MOCCA country managers to identify actors and set the interviews limited our influence on whom to include in the sample of actors, which may have introduced bias in the results.
  - The limited number of focus groups did not allow to compare the different models used by MOCCA in a robust way, which limited our understanding of the differences between models.

*The farmer midline evaluation has the following limitations:*

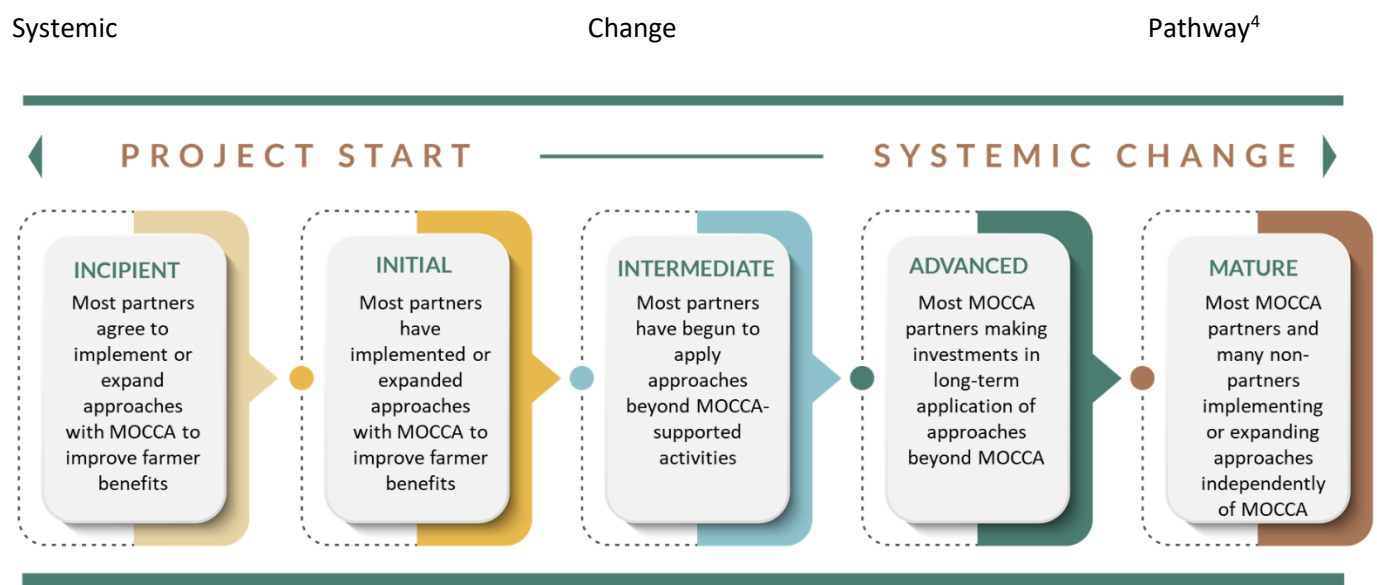
- Given that we did not identify a counterfactual group at baseline (for reasons explained in the baseline report), the evaluation results only reflect the contribution of the MOCCA program to the observed changes at midline.
- The results may be slightly biased because of the sampling strategy used for the midline evaluation (more details in section 2.3.2). Since we wanted to focus the evaluation on the effects among trained farmers, we excluded from the sampling frame farmers who had not received training from the program by November 2021. Thus, the results are most likely biased upward and represent the project effects on farmers who have received at least one training.
- The results do not represent all MOCCA beneficiaries, as we selected municipalities according to the number of farmers they concentrated, starting with the ones with more farmers, until we reached the required (midline) sample size. We did this to speed the data collection process, given the tight deadline we had to complete the evaluation.
- Finally, we could not construct a panel dataset for all variables, because of time limitations to complete the evaluation. Thus, although we did do panel analysis for key indicators, for most variables the differences presented do not present a statistical analysis.

Next, we provide details about the methods followed for the market systems and farmer evaluations.

## 2.2 Market systems evaluation

### 2.2.1 Evaluation design

At the market system level, this report focuses on exploring the degree to which MOCCA partners had incorporated changes into their business models, practices or workplans in response to the incentives and support provided by the project. The evaluation also sought to assess to what degree those changes were likely to expand or continue beyond project support or project end. The overall framing for the assessment uses the Systemic Change Pathway developed by the Market Development Facility, which defines stages of systemic change related to project implementation and helps to visualize the depth of the changes brought about by MOCCA so among target businesses and institutions within the market. The approach uses four stages to mark levels of change, see below. We have added a preliminary stage (incipient) to capture where partners have made commitments but have yet to adopt new approaches. Here we provide the generic definitions associated to each of the five stages.



- Incipient:** Most partners agree to implement or expand approaches with MOCCA to improve farmer benefits
- Initial:** Most partners have implemented or expanded approaches with MOCCA to improve farmer benefits
- Intermediate:** Most partners have implemented or expanded approaches with MOCCA to improve farmer benefits
- Advanced:** Most MOCCA partners making investments in long-term application of approaches beyond MOCCA
- Mature:** Most MOCCA partners and many non-partners implementing or expanding approaches independently of MOCCA

<sup>4</sup> Adapted from: [https://www.enterprise-development.org/wp-content/uploads/Case\\_8SystemicChangeMDF.pdf](https://www.enterprise-development.org/wp-content/uploads/Case_8SystemicChangeMDF.pdf)

We also explore how partners are scaling or adapting the models, or sharing with others, to begin to identify change pathways to be explored in the final evaluation.

### 2.2.2 Sampling strategy, sampling frame and sample

Based on project reports and interviews with key MOCCA staff, we created a list of MOCCA partners for coffee and cacao in each country. Where possible, we interviewed all partners in each country. Where not possible, we selected actors to cover a diversity of actor types (for example exporters, farmer organizations and financial institutions) and MOCCA activities (technical assistance, market access, etc.). In each country we included an interview with the national commodity institute, where it exists, and/or a key public sector entity engaged in the sector, a focus group with technicians providing technical assistance under MOCCA, and visits to nurseries or genetic material providers. In all we engaged informants from 43 entities in coffee (47% of MOCCA partners) and 43 entities in cacao (41% of MOCCA partners). See table below for details on the distribution of informants by country and commodity. In most categories we interviewed at least 50% of MOCCA partners with the exception of roasters given their role primarily as funders and not implementers of activities, producer organizations given the large numbers and financial institutions given many are not yet providing services to MOCCA farmers. Within these three categories, we prioritized actors together with MOCCA country staff based on importance of the relationship with MOCCA. Table 2 below shows MOCCA partners and informants by activity, regardless of type of organization. For example, in Activity 5 focused on financial services, partners include both financial institutions as well as exporters. We were able to interview at least half of MOCCA partners in most activities across both crops as well, with lower coverage for technical assistance and market access where partner numbers were very high. We also interviewed MOCCA staff from all countries for both coffee and cacao as well as a number of regional staff including key staff from consortium partners ISF and WCR.

*Table 1. Key informants and partners by country, sector and type of actor*

| ACTORS <sup>5</sup>                              | Ecuador               |                        | El Salvador       |                  | Guatemala         |                   | Honduras          |                   | Nicaragua         |                    | Peru              |             | Regional         |                    | Total               |
|--|-----------------------|------------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-------------|------------------|--------------------|---------------------|
| Total number of partners<br>(Number interviewed) | Cacao                 | Coffee                 | Cacao             | Coffee           | Cacao             | Coffee            | Cacao             | Coffee            | Cacao             | Coffee             | Cacao             | Coffee      | Cacao            | Coffee             | Cacao               |
| Exporters  | 4 <sup>6</sup><br>(1) |                        |                   | 3<br>(3)         | 1<br>(1)          | 3<br>(3)          |                   | 2<br>(2)          |                   | 1<br>(1)           | 2<br>(2)          |             |                  | 9<br>(9)           | 7<br>(4)            |
| Roaster/brand/ importer                          | 2<br>(0)              |                        |                   | 2<br>(0)         | 1<br>(0)          | 3<br>(2)          |                   |                   |                   | 2<br>(1)           |                   | 3<br>(0)    |                  | 10<br>(3)          | 3<br>(0)            |
| Producer organizations                           | 6<br>(5)              | 7<br>(1 <sup>7</sup> ) | 3<br>(1)          |                  | 7<br>(2)          | 5<br>(1)          | 14<br>(5)         | 7<br>(1)          | 7<br>(6)          | 9<br>(2)           | 21<br>(2)         |             |                  | 28<br>(5)          | 58<br>(21)          |
| Research Institutions                            | 2<br>(2)              |                        | 1<br>(1)          |                  | 2<br>(0)          |                   | 1<br>(0)          | 1<br>(1)          | 1<br>(0)          |                    | 3<br>(2)          | 1<br>(1)    | 3<br>(3)         | 2<br>(2)           | 13<br>(8)           |
| Financial Institutions                           | 6<br>(2)              | 1<br>(1)               |                   | 2<br>(1)         |                   | 2<br>(0)          |                   | 1<br>(1)          |                   | 9<br>(2)           | 2<br>(2)          |             |                  | 15<br>(5)          | 8<br>(4)            |
| NCIs and public institutions                     | 2<br>(2)              | 2<br>(2)               | 1<br>(1)          | 1<br>(1)         | 2<br>(0)          | 1<br>(1)          | 2<br>(3)          | 1<br>(3)          | 2<br>(2)          | 1<br>(1)           | 2<br>(1)          | 1<br>(1)    | 1<br>(0)         | 7<br>(9)           | 12<br>(9)           |
| NGOs/Projects                                    | 1<br>(0)              |                        | 5<br>(3)          |                  | 1<br>(2)          |                   | 1<br>(0)          |                   | 2<br>(1)          | 2<br>(2)           | 2<br>(0)          | 1<br>(1)    | 1<br>(1)         | 3<br>(3)           | 13<br>(6)           |
| Others <sup>8</sup>                              |                       | 1<br>(1)               |                   |                  |                   | 1<br>(1)          |                   |                   |                   |                    |                   | 1<br>(1)    |                  | 3<br>(3)           |                     |
| Nurseries/ genetic material providers            |                       | (2)                    |                   |                  |                   | (1)               | (1)               | (1)               |                   | (2)                |                   |             |                  | (6)                | (3)                 |
| <b>TOTAL INTERVIEWS<sup>9</sup></b>              | <b>23<br/>(12)</b>    | <b>11<br/>(7)</b>      | <b>10<br/>(6)</b> | <b>8<br/>(5)</b> | <b>14<br/>(5)</b> | <b>15<br/>(9)</b> | <b>18<br/>(9)</b> | <b>12<br/>(9)</b> | <b>12<br/>(9)</b> | <b>24<br/>(11)</b> | <b>32<br/>(9)</b> | <b>7(3)</b> | <b>5<br/>(4)</b> | <b>77<br/>(44)</b> | <b>114<br/>(51)</b> |
| FOCUS GROUPS <sup>10</sup>                       |                       |                        |                   |                  |                   |                   |                   |                   |                   |                    |                   |             |                  |                    |                     |
| Entities   | -                     | 2                      | 1                 | 2                | 2                 | 2                 | 2                 | 1                 | 1                 | 1                  |                   |             |                  | 7                  | 6                   |
| Participants                                     |                       | 7                      | 3                 | 4                | 12                | 11                | 3                 | 7                 | 7                 | 4                  |                   |             |                  | 33                 | 25                  |

<sup>5</sup> Actors are institutions not individuals. Interviews were sometimes attended by multiple individuals from a single institution so actual numbers of individual informants are higher. Some actors were prioritized for both sectors and so there is some duplication of actors within countries across sectors. Some actors were present and prioritized in several countries i.e., some of the larger anchor firms.

<sup>6</sup> The number on top indicates the total number of MOCCA partners. The number in parenthesis below indicates the total number of actors interviewed.

<sup>7</sup> Where there are more interviewees than partners, we interviewed either additional farmer organizations engaged by MOCCA's direct partners, or we interviewed additional public institutions to gain their perspective, regardless of their engagement with MOCCA.

<sup>8</sup> Others include an association of women in coffee in ES and HO, and RFA.

<sup>9</sup> Total of interviews with partners, exclusive of focus groups and MOCCA staff interviews.

<sup>10</sup> In most cases, focus group participants come from entities that were also interviewed.

*Table 2. Key informants and partners by country, sector and MOCCA activity*

| Activity<br>Total # of partners<br>(# interviewed) | Ecuador                  | El Salvador |          | Guatemala |           | Honduras  |           | Nicaragua |          | Peru      |           | Regional |          | Total      |            |
|--|--------------------------|-------------|----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|----------|----------|------------|------------|
|  | Cacao                    | Coffee      | Cacao    | Coffee    | Cacao     | Coffee    | Cacao     | Coffee    | Cacao    | Coffee    | Cacao     | Coffee   | Cacao    | Coffee     | Cacao      |
| ACTIVITY 1:<br>Technical Assistance                | 15 <sup>11</sup><br>(11) | 6<br>(3)    | 5<br>(4) | 6<br>(4)  | 2<br>(2)  | 11<br>(5) | 14<br>(5) | 10<br>(4) | 9<br>(7) | 14<br>(6) | 25<br>(6) | 3<br>(0) | 1<br>(1) | 50<br>(22) | 71<br>(36) |
| ACTIVITY 2: Inclusive<br>Market Access             | 12<br>(9)                | 5<br>(1)    | 4<br>(2) | 4<br>(3)  | 11<br>(4) | 7<br>(6)  | 14<br>(5) | 2<br>(2)  | 7<br>(6) | 12<br>(4) | 24<br>(5) |          | 2<br>(1) | 30<br>(16) | 74<br>(32) |
| ACTIVITY 3:<br>Research                            | 2<br>(2)                 |             | 2<br>(2) | 1<br>(1)  | 2<br>(0)  | 1<br>(1)  | 3<br>(1)  | 1<br>(1)  | 3<br>(2) | 1<br>(1)  | 2<br>(1)  | 2<br>(2) | 4<br>(4) | 6<br>(6)   | 18<br>(12) |
| ACTIVITY 4: Genetic<br>Material                    | 9<br>(8)                 | 1<br>(1)    | 1<br>(1) | 2<br>(2)  |           | 2<br>(2)  | 4<br>(3)  | 2<br>(2)  | 8<br>(6) | 1<br>(1)  | 3<br>(3)  | 2<br>(2) | 1<br>(1) | 10<br>(10) | 26<br>(22) |
| ACTIVITY 5: Financial<br>Services                  | 8<br>(4)                 | 1<br>(1)    |          | 4<br>(3)  |           | 6<br>(3)  |           | 3<br>(3)  |          | 12<br>(5) | 5<br>(5)  | 1<br>(1) |          | 27<br>(16) | 13<br>(9)  |
| ACTIVITY 6: National<br>Platforms                  | 2<br>(1)                 | 2<br>(2)    | 2<br>(1) | 1<br>(1)  | 2<br>(0)  | 1<br>(1)  | 2<br>(2)  | 1<br>(1)  |          | 1<br>(1)  | 2<br>(2)  | 1<br>(1) |          | 7<br>(7)   | 10<br>(6)  |
| ACTIVITY 7: Regional<br>Platforms                  |                          |             |          |           |           |           |           |           |          |           |           | 1<br>(1) | 3<br>(1) | 1<br>(1)   | 3<br>(1)   |

<sup>11</sup> The number on top indicates the total number of MOCCA partners. The number in parenthesis below indicates the total number of actors interviewed.

### 2.2.3 Instruments used

Semi-structured interviews and focus groups were used to collect information from informants. We designed the instruments to capture changes implemented by actors as a result of their engagement with MOCCA in their business as usual in each of the MOCCA activity areas. We modeled the instruments after the MDF Framework pathway for systemic change shown above. The content of the instruments sought to gather information that would allow us to place each actor and group of actors on this pathway.

**Semi structured interviews with MOCCA partners** sought to explore how actors had engaged with MOCCA activities and the changes that resulted. For each activity, we explored the changes being implemented by partners with support from MOCCA, their perceptions of the major achievements and challenges in implementing the models proposed by MOCCA, and to what degree these changes were being taken up and implemented beyond the specific scope of work with MOCCA, or how likely they were to be taken up in the future. For example, we asked if the entity had replicated the work with other groups of beneficiaries, if they had engaged in new partnerships, and how likely it was that their organization would continue to implement the model once MOCCA comes to an end. These questions were repeated for each of the MOCCA activities the actor was engaged with. The instrument also included questions about contextual factors affecting the sector or MOCCA, efforts to promote gender equity, and recommendations for additional partners or activities that could contribute to improving market access and capacity for R and R.

**Focus groups with technical assistance providers** explored how training activities were being carried out in support of R and R and the major changes promoted by MOCCA. We also explored achievements and challenges, recommendations for MOCCA, and the likelihood of this kind of TA continuing post project.

**Interviews with MOCCA staff** in each country were used to understand the local context and the implementation structure in each country.

**Interviews with public institutions** were used to assess contextual changes in the sector that may have impacted MOCCA, as well as their perspectives on major achievements or challenges of MOCCA in the sector.

### 2.2.4 Training of enumerators and data collection

Three interviewers led the in-country data collection during two weeks in each country, one week focused on coffee and one focused on cacao. Interviews with MOCCA country managers were carried out prior to travel and served to finalize the proposed list of informants and in-country agenda, as well as to understand the particularities of the country context and project activities from the perspective of the project implementers. The time spent in country was divided between interviews in a main city and visits to production areas for focus groups and additional interviews. In some cases, due to logistics or availability, interviews were carried out virtually.

### 2.2.5 Data analysis

Interviews and focus groups were documented in notes and an excel file was created to summarize the core information by actor. The information from all informants in each sector was used to generate

quantitative (i.e., number of actors showing evidence of scaling activities beyond MOCCA) and qualitative (principal changes in TA introduced by MOCCA) descriptions of the type and level of changes among MOCCA partners that can be associated with the project. Using the evidence gathered, we also scored each actor vis a vis the Systemic Change Pathway to assess the depth of change observed among MOCCA partners within each country for each commodity. This information is presented below.

## **2.3 Farmer level evaluation**

### **2.3.1 Evaluation design**

To evaluate the impact of the MOCCA project on farmers, we will compare beneficiary farmers prior and post project implementation.<sup>12</sup> Under this design, we are measuring the contribution of the MOCCA project implementation on the observed changes. The main limitation of this study is that changes we may observe at the endline evaluation could not be entirely attributed to MOCCA but also to other unrelated factors. To address this issue, we are documenting potential external factors (with farmer-level, monitoring and qualitative data) as to control them for the final evaluation. We also present panel analysis results for key indicators (e.g. yields, sales, key agronomy practices), using midline data only and using the panel data (i.e., baseline and midline data).

### **2.3.2 Sampling strategy, sampling frame and sample**

The evaluation design included one-half of the baseline sample size as to save time and resources since it is soon to expect significant changes in key indicators related to yield and adoption. We were able to interview 1,077 and 549 coffee and cacao farmers, respectively (Table 3). As observed in the table, Ecuador registered a low completion rate, mainly due to limitations to survey 36 beneficiary farmers before the elaboration of this report.

To sample farmers, we followed this procedure:

- Firstly, we cleaned the baseline data from farmers that were no longer participants in MOCCA (e.g., farmers who migrated, declined participation, etc.) (Table 4).
- Secondly, we excluded farmers that have not received training by November 2021. We wanted to focus on the effect among trained farmers however, results should be interpreted with caution, as these are most likely biased upward. Thus, the farmer-level results presented in this document represent the project effect on farmers who have received at least one training.
- Third, with the use of monitoring data farmers were classified into three categories according to the number of trainings received (active for farmers participating in >50% of the trainings offered, semi-active for farmers participating in 30%-50% of the trainings offered, and inactive for farmers participating in <30% of the trainings offered), we sampled midline farmers proportionally according to these categories.
- Finally, in order to streamline the data collection process, we selected municipalities according to the number of farmers they concentrated, starting with the ones with more farmers, until we

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<sup>12</sup> Using difference-in-difference (DiD) with propensity score matching was not possible because the pandemic caused by COVID-19 made difficult obtaining information from potential counterfactual ('control') farmers in time for baseline data collection. The design used was originally considered as a "contingency plan."

reached the sample size. This also has implications in the representativeness of the results, as the selected municipalities could be systematically different from non-selected municipalities, and this could be the reason for the high concentration of farmers who have received at least one training. We identified replacement farmers at this level too. The sampled farmers came from most anchor firms collaborating with MOCCA (Table 5).

**Table 3. Sampling frame, sample size and realized sample for MOCCA midline evaluation**

| Sampling details | Ecuador | El Salvador | Guatemala | Honduras | Nicaragua | Peru | All countries |
|------------------|---------|-------------|-----------|----------|-----------|------|---------------|
| <b>Coffee</b>    |         |             |           |          |           |      |               |
| Sampling frame   | n.a.    | 344         | 445       | 441      | 447       | 437  | <b>2,114</b>  |
| Sample size      | n.a.    | 172         | 223       | 221      | 224       | 219  | <b>1,059</b>  |
| Realized sample  | n.a.    | 174         | 230       | 197      | 227       | 249  | <b>1,077</b>  |
| <b>Cacao</b>     |         |             |           |          |           |      |               |
| Sampling frame   | 283     | 106         | 73        | 86       | 148       | 432  | <b>1,128</b>  |
| Sample size      | 142     | 53          | 37        | 43       | 74        | 216  | <b>565</b>    |
| Realized sample  | 107     | 52          | 46        | 56       | 75        | 213  | <b>549</b>    |



**Table 4. Cleaning of baseline lists for midline sampling**

| Crop   | Country     | Number of farmers |                    |           |             |                        | Eligible farmers |             |          | Midline sample size |
|--------|-------------|-------------------|--------------------|-----------|-------------|------------------------|------------------|-------------|----------|---------------------|
|        |             | Expected baseline | Effective baseline | Drop-outs | No training | Midline sampling frame | Active           | Semi-active | Inactive |                     |
| Coffee | El Salvador | 344               | 316                | 0         | 0           | 316                    | 267              | 40          | 9        | 172                 |
|        | Guatemala   | 445               | 455                | 65        | 15          | 363                    | 257              | 38          | 68       | 223                 |
|        | Honduras    | 441               | 427                | 56        | 36          | 330                    | 95               | 133         | 102      | 221                 |
|        | Nicaragua   | 447               | 422                | 31        | 64          | 327                    | 245              | 27          | 55       | 224                 |
|        | Peru        | 437               | 677                | 83        | 188         | 406                    | 300              | 102         | 4        | 219                 |
| Cacao  | Ecuador     | 283               | 227                | 1         | 67          | 159                    | 58               | 34          | 67       | 142                 |
|        | El Salvador | 106               | 101                | 0         | 26          | 75                     | 14               | 18          | 43       | 53                  |
|        | Guatemala   | 73                | 73                 | 0         | 14          | 59                     | 23               | 21          | 14       | 37                  |
|        | Honduras    | 86                | 87                 | 5         | 0           | 82                     | 39               | 30          | 13       | 43                  |
|        | Nicaragua   | 148               | 142                | 0         | 62          | 80                     | 16               | 28          | 36       | 74                  |
|        | Peru        | 432               | 429                | 16        | 156         | 257                    | 102              | 52          | 103      | 216                 |

**Table 5. Anchor firms included in the midline evaluation, by crop and country**

| Crop   | Anchor firms  |             |                         |                                |   |                             |
|--------|---|-------------|-------------------------|--------------------------------|---|-----------------------------|
|        | Ecuador   | El Salvador | Guatemala               | Honduras                       | Nicaragua   | Peru                        |
| Coffee | n.a   | BFA<br>CSC  | OLAM<br>UNEX<br>VOLCAFE | BECAMO<br>COFFEE PLANET<br>RGC | ALDEA GLOBAL<br>ECOM<br>FDL<br>MERCON   | MIDAGRI<br>OLAM<br>RGC      |
| Cacao  | ANECACAO<br>APECAP<br>APEOSAE<br>FORTALEZA<br>UNOCACE | LWR         | VERAPAZ                 | FENAPROCACHO<br>OMOA           | APCA<br>ASIHERRA<br>CACAONICA<br>CACHERCAM<br>COODEPROSA<br>COOFLORESCAMPO<br>COOPROCAFIC<br>COOSEMUCRIM<br>UCA AHMED<br>UCASOPPEXCCA | AGROTEC<br>APPCACAO<br>ECOM |

The midline sample included farmers from 82 coffee municipalities and 72 cacao municipalities (Table 6), representing 65% and 71% of baseline municipalities, respectively. Details of the list of departments and municipalities sampled for the midline can be found in Annex Sample 1 and Annex Sample 2, respectively. On average, sampled coffee farmers were located at a higher altitude (1,244 m.a.s.l.) than cocoa farmers (507 m.a.s.l.) Further, the proportion of male farmers in the sample was similar for both crops (70.7% for coffee and 76% for cacao) and enumerators took longer to complete the interview with coffee farmers (1.7 hr vs. 1.3 hr with cacao farmers).

*Table 6. Midline sample information*

| Sample information          | Ecuador    | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|-----------------------------|------------|-------------|------------|------------|------------|------------|---------------|
| <b>Coffee producers</b>     |            |             |            |            |            |            |               |
| # municipalities            |            | 9           | 26         | 17         | 13         | 17         | 82            |
| Altitude (m.a.s.l.)*        |            | 1,042.3     | 1,404.1    | 1,267.6    | 821.5      | 1,560.3    | 1,243.6       |
| Male sampled households (%) | n.a.       | 57.5        | 68.7       | 70.6       | 80.2       | 73.1       | 70.7          |
| Length of interview (hr)    |            | 2.3         | 1.6        | 1.2        | 1.6        | 2.0        | 1.7           |
| <b>Number of households</b> |            | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |
| <b>Cacao producers</b>      |            |             |            |            |            |            |               |
| # municipalities            | 19         | 19          | 2          | 5          | 8          | 17         | 72            |
| Altitude (m.a.s.l.)**       | 291.5      | 543.3       | 282.4      | 308.4      | 405.7      | 748.2      | 506.9         |
| Male sampled households (%) | 78.5       | 78.8        | 67.4       | 66.1       | 81.3       | 76.5       | 76.0          |
| Length of interview (hr)    | 1.5        | 1.6         | 0.7        | 1.4        | 1.4        | 1.1        | 1.3           |
| <b>Number of households</b> | <b>107</b> | <b>52</b>   | <b>46</b>  | <b>56</b>  | <b>75</b>  | <b>213</b> | <b>549</b>    |

\*873 total observations: 161 observations to El Salvador, 179 observations to Guatemala, 140 observations to Honduras, 168 observations to Nicaragua, 225 observations to Peru

\*\*429 observations: 98 to Ecuador, 43 to El Salvador, 21 to Guatemala, 50 to Honduras, 53 to Nicaragua, 164 to Peru

### 2.3.3 Instruments used

The baseline coffee and cacao questionnaires were leveraged as the starting point for the midline evaluation. Alongside with TNS, we excluded some sections and focused the survey on agronomy practices and the plots where farmers grew the crops of interest.<sup>13</sup> The year of reference for almost every question<sup>14</sup> was the 2021/2022 agricultural year. Data was collected during January and April 2022. Protocols for the field teams that collected the data were elaborated, which included: instructions for software installation

<sup>13</sup> These instruments are provided as 11 separate annex documents, in Spanish.

<sup>14</sup> For few questions, we inquired about the 12 months prior to the interview, the previous two years, or the time between baseline and the day of the interview.

and use, field manual for enumerators, field manual for supervisors, protocol to draw maps of the farm, and a video with instructions of how to identify sampling points in the main plot visited.

#### 2.3.4 Training of enumerators and data collection

Data was collected by MOCCA project trainers as well as by technical staff from its partners. The enumerators had experience in data collection. Most of these technicians also participated in the baseline data collection, which facilitated the training, as they knew both the survey and the data collection process. Collecting midline data with these technicians was planned since the original evaluation design. Although this could bias the data, we assume these technicians collected the data in a way that minimized this bias (i.e., without guiding farmers' responses).

CIAT, in collaboration with TNS, LWR and MOCCA staff conducted 13 training sessions (most were conducted in-person) where enumerators, supervisors and project representatives/country coordinators participated (Table 7). Each training lasted three full days and included a theoretical session where participants reviewed a printed version of the instrument, a practical session where participants used the software to review the questionnaire (as the interface is different than the printed version) and practice data entry, and a pilot session where enumerators interviewed a farmer (or played roles when this was not possible) not from the sample list. These sessions started on January 25 and ended on March 23, 2022.

Similar to the baseline, we programmed the instruments using CPro® and enumerators used their project-provided phones to collect the data, soon after we finished the training. CIAT guaranteed data quality by performing remote monitoring twice a week and sending a report to country teams, who addressed the inconsistencies identified in such reports. We performed additional data checks during the data-cleaning phase, and country teams helped clarifying these doubts. To comply with best practices regarding the protection of human subjects in research and data management, we obtained approval from CIAT's Institutional Review Board prior to the start of field activities and trained enumerators accordingly so they follow these practices during data collection and management.

#### 2.3.5 Data analysis

Similar to the baseline, most of the analysis included descriptive statistics at the country level, and at the project level (all countries combined), using midline data. We present mean values unless otherwise specified. Descriptive statistics provide us midline values for the variables evaluated. For key MOCCA indicators, we present results disaggregated by sex of beneficiary farmer, area planted with the MOCCA crop of interest (<5 ha vs. >5 ha), and by anchor firm. For two of the outcome indicators (renovation and rehabilitation), we estimated multivariate regressions to learn about the factors influencing adoption of these practices, following the same conceptual framework and empirical estimation described in the baseline report.<sup>15</sup> As mentioned above, we present panel analysis results only for the adoption of renovation and rehabilitation practices. For all other variables, although we present results for the

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<sup>15</sup> We encourage readers to review the MOCCA Farmer level baseline report (Reyes *et al.*, 2021) for detailed information.

baseline only because we did not construct a panel dataset, in our discussion we make reference to baseline results for some key indicators.

**Table 7. Trainings of enumerators implemented in 2022 for MOCCA midline data collection**

| #  | Date   |        | Crop  | Country     | Anchor firm   | # participants |             |
|----|--------|--------|-------|-------------|---|----------------|-------------|
|    | Start  | End    |       |             |   | Enumerators    | Supervisors |
| 1  | 25-ene | 27-ene | Cacao | Guatemala   | Cacao Verapaz   | 4              | 1           |
| 2  | 31-ene | 2-feb  | Cacao | Honduras    | Fenaprocacaho   | 6              | 1           |
| 3  | 2-feb  | 4-feb  | Cacao | Peru        | APPCACAO, ECOM y AGROTEC                                | 10             | 1           |
| 4  | 7-feb  | 9-feb  | Cacao | Nicaragua   | Todos los aliados                                       | 11             | 1           |
| 5  | 7-feb  | 9-feb  | Cacao | Ecuador     | Anecacao, Fortaleza del Valle, UNOCACE, APEOSAE, APECAP | 9              | 1           |
| 6  | 15-feb | 17-feb | Cacao | El Salvador | Equipo LWR  | 7              | 2           |
| 7  | 7-feb  | 9-feb  | Café  | Peru        | MIDAGRI, RGC, OLAM                                      | 19             | 2           |
| 8  | 23-feb | 25-feb | Café  | Nicaragua 1 | Aldea Global, Mercon 1 & 2                              | 10             | 3           |
| 9  | 7-mar  | 9-mar  | Café  | Nicaragua 2 | ECOM, FDL   | 8              | 3           |
| 10 | 28-feb | 2-mar  | Café  | Honduras    | Becamo  | 26             | 3           |
| 11 | 2-mar  | 4-mar  | Café  | El Salvador | Todos los aliados                                       | 8              | 1           |
| 12 | 14-mar | 16-mar | Café  | Guatemala   | Volcafé y UNEX  | 18             | 3           |
| 13 | 21-mar | 23-mar | Café  | Guatemala   | OLAM  | 8              | 1           |

### 3 Project-level progress on MOCCA's performance indicators

*Here we present the project's progress against project-level goals, for key performance indicators, using monitoring data from MOCCA from the start of the project through March 2022 (Table 8. Progress on project-level indicators, at midline*

| MOCCA Activity | Performance indicator  | LOP Target  | Baseline    |
|----------------|--|-------------|-------------|
| 1              | Number of individuals in the agriculture system who have applied improved management practices or technologies with USDA assistance          | 29,717      | 0           |
| 1              | Number of hectares under improved management practices or technologies with USDA assistance  | 30,449      | 0           |
| 1              | Number of individuals benefitting indirectly from USDA-funded interventions  | 546,993     | 0           |
| 1              | Number of individuals who have received short-term agricultural sector productivity or food security training as a result of USDA assistance | 79,110      | 0           |
| 1              | Yield (Kg/Ha) of targeted agricultural commodities among program participants with USDA assistance - coffee                                  | 871         | 646         |
| 1              | Yield (Kg/Ha) of targeted agricultural commodities among program participants with USDA assistance - cacao                                   | 522         | 353         |
| 2              | Value of annual sales of farms and firms receiving USDA assistance - Cacao   | 61,312,320  | 31,334,346  |
| 2              | Value of annual sales of farms and firms receiving USDA assistance - Coffee  | 366,681,518 | 159,833,243 |
| 2              | Volume (MT) of commodities sold by farms and firms receiving USDA assistance - coffee  | 123,178     | 51,894      |
| 2              | Volume (MT) of commodities sold by farms and firms receiving USDA assistance - cacao   | 25,130      | 12,842      |
| 2              | Number of farmers accessing improved markets through partnerships supported by the project   | 25,000      | 0           |
| 2              | Value of new USG commitments and new public and private sector investment leveraged by USDA to support food security and nutrition           | 21,000,000  | 0           |
| 3              | Number of technologies, practices, and approaches under various phases of research, development, and uptake as a result of USDA assistance   | 165         | 0           |

). We discuss this progress according to the main (seven) MOCCA activities: **activity 1)** farmer training, **activity 2)** market linkages, **activity 3)** improved research, **activity 4)** strengthening suppliers of planting materials, **activity 5)** facilitate access to finance, **activity 6)** supporting trade association service provision, and **activity 7)** bolster platforms. We assess progress vs targets at project level as targets were not set for coffee vs cacao.

For **activity 1**, there are four performance indicators which have not been measured yet. Regarding the three other indicators related to this activity, MOCCA has reached 82% of its target in the number of individuals who have received short-term agricultural sector productivity or food security training as a result of USDA assistance; 59% of its target in the number of individuals participating in USDA food security programs (this indicator also relates to activities 4 and 5 but we only discuss its progress here); and 78% of its target in the number of individuals benefitting indirectly from USDA-funded interventions. Excluding the four indicators the project has not measured yet, the progress at midline for the activities implemented under activity 1 are well advanced and should reach its target.

Regarding **activity 2**, the project has made progress in all six of its performance indicators, though at various levels, some of which require attention to be able to meet the final goal. For the value of annual sales of farms and firms receiving USDA assistance, the project has only reached 22% of its target for coffee and 69% of its target for cacao. Further, the project has reached 24% of its goal for the volume (MT) of commodities sold by farms and firms receiving USDA assistance for coffee and 73% of its goal for the same indicator for cacao. The project has also reached 52% of its goal regarding the number of farmers accessing improved markets through anchor firm partnerships supported by the project. Finally, on the last indicator, the progress has been limited, as it has only reached 9% of its goal regarding the value of new USG commitments and new public and private sector investment leveraged by USDA to support food security and nutrition. If we look at the progress for volume and value of sales, the project has reached more than what was expected at midline of its goals for cacao and has made limited progress for coffee. It is likely that progress has been limited in some of these indicators because building relationships between farmers and buyers takes time, and the pandemic may have contributed to the little progress observed (as interaction between these actors was paused). Given that in one-half of the indicators for this activity the progress is under what would be expected at midline (especially for one indicator), MOCCA should identify a strategy that would allow it to make exponential progress on these indicators to reach its target. With such adjustments, MOCCA should be able to reach the project goals for this activity.

There are four performance indicators related to **activity 3**, and two of these also relate to activity four (we only discuss them here). MOCCA has surpassed its goal for the number of technologies, practices, and approaches under various phases of research, development, and uptake as a result of USDA assistance (115% of the goal). The project has reached 86% of its target for the number of organizations that received assistance from USDA-funded interventions and 39% of the number of organizations with increased performance with USDA assistance (both also relate to activity 4). Finally, MOCCA has reached 26% of its target for the number of market system actors disseminating research findings as a result of USDA support. While the results of the first two indicators discussed are positive, for the latter two indicators the project implementers need to find ways to make more progress in the remaining life of the project.

**Table 8. Progress on project-level indicators, at midline**

| MOCC<br>A<br>Activity | Performance indicator  | LOP Target  | Baseline    | Progress against target<br>through March 2022 |     |
|-----------------------|--|-------------|-------------|---|-----|
|                       |  |             |             | #   | %   |
| 1                     | Number of individuals in the agriculture system who have applied improved management practices or technologies with USDA assistance          | 29,717      | 0           | Not measured yet                              |     |
| 1                     | Number of hectares under improved management practices or technologies with USDA assistance  | 30,449      | 0           | Not measured yet                              |     |
| 1                     | Number of individuals benefitting indirectly from USDA-funded interventions  | 546,993     | 0           | 429,317                                       | 78% |
| 1                     | Number of individuals who have received short-term agricultural sector productivity or food security training as a result of USDA assistance | 79,110      | 0           | 64,973  | 82% |
| 1                     | Yield (Kg/Ha) of targeted agricultural commodities among program participants with USDA assistance - coffee                                  | 871         | 646         | Not measured yet                              |     |
| 1                     | Yield (Kg/Ha) of targeted agricultural commodities among program participants with USDA assistance - cacao                                   | 522         | 353         | Not measured yet                              |     |
| 2                     | Value of annual sales of farms and firms receiving USDA assistance - Cacao   | 61,312,320  | 31,334,346  | 42,080,964                                    | 69% |
| 2                     | Value of annual sales of farms and firms receiving USDA assistance - Coffee  | 366,681,518 | 159,833,243 | 79,276,604                                    | 22% |
| 2                     | Volume (MT) of commodities sold by farms and firms receiving USDA assistance - coffee  | 123,178     | 51,894      | 29,080  | 24% |
| 2                     | Volume (MT) of commodities sold by farms and firms receiving USDA assistance - cacao   | 25,130      | 12,842      | 18,414  | 73% |
| 2                     | Number of farmers accessing improved markets through partnerships supported by the project   | 25,000      | 0           | 13,113  | 52% |

|   |  |            |   |           |      |
|---|--|------------|---|-----------|------|
| 2 | Value of new USG commitments and new public and private sector investment leveraged by USDA to support food security and nutrition         | 21,000,000 | 0 | 4,107,122 | 9%   |
| 3 | Number of technologies, practices, and approaches under various phases of research, development, and uptake as a result of USDA assistance | 165        | 0 | 189       | 115% |

Table 8. Continued.

| MOCCA Activity | Performance indicator   | Target     | Baseline | Progress against target through March 2022 |      |
|----------------|---|------------|----------|--|------|
|                |   |            |          | #  | %    |
| 3              | Number of market system actors disseminating research findings as a result of USDA support                            | 90         | 0        | 23   | 26%  |
| 4              | Number of seed-producing farms, nursery and clonal gardens supported to produce quality genetic material for planting | 1,055      | 0        | 778  | 74%  |
| 4              | # of plants and budwood acquired from strengthened seed lots, nurseries, and clonal gardens                           | 90,347,479 | 0        | 10,330,332                                 | 11%  |
| 5              | Number of individuals accessing agriculture-related financing as a result of USDA assistance                          | 22,145     | 0        | 5,831                                      | 26%  |
| 5              | Value of agriculture-related financing accessed as a result of USDA assistance (USD)                                  | 63,883,100 | 0        | 20,356,258                                 | 32%  |
| 1, 4, 5        | Number of individuals participating in USDA food security programs  | 121,022    | 0        | 71,582                                     | 59%  |
| 3, 4           | Number of organizations with increased performance with USDA assistance   | 872        | 0        | 336  | 39%  |
| 3, 4           | Number of organizations that received assistance from USDA-funded interventions.                                      | 1,207      | 0        | 889  | 86%  |
| 7              | Market system actors actively engaged in supporting R&R with regional platform support                                | 24         | 0        | 17   | 71%  |
| 7              | Number of regional platforms strengthened or created to support R&R initiatives                                       | 2          | 0        | 4  | 200% |



For **activity 4**, the progress made in the two additional indicators is contrasting, as in one hand, the project has reached 74% of its target for the number of seed-producing farms, nursery and clonal gardens supported to produce quality genetic material for planting (a very good progress), and in the other hand, it has only reached 11% of its target for the number of plants and budwood acquired from strengthened seed lots, nurseries, and clonal gardens. Of course, we would anticipate one indicator to move before the other, for example that the project first build capacity of genetic material providers to then see greater acquisition of material from these providers. The project needs to identify a strategy that would allow it to speed the acquisition of seedlings at verified or certified nurseries or clonal gardens, although this may require a long time because in all countries where MOCCA operates, there are no laws and regulations for certified nurseries, which makes this a slower process.

For **activity 5**, the progress made in the two additional indicators is modest. The project has reached 32% of its target for the value (USD) of agriculture-related financing accessed as a result of USDA assistance and 26% of its target for the number of individuals accessing agriculture-related financing as a result of USDA assistance. Facilitate access to financing has been challenging from start as establishing alliances with financial institutions was no easy task. Despite this, MOCCA has been able to formalize alliances with 17 financial institutions committed to provide more flexible loan conditions in pro of coffee and cacao farmers requesting a loan, despite the limitations caused by the pandemic (primarily an increase in unpaid loans due to lack of cash from borrowers, particularly in urban areas). Further, MOCCA has faced little enthusiasm from potential borrowers (farmers) because of the low coffee prices and the uncertainty caused by deaths due to COVID 19 in their homes, families and farms, which limited the possibility of new investments. It is worth noting that COVID put a brake on provision of new finance in many countries, and that progress in coffee and cacao has proved challenging. Despite this, MOCCA has been able to make some progress in this activity, and in the coming months, this progress is expected to be even larger, as new payments (of already approved loans) will become effective.

There are no indicators related specifically to **activity 6**. For **activity 7**, the progress made in its two indicators is also contrasting, but quite positive, as for the number of regional platforms strengthened or created to support R&R initiatives the project has reached 200% of its goal, and for the market system actors actively engaged in supporting R&R with regional platform support it has reached 71% of its goal. For this activity, the project is expected to meet its targets.

Of the 23 indicators discussed above, the project implementers have reached or surpassed the end-of-project goal in two indicators, have met between 50%-99% of the end-of-project goal in nine indicators, between 21%-49% of its end-of-project goal in six indicators, have met <20% of its end-of-project goal in two indicators, have not yet measured progress for four indicators. However, since the latter four indicators cannot be accounted for in the progress evaluation because these have not been measured yet, analyzing the progress made in the remaining indicators, we consider the project's progress at midline to be almost on track, as it is above 50% of its target in 58% of the indicators (11 out of 19). Despite this, attention needs to be paid to the indicators for which progress has been more limited.

## 4 Results for coffee

### 4.1 Contextual changes affecting the coffee sector

#### 4.1.1 Contextual factors affecting the coffee sector independent of MOCCA

Informants report several external factors that have directly impacted coffee market dynamics since 2019, namely: the Covid-19 pandemic, the Eta and Iota hurricanes in Central America in 2020, high emigration rates from Central America, political instability in Peru, the rise in coffee prices, the rise in input costs, and more recently, the war in Ukraine. Pandemic related restrictions and implications varied somewhat by country, but in all cases, farmers activities and technical assistance were affected. For example, the bureaucratic requirements for exporting coffee became more complex as a result of the pandemic. While COVID-19 related restrictions were less severe in Nicaragua, many in person activities were either cancelled or switched to online activities.

The fact that coffee prices have been relatively high these past few years has meant that farmers are interested in improving the health and productivity of their farms. This has been beneficial in terms of farmer interest in MOCCA-led activities. At the same time, demand for specialty coffee is increasing so there are opportunities for additional growers to try to insert themselves into niche markets, and potentially obtain higher prices for the product. Even though coffee prices are currently high, the price instability generates uncertainty for coffee farmers. Prior to this latest increase in prices, many farmers had underinvested in their farms, and hence their productivity was impacted.

Climate change is directly affecting the coffee sector, most notably due to the frequency and severity of hurricanes. According to informants, the 2020 hurricanes in Central America dramatically impacted coffee yields and damaged farms. Excess water resulted in fungus issues in many coffee farms and also impacted the work calendar, particularly in Nicaragua and Honduras. Central American countries are also experiencing high emigration rates towards the United States, and this has meant that it is increasingly difficult to find laborers willing to work on coffee farms. Farmers and even technicians and professionals have decided to migrate for either economic reasons or sociopolitical reasons. This has resulted in a sort of brain drain (especially in Nicaragua and Honduras) and rising labor costs for coffee communities. There is also a significant number of internal migrants searching for better remunerated work alternatives different from farming. Most informants cite rising input and labor costs as a challenge. In Nicaragua, for example, labor costs during harvests doubled or even tripled. Some key inputs have also tripled in price, according to informants.

The prioritization of renovation and renovation (R&R) in the coffee sector varies across the region. In El Salvador, for example, the effects of the 2012-14 coffee rust crisis are still being felt. The dramatic fall in productivity (around 70%) this caused has been very slow to recover. It has been difficult to improve the damaged reputation of El Salvador's coffee sector, especially among buyers and roasters looking for volume and consistency. The country continues to rely on coffee imports to cover domestic demand. El Salvador is also affected by the huge debt aggravated during the rust crisis. In Nicaragua, since the coffee rust crisis, farmers have gradually been able to renovate their plants with rust resistant varieties.

#### 4.1.2 How affected MOCCA/or any major adjustments in MOCCA strategy as a result?

The numerous restrictions introduced as a response to the Covid-19 pandemic affected all MOCCA's plans and timelines in some way. It most directly affected MOCCA plans around technical assistance (TA)

activities and the formalization of training partnerships, a core part of the program. Essentially, the majority of the designs and budget agreements were set prior to March 2020 but had to be delayed once it became obvious that COVID was to be taken seriously. MOCCA had to work with the donor to allow investments in personal protective equipment (PPE), and with partners to use their resources for PPE, and convince some partners to continue coinvesting with the project. Further, budgeting efforts took a few more months than anticipated. This resulted in most partnerships being delayed until after the Central American coffee harvest.

Also, due to the high rate of COVID transmission and fatalities in Peru, as per TechnoServe's hiring policy, the project was not allowed to hire training personnel until early 2021, particularly in Peru. Further, in accordance with TNS policy and based on transmission and fatality rates, MOCCA limited the size of training groups to a maximum of eight people, later increasing to 14, and currently stands at 20. This forced MOCCA to not invite spouses and older children to participate in activities. At times, MOCCA had to train only 1 on 1, instead of in a group setting, particularly in Guatemala, Honduras, and Peru. As a result, many farmers got used to receiving trainer visit on their own farm instead of having to travel outside to a group training, which has made transitioning to almost exclusively group trainings difficult for some farmers. Other adjustments included transitioning to online options (training videos and WhatsApp groups) and radio programming for farmers without internet and smart phones, a monumental effort by project implementers.

A cross-cutting challenge in MOCCA-led TA training has been the high turnover in technicians, many of which have decided to migrate or look for better paying jobs. There have been security concerns around visiting certain remote areas where farms are located because of the presence of gangs and drug cartels, further reinforcing the use of virtual TA methods. The uncertainties caused by the pandemic also directly impacted MOCCA's work in relation to improving access to financial services for farmers. Financial institutions were generally weary of creating new credit opportunities for farmers in this context, and farmers were also hesitant to request new loans. ISF's long-term access to finance work was also impacted, mainly by mobility restrictions, macroeconomic shocks, and the fact that partners were often prioritizing other issues as they sought to assimilate the implications of the global crisis. Political environments also impacted the project to some degree. Ecuador, Peru, El Salvador and Honduras recently had presidential elections that resulted in important policy changes and significant turnover in the personnel of public institutions, some of which are more aligned with MOCCA objectives than others. The government of El Salvador, for example, has been particularly interested in collaborating with MOCCA because revitalizing its weakened sector is a policy priority. It has been much harder to collaborate with the Nicaraguan public sector.

## **4.2 Project Results**

### **4.2.1 MOCCA's engagement by actor and country**

To date, MOCCA has partnered with 77 market system actors in coffee, ranging from 8 in Guatemala to 32 in Peru. MOCCA's implementation strategy for coffee has focused heavily on exporters (11), largely global exporters. Several coffee roasters and brands have been engaged (10), usually in partnership with an exporter in country, and as donors to co fund activities, with little direct engagement in those activities or with the farmers supported. Various farmer organizations are direct MOCCA partners in coffee (28),

while many more are engaged through other MOCCA partners such as exporters who purchase their crop. El Salvador is the exception, where MOCCA has not engaged directly with exporters, but instead has adopted a model of direct implementation with farmers and their organizations in coordination with the Salvadoran Coffee Council for farmer training. Fifteen financial institutions have been engaged, across all five countries. Where present, national commodity institutes have been engaged and where not present, MOCCA has partnered with the ministry of agriculture in Peru and with a multi-stakeholder platform in Nicaragua. NGOs play a role in Peru where many large projects already exist and are working in the sector. No coffee research institutions are engaged beyond the NCIs with research activities, and MOCCA consortium member, WCR.

*Table 9. MOCCA partners for coffee, by actor type and country*

| Partners                     | El Salvador | Guatemala | Honduras  | Nicaragua | Peru      | Regional | Total     |
|------------------------------|-------------|-----------|-----------|-----------|-----------|----------|-----------|
| Exporters                    |             | 3         | 3         | 2         | 1         |          | 9         |
| Roaster/brand/ importer      |             | 2         | 3         |           | 2         |          | 10        |
| Producer organizations       | 7           |           | 5         | 7         | 9         |          | 28        |
| Research Institutions        |             |           |           | 1         |           | 1        | 2         |
| Financial Institutions       | 1           | 2         | 2         | 1         | 9         |          | 15        |
| NCIs and public institutions | 2           | 1         | 1         | 1         | 1         | 1        | 7         |
| NGOs/Projects                |             |           |           |           | 2         | 1        | 3         |
| Others <sup>16</sup>         | 1           |           | 1         |           |           |          | 3         |
| <b>TOTAL</b>                 | <b>11</b>   | <b>8</b>  | <b>15</b> | <b>12</b> | <b>22</b> | <b>3</b> | <b>77</b> |

Looking at the roles different kinds of market system actors play in MOCCA activities across countries, we can see that for some support services, we have a duplicity of organization types providing those to farmers. Technical assistance under MOCCA is provided by exporters and farmer organizations largely, but also by NCIs in the case of Guatemala, the ministry of agriculture in the case of Peru, and entities allied with financial service providers in the case of Nicaragua. Market access is largely supported by exporters and farmer organizations, including two women's coffee associations. To date, research activities in coffee are mostly carried out in country by NCIs where that capacity exists (only Guatemala and Honduras), and in the rest by the private sector either under direct implementation by WCR for example with their networks of research plots or by an exporter in the case of Peru. Two kinds of coffee nurseries and seed producers have been engaged as beneficiaries of the project. Large nurseries, often affiliated with an exporter, have been engaged through the WCR Verification process and smaller individual nurseries have been engaged through the TNS nursery strengthening program. Access to finance is carried out by a mix of financial institutions and exporters. Strengthening national platforms engages as partners the existing formal national coffee structures in El Salvador, Guatemala and Honduras, while engaging multi-actor platforms and the ministry of agriculture in countries where these are not present. Finally, the work to strengthen regional platforms is carried out with PROMECAFE with support from WCR. Of the total of 77 partners, 47 are downstream from farmers (actors who purchase coffee, often also providing services) while 30 are upstream (providing services and inputs to farmers but not buying their coffee).

<sup>16</sup> Others include associations of women in coffee in El Salvador and Honduras and a certifier.

## **4.2.2 General characteristics of farmers**

### **4.2.2.1 Farmers' households**

To learn about decision making in the household, we inquired about how household heads made decisions about how to use the income from coffee sales, and whether this process was consulted with other family members. Overall, most heads made the decision by themselves (59% of male heads plus 21.4% female heads), only in one out of five households other members made this decision, and only in 21.9% of the households (regardless of who is the head) a female makes this decision (Table 10). For the latter variable, female participation comes mostly from female-headed households (either because the head makes the decision or another female member makes the decision), as only in 0.5% of male-headed households a female decides how to use the income from coffee sales. Although we observed this trend in most countries, in Guatemala we observed a higher share of households where members other than the head of the household made this decision. However, in general, this process was consulted mostly with other household members, except for El Salvador, where most farmers (73.6%) reported they did not consult with anyone about making this decision. It was rare to consult with people outside the household.

In the 12 months prior to the interview, migration was low, as only in 10.5% of the households at least one member migrated (this share is similar to the values observed at baseline). Migration was slightly higher in Honduras. Among these households, the number of members migrating was higher in Honduras and Peru, and lowest in El Salvador, and in most cases (except Peru), they migrated to another country, being the USA the most common destination (Table 10).

In a little over one out of five households, farmers reported off-farm work as a source of additional income, and this was most common in El Salvador and least common in Peru. A similar share of farmers reported having received subsidies although this was rare in Central America, and very common in Peru. Finally, almost 8% of households reported receiving remittances, being this more common in Guatemala and Honduras (Table 10).

*Table 10. Coffee: household characteristics*

| Household (HH) characteristics  | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Households (%) where decision of how to use the income from coffee sales was <b>made</b> by:        |             |            |            |            |            |               |
| Male HH head only   | 52.3        | 56.5       | 60.4       | 67.0       | 57.4       | 59.0          |
| Female HH head only   | 36.2        | 13.5       | 22.3       | 16.7       | 21.7       | 21.4          |
| Other HH member   | 11.5        | 30.0       | 17.3       | 16.3       | 20.9       | 19.7          |
| A female (either a female head or female member)  | 36.8        | 14.3       | 22.3       | 18.1       | 21.7       | 21.9          |
| Households (%) where decision of how to use the income from coffee sales was <b>consulted</b> with: |             |            |            |            |            |               |
| No one  | 73.6        | 30.7       | 48.7       | 41.9       | 19.9       | 40.9          |
| Other male HH member  | 17.8        | 25.0       | 23.9       | 20.7       | 24.8       | 22.7          |
| Other female HH member  | 7.5         | 39.5       | 25.9       | 36.1       | 55.3       | 34.7          |
| Other person outside the HH   | 1.2         | 4.8        | 1.5        | 1.3        | 0.0        | 1.8           |
| % HH where at least one member migrated within last 12 months:                                      | 4.0         | 11.7       | 16.8       | 13.7       | 6.0        | 10.5          |
| Among HH where a member migrated, # members who migrated  | 1.0         | 1.3        | 1.5        | 1.3        | 1.5        | 1.4           |
| Among HH where a member migrated, % HHs with at least one member migrating to another country       | 100         | 85.2       | 87.9       | 83.9       | 6.7        | 76.1          |
| Among HH where a member migrated to another country, % HH where members migrated to:                |             |            |            |            |            |               |
| Prefer not to answer  | 0           | 0          | 0          | 0          | 0          | 0             |
| USA   | 4.0         | 9.6        | 13.7       | 8.8        | 0          | 7.1           |
| Mexico  | 0           | 0          | 1.0        | 0          | 0          | 0.2           |
| Canada  | 0           | 0.4        | 0.5        | 0          | 0          | 0.2           |
| Central American country  | 0           | 0          | 0          | 1.3        | 0          | 0.3           |
| South American country  | 0           | 0          | 0          | 0          | 0          | 0             |
| Europe  | 0           | 0          | 0          | 0.4        | 0.4        | 0.2           |
| Other region  | 0           | 0          | 0          | 1.3        | 0          | 0.3           |
| % HH receiving income from off-farm work  | 39.1        | 28.7       | 16.8       | 24.7       | 12.9       | 23.7          |
| % HH receiving subsidy from the government or NGOs  | 8.6         | 7.0        | 6.1        | 7.9        | 66.3       | 21.0          |
| % HH receiving remittances  | 7.5         | 14.4       | 14.2       | 4.0        | 0.8        | 7.9           |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

#### 4.2.2.2 Farm characteristics

In this evaluation, we only inquired about plots where coffee was grown (existing and new). In the year of reference, the plots where farmers reported growing coffee were 2.48 ha large, and most (2.06 ha) were used for coffee cultivation (Table 11). Compared to baseline data, the plot area was smaller (but is understandable as we did not ask about additional plots where coffee was not grown) as was the coffee area (down from 2.74 ha reported in the baseline). One explanation of the latter is that in the midline, we only interviewed a sub-sample of baseline farmers, which can be influencing the mean values. While farmers in Nicaragua reported growing the largest area with coffee, farmers in Guatemala reported the lowest area.

Almost two out of three households reported growing only one coffee plot, 23.8% reported growing two coffee plots and almost 13% grew three or more plots with coffee (all similar shares to the ones reported at baseline). This varied by country as in Nicaragua, a higher share of farmers grew more than one plot with coffee, followed by farmers in Peru and Guatemala. In general, few farmers (7.8%) established new coffee plots since the baseline, and this was slightly more common in Peru.

**Table 11. Coffee: farm characteristics in the 2021-2022 agricultural year**

| Farm characteristics   | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|--|-------------|------------|------------|------------|------------|---------------|
| Total area (ha)* in plots with coffee                                  | 1.17        | 1.02       | 2.08       | 4.01       | 3.66       | 2.48          |
| Total coffee area (ha)   | 0.98        | 0.94       | 2.02       | 3.51       | 2.56       | 2.06          |
| Households (%) with:   |             |            |            |            |            |               |
| One coffee plot  | 95.4        | 61.3       | 73.1       | 41.9       | 53.0       | 63.0          |
| Two coffee plots   | 4.6         | 26.1       | 19.8       | 32.2       | 30.5       | 23.8          |
| Three or more coffee plots   | 0           | 12.2       | 7.1        | 25.1       | 16.1       | 12.9          |
| Share (%) of new coffee plots established since the baseline           | 8.6         | 7.1        | 5.3        | 6.1        | 11.5       | 7.8           |
| Farmers (%) doing a production diagnosis of their coffee crop          | 6.9         | 11.7       | 24.4       | 60.8       | 44.2       | 31.1          |
| Farmers (%) implementing:  |             |            |            |            |            |               |
| Dead cover in their coffee plots                                       | 45.4        | 60.4       | 57.4       | 64.3       | 79.5       | 62.7          |
| Live/green cover in their coffee plots                                 | 4.0         | 11.3       | 27.9       | 34.4       | 47.0       | 26.3          |
| Covering space between coffee rows with residues from weeding          | 64.4        | 94.8       | 87.8       | 75.3       | 59.4       | 76.3          |
| Cleaning drainage of coffee plots                                      | 44.3        | 34.8       | 29.4       | 39.2       | 23.3       | 33.6          |
| Farmers (%) implementing these cost-saving practices to control weeds: |             |            |            |            |            |               |
| Use of weed-wacker (or trimmer)  | 1.2         | 0          | 25.4       | 1.8        | 77.5       | 23.1          |
| Scheduling weeding activities  | 53.5        | 21.7       | 39.6       | 68.7       | 53.8       | 47.5          |
| Selective weed control   | 2.9         | 16.5       | 16.8       | 38.3       | 28.5       | 21.7          |
| Use of herbicides  | 4.0         | 17.4       | 10.7       | 67.0       | 4.4        | 21.5          |
| Among HH using herbicides, % applying it focalized/using a screen      | 71.4        | 62.5       | 47.6       | 54.0       | 90.9       | 57.1          |
| <b>Number of households</b>  | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

\*1 ha (hectare) = 10,000 square meters

Almost one in three farmers reported doing a production diagnosis of their coffee plots, an increase from the baseline share of 24.4%. Doing a diagnosis was extremely more common in Nicaragua, followed by far by Peru and even farther by Honduras and all other countries (Table 11).

Regarding soil management practices, following the baseline evaluation, we focus on whether farmers implement soil conservation practices and discuss whether farmers implement cost-saving practices to control weeds. The implementation of these practices varied by the type of practice. While it was common for farmers to cover the space between coffee rows with residues from weeding followed by having dead cover in their coffee plots (same order of importance as in the baseline), it was less common to clean the drainages or have live/green covers. Among cost-saving practices to control weeds, scheduling weeding activities was the most common practice (this was the second most common practice reported at baseline), followed by using a weed-wacker, doing selective weed control and using herbicides. However, in Peru using a weed-wacker was the most common method used to control weeds. Using herbicides was extremely common in Nicaragua, and least common in Peru and El Salvador, and overall, only 21.5% of farmers reported using herbicides (a slight decrease compared to the 26.4% who reported this at baseline). Among farmers applying herbicides, 57.1% applied them focalized (using a screen or other equipment), a slight increase from baseline (Table 11).

At the aggregate level, land tenure was quite similar to what was reported at baseline, as most farmers reported owning land with deed and few farmers reported not owning any land (Table 12). However, we observed some differences across countries, particularly in El Salvador (positive change as a higher share of farmers now own land with deed), and Guatemala and Peru (both negative, as fewer farmers reported owning land with deed).



*Table 12. Coffee: Land tenure in the 2021-2022 agricultural year*

| Land tenure (% HH)          | El Salvador |            |            | Guatemala |            |            | Honduras  |            |            | Nicaragua |            |            | Peru      |            |            | All countries |            |             |
|-----------------------------|-------------|------------|------------|-----------|------------|------------|-----------|------------|------------|-----------|------------|------------|-----------|------------|------------|---------------|------------|-------------|
|                             | Female      | Male       | Total      | Female    | Male       | Total      | Female    | Male       | Total      | Female    | Male       | Total      | Female    | Male       | Total      | Female        | Male       | Total       |
| Owning land with deed       | 79.7        | 81.0       | 80.5       | 52.8      | 60.1       | 57.8       | 69.0      | 66.2       | 67.0       | 53.3      | 68.1       | 65.2       | 9.0       | 9.3        | 9.2        | 52.9          | 53.8       | 53.5        |
| Owning land without deed    | 20.3        | 18.0       | 19.0       | 43.1      | 31.0       | 34.8       | 31.0      | 32.4       | 32.0       | 13.3      | 12.1       | 12.3       | 67.2      | 70.3       | 69.5       | 36.4          | 34.4       | 35.0        |
| Not owning land             | 0.0         | 1.0        | 0.6        | 5.6       | 8.9        | 7.8        | 0.0       | 4.3        | 3.1        | 35.6      | 22.0       | 24.7       | 31.3      | 28.6       | 29.3       | 13.0          | 14.9       | 14.3        |
| <b>Number of households</b> | <b>74</b>   | <b>100</b> | <b>174</b> | <b>72</b> | <b>158</b> | <b>230</b> | <b>58</b> | <b>139</b> | <b>197</b> | <b>45</b> | <b>182</b> | <b>227</b> | <b>67</b> | <b>182</b> | <b>249</b> | <b>316</b>    | <b>761</b> | <b>1077</b> |

#### 4.2.3 Results by Activity 1: Farmer Training

The majority of MOCCA's work so far has focused on strengthening and widening the technical assistance offered to coffee farmers. Technical Assistance in coffee under MOCCA is carried out largely in coordination with exporters and farmer organizations, some national commodity institutes and some financial institutions. The arrangements are varied, ranging from full implementation by partners with minimal curricular inputs from TechnoServe to full direct implementation by TechnoServe, with the partner supporting farmer identification and recruitment and minimal technical supervision. The core of MOCCA's theory of change vis a vis technical assistance is that farmers are served best by a curriculum that is well structured, includes topics relevant to R and R as well as quality and is delivered with groups of farmers with a strong adult education/participatory learning methodology. Technical assistance should be timely and regular, ensuring that content is relevant to the crop development stage such that recommended practices can be readily implemented. MOCCA developed the curriculum and has supported partners with its implementation.

MOCCA has established numerous alliances to reach thousands of farmers with technical assistance. The majority of technical assistance partners are coffee buyers, either exporters or cooperatives buying coffee from farmers or roasters or processors sourcing their coffee in MOCCA countries. El Salvador is an exception where buyers have been uninterested or unable to co invest in technical assistance, while public institutions have shown strong interest to incorporate MOCCA technical assistance curriculum into a large public coffee sector renovation project. Farmer technical assistance began in the fourth semester of implementation (April to September 2020) just as the pandemic intensified in all MOCCA countries and restrictions on mobility and group gatherings were imposed. This required a major shift in MOCCA's coffee training model to incorporate virtual training tools and methods to support farmers during this complex period. While the severity of restrictions varied across countries and over time, in general the pandemic forced a delay in the start of trainings and a shift from group in-person trainings to more virtual and one-on-one sessions. Between April and September 2020, the first partner agreements were signed for technical assistance to benefit 38,000 farmers, 30% of which are women. Training also began during this period, reaching an initial 3500 farmers. During the following semester, training really took off with numbers of farmers trained tripling during the following semester and more agreements were signed. Farmers trained doubled during the sixth semester by September 2021 and increased another 30% by March 2022. MOCCA continues to develop new partnerships to bring online new partners benefitting additional farmers, the results of which we should be able to see in the next few semesters.

Informants in all countries highlight numerous benefits and innovations in the technical assistance methodologies introduced as a result of MOCCA. The most frequently cited achievements include: wider coverage; the prioritization of R&R; financial literacy training; the use of WhatsApp and radio to reach more farmers; a greater focus on increasing productivity and improving quality; the use of demonstration plots; the gender equity focus; better understanding of certification options and processes; more frequent and consistent TA; and a focus on restoration and renovation techniques. In general, the fact that the training received is comprehensive and covers many different themes is considered a strength. Interviewees believe that the field schools and demonstration plots have been particularly effective for visualizing the lessons learned remotely. The themes covered are diverse, including soil management; pests and diseases; shade management; training on best practices with equipment and tools; coffee quality monitoring practices; storage practices; investment planning; harvest and post-harvesting techniques; commercialization; diversification; pruning; gender equity; and certification norms and

requirements. In Central America, training on climate resilience and soil recovery strategies were particularly valuable in the aftermath of the Eta and Iota storms.

**Table 13. Results at the level of businesses and institutions**

| El Salvador   | Guatemala   | Honduras  | Nicaragua   | Peru   |
|---|---|---|---|--|
| <b># MOCCA partners participating in Activity</b>   |   |   |   |  |
| 6   | 6   | 11  | 10  | 14   |
| <b># farmers reached<sup>17</sup></b>   |   |   |   |  |
| 2,113   | 14,228  | 6,717   | 9,171   | 10,141   |
| <b>Major changes made in their TA services under MOCCA</b>  |   |   |   |  |
| More frequent visits of technicians; use of WhatsApp and radio; better curriculum structure; more credibility;  | Wider coverage; better curriculum structure; financial planning; use of visual materials  | One on one assistance; different methodologies; use of WhatsApp and radio; greater coverage; broader curriculum; more frequent; technicians know their area of work; more continuity; focus on increasing productivity and income | More small-scale farmers are being trained, as opposed to solely medium and large-scale farms; use of WhatsApp; supporting farmers with certifications; more frequent visits  | More follow-up and monitoring of activities; development of methodologies for individual and group trainings; more consistent assistance; more focus on improving quality and productivity |
| <b>Major achievements in TA under MOCCA</b>   |   |   |   |  |
| Training on organic techniques; incorporation of gender equity themes; creation of demonstration plots; better understanding of coffee plant diseases; more follow-up   | Integration of the PIER program; better information design and management; focus on R&R; financial training; support with certification processes; productivity and quality improvements                        | Better quality trainings; expansion of technical assistance networks; more producers reached; improved market access; productivity improvements   | More farmers reached; TA connects more small-scale farmers with new market access models; some farmers achieved greater productivity  | Inclusion of family unit in trainings; increased productivity; quality improvements; use of new training methodologies; improved use of wet-milling equipment                              |
| <b>Major challenges in TA under MOCCA</b>   |   |   |   |  |
| Technician turnover makes continuity difficult; some farmers perceive training as waste of time; financial institutions do not prioritize coffee farmer training; hesitancy to adopt R&R practices for economic reasons | More accompaniment on farm/ in demonstration plots; COVID-related mobility restrictions; cultural differences; lack of motivation because new practices are difficult to implement due to financial limitations | Expensive inputs; producer dispersion; farm abandonment due to migration; retaining technicians with low salaries; need to include more youth and women   | Covid-19 did not allow group trainings, individual trainings slowed the process; need greater support for obtaining financial services; technicians lack knowledge on commercialization topics, as they focus on production; many technicians migrated so there was personnel turnover. | Lack of farmer investment capacity; challenges in group trainings; remote locations difficult to access; need to include more women  |

<sup>17</sup> From MOCCA Report September 2021 to March 2022

Many of the challenges with regards to technical assistance cited by informants are relevant across several countries including: the lack of tools and financing necessary for farmers to implement some of the R&R techniques learned; the need to incorporate more women and youth to trainings; the remoteness of some farms makes it difficult for some farmers to travel or for technicians to reach them consistently; as many small-scale coffee farmers do not solely grow coffee, they often do not have time or do not prioritize to participate in TA activities; and the turnover in technicians interrupts the consistency of the TA work. In Honduras, for example, informants commented that technicians' salaries were not sufficiently high in the face of rising fuel prices and hence many have decided to migrate or search for better paying jobs. High emigration rates from Central America have meant that some farms have been abandoned and it's becoming increasingly challenging to find qualified technicians. As many farmers live in remote areas, it's expensive to reach them. In El Salvador, security issues have a direct impact on the ability to carry out TA in some remote areas or places with a strong gang presence.

Before the pandemic, few thought that it was feasible or desirable to design remote training methodologies. Even though the development of the training materials involved an immense amount of work and significant monetary costs, they've generally been well received. As several focus group conversations with TA providers confirmed, MOCCA's model allows for TA to reach more small-scale farmers than was previously the case. The hope is that they will continue to be relevant even after MOCCA and that they can be used and adapted by other actors carrying out technical assistance. In all countries informants mentioned the value of using technology to share information with farmers. The use of WhatsApp groups has allowed for growers to exchange information with one another in a way that they hadn't before. Still, these models are challenging for some farmers that are not experts with smartphones and tablets. During a focus group with TA providers in El Salvador, for example, participants commented that less than half of the farmers that they have trained have smartphones. On the upside, many farmers have gradually learned how to use smartphones and social media so as to benefit from the information shared as part of the project. In several cases, informants commented that the language in the materials shared is too technical for many farmers to grasp. Thus, there is a need for developing materials that are even more farmer friendly.

In Nicaragua, MOCCA has supported ongoing initiatives to renovate coffee farms. One of the challenges is cultural, as there continues to be some resistance from farmers with regards to introducing major R&R practices. On another level, the resistance is pragmatic; farmers do not want to sacrifice productivity at a time when coffee prices are high. They also lack sufficient financial services to implement R&R.

In El Salvador, TA providers commented that independent farmers have been more willing to implement R&R practices than those that are part of cooperative. There has been high interest in organic inputs, given that conventional inputs are ever more expensive. Since MOCCA does not contribute with donations or inputs, some farmers do not want to participate because they lack the resources to implement the practices proposed by technicians. One recurring limitation cited by informants regarding TA is that it should be complemented with inputs and tools because even though farmers are learning new techniques, they do not have the materials necessary to implement them on their farm, especially given the rising prices of inputs. Knowledge that is not applied immediately is often lost. Additional model plots where farmers can observe good agronomic practices were also proposed as a way of strengthening MOCCA's work.

Despite the challenges, there is evidence that in all countries some partners that have partnered with MOCCA in technical assistance are replicating their work beyond MOCCA's target group. As can be seen in the table below, many of them have also established partnerships with new actors as a result. Importantly, the majority indicate that they believe it is likely that their technical assistance work will continue beyond MOCCA. The major reason cited for this likely continuity is that technical assistance is necessary and important for farmers. Moreover, MOCCA's technical assistance work has produced closer relationships between anchor firms and farmers. All exporter anchor firms in Nicaragua working with MOCCA, for instance, have implemented technical assistance models that are linked to financing opportunities, improved market access, and support with certification processes. Farmers value the market access opportunities that this relationship entails, while firms benefit from farmer loyalty and improved quality and productivity. In Honduras, anchor firm informants commented that their work alongside MOCCA has allowed farmers to build new relationships with cooperatives, which also has helped them sell more coffee. For these reasons, the TA model advocated by MOCCA is likely to continue. A few actors cited the lack of resources as a possible factor that could make continuity challenging. Still, the trends are promising regarding the possibility for systemic change at the market systems level in relation to technical assistance.

**Table 14. Systemic change at the level of businesses and institutions in technical assistance**

| Details   | El Salvador | Guatemala | Honduras  | Nicaragua | Peru     |
|---|-------------|-----------|-----------|-----------|----------|
| % of informants replicating activities beyond MOCCA target group                                | 1/4: 25%    | 3/4: 75%  | 4/6: 67%  | 3/4: 75%  | 4/5: 75% |
| % of informants who have established new partnerships as a result of MOCCA                      | 1/4: 25%    | 2/4: 50%  | 6/6: 100% | 1/4: 25%  | 4/5: 75% |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 3/4: 75%    | 4/4: 100% | 6/6: 100% | 4/4: 100% | 4/5: 75% |
| Level of systemic change (Systemic Change Pathway average) <sup>18</sup>                        | 1.75        | 3         | 1.7       | 2.25      | 2.8      |

<sup>18</sup> 1. Incipient. Market system actors agree to implement approaches with MOCCA to improve farmer training  
2. Initial. Partners adopting improvements affecting farmer training quality, frequency, or scale  
3. Intermediate. Partners adopting improvements in farmer training beyond MOCCA-supported activities  
4. Advanced. Partners making investments to apply improved training approaches beyond MOCCA  
5. Mature. MOCCA partners & non-partners adopting improvements in training quality, frequency, or scalability independently of MOCCA

In all countries, partners are adopting improvements in at least one dimension related to farmer training, including the quality, frequency and scale of the technical assistance provided. In a few cases, especially in Guatemala and Peru, partners have improved their training approaches beyond what was agreed upon with MOCCA. For these reasons, we locate all countries in either the initial or intermediary stages of the Systemic Change Pathway.

#### 4.2.4 Results by Activity 2: Market linkages

For MOCCA, Inclusive Market Access includes both access to better commercial relationships resulting in better prices for farmers, including for example quality differentials, certifications, less intermediation, as well as commercial relationships that facilitate access to other important services that generate non-price benefits to farmers such as technical assistance, finance, or access to planting material. Activity 2 has been strongly tied to Activity 1: Technical Assistance in MOCCA's implementation strategy with most partners engaged across both of these activities to realize synergies between improved crop management practices leading to improved productivity and quality, leading to improved profitability, leading to further investment in improved crop management practices. The idea is that anchor firms willing to coinvest with MOCCA in technical assistance build stronger relationships with farmers they can integrate into their supply chains. Moreover, by investing in training farmers in their supply chains, they help improve the outcomes of their farmer suppliers who, by adopting recommendations can improve yields, quality, and profitability. Over time this is a potential win-win as it contributes both to farmer loyalty when it comes to sales and increases in volume and quality of coffee available from these suppliers, allowing exporters to grow their businesses. Activity 2 also seeks to improve the conditions under which anchor firms lend money to farmers and facilitate access to better quality genetic material as part of their commercial relationships with farmers.

The majority of partners for this activity are market system actors who purchase coffee from farmers or cooperatives to sell on to traders, roasters, or processors. These include exporters, many engaged in the specialty coffee market and interested in expanding supply for that segment; cooperatives; coffee processors or brands, and two coffee women's associations focusing on market access for women. Agreements with partners under this activity include buying dried coffee instead of coffee cherries, buying more directly from farmers, and introducing visual quality assessments as well as cupping to establish price differentials for farmers and improve coffee quality for buyers. Agreements also include provision or facilitation of complementary services to farmers including technical assistance (a criteria for partner selection), access to finance, improved genetic material and in some cases research results. Of 16 buyers interviewed (including exporters and farmer organizations), all were engaged with MOCCA in improving technical assistance services to farmers (of course as was part of selection criteria). In addition, eight (50%) were involved in providing or facilitating improved access to finance, five (31%) in improving access to quality planting material, and two (13%) in research relevant for small farmers. This indicates progress in broadening the benefits to farmers of commercial relationships not just via price improvements but also via improvements in access to complementary services that also translate into economic benefits for farmers.

Except for El Salvador, the project is engaging multiple buyers in each country, important for instigating system-wide change. This has not happened in El Salvador as anchor firms were uninterested in

introducing changes in their business models to increase benefits to farmers and were unwilling or unable to co invest in technical assistance. In some cases, national coffee entities also play a role supporting quality management and marketing of the country as a coffee origin.

Given the annual crop cycle for coffee and the start of field activities with farmers in 2020, the first commercial sales under MOCCA would only happen in late 2020 or early 2021. In the semester report April to September 2021, we begin to see a few mentions from partner anchor firms of sales with MOCCA farmers including new certifications and buying arrangements. We anticipate, however, that the bulk of activity and results for this area will show in 2022.

**Table 15. Results at the level of businesses and institutions**

| El Salvador   | Guatemala  | Honduras   | Nicaragua  | Peru  |
|---|--|--|--|---|
| <b># MOCCA partners participating in Activity</b>   |  |  |  |   |
| 5   | 4  | 7  | 2  | 12  |
| <b># Farmers reached</b>  |  |  |  |   |
| 0   | 569  | 1,288  | 1,115  | 1,343   |
| <b>Major changes made in their market access services under MOCCA</b>                       |  |  |  |   |
| MOCCA in conversations with partners interested in collaborating with the project           | Quality improvements; focus on certifications and quality competitions   | 38% of informants say they introduced new buying models; anchor firms state they are working with more farmers   | Some farmers that have received TA and fulfill certain requirements are selling their coffee 2-3 dollars above market price; support with RA certification       | More focus on access to financial services; in some cases, volume of purchases increased due to relationships with farmers (according to anchor firms)                          |
| <b>Major achievements in market access under MOCCA</b>                                      |  |  |  |   |
| No results yet  | Partners establish direct relationships with more farmers; more certifications; use of technology (app) for purchases; improvement of post-harvest practices | Quality improvements; stronger or new alliances with buyers; quality standardization; improved prices when selling directly; more fair-trade product   | More small-scale farmers have access to better prices; certification process initiated for a group of farmers  | Quality improvements; better prices for better quality; more volume being sold  |
| <b>Major challenges in market access under MOCCA</b>  |  |  |  |   |
| Technical assistance has not necessarily translated into improved market access for farmers | Making quality more homogeneous; role of intermediaries; supporting farmers with tax issues; complying with quality expectations                             | Not to depend on international aid projects; intermediary speculation; high labor and input costs; having buyers who consistently pay more; disloyal competition; establish sustainability norms | The logistics of purchasing from small-scale farmers is difficult; finding more credit options; remoteness of some farms makes certification processes difficult | The power of intermediaries; not to mix varieties; having bank accounts; improving access to financial services; retaining client loyalty; keeping quality profiles consistent. |

According to informants, MOCCA's work has facilitated the strengthening of farmer-anchor firm relationships, which in some cases has resulted in greater volumes of coffee purchased by the anchor firms. In Nicaragua, for example, new market access models are making it more practical for anchor firms to buy their coffee directly from small-scale farmers as the relationships solidify, especially as a result of the combined TA and financing (shared harvest) model. There is also more focus on quality improvements and on obtaining relevant certifications for specialty markets. MOCCA has offered information and accompaniment for various types of certification options, which in turn opens opportunities for farmers



to access better prices for coffee. Quality improvements also increase opportunities for better prices. In Honduras, however, growers with certified coffee and better-quality product did not always benefit from better prices this past harvest because prices for coffee were high. According to anchor firm informants, MOCCA has allowed for more farmers to establish closer relationships with them, which in turn helps them secure a buyer for their product.

Given the close and personal relationship that has been established between anchor firms and MOCCA farmers, it is very likely that this market access model will continue in the near future. Some anchor firms MOCCA partnered with already had some elements of the inclusive business models proposed by MOCCA in place. These firms have not reported major *changes* in their practices, but MOCCA has supported the continuation and expansion of practices and systems that were already in place to greater numbers of farmers. In El Salvador, activity 1 and 2 have not effectively gone hand in hand, as MOCCA hoped that they would. The fact that MOCCA's most direct allies are state actors as opposed to coffee buyers may be part of the reason why. Still, market access has not visibly improved for small-scale farmers yet according to informants in El Salvador. Additional support with market access was commonly cited as an issue that could be worked on further as part of MOCCA, in El Salvador and elsewhere.

As can be seen in the table below, the evidence of progress towards systemic change in relation to improved market access is variable across countries. El Salvador has made the least progress, whereas Guatemala and Peru have the highest proportion of actors replicating their activities beyond what was agreed upon with MOCCA. One anchor firm in Peru, for example, reported replicating their quality improvement work with 6 cooperatives. Another successful example is that of a Nicaraguan anchor firm that was able to expand its Rainforest certification program to small-scale farmers as opposed to solely working with medium and large-scale producers. This has involved some negotiation with intermediaries such that they transfer the entirety of price premiums to farmers. In this particular case, the market access model, including the certification program, is interrelated to the financing and shared harvest opportunities the firm provides to farmers. They anticipate that these changes will endure beyond MOCCA, given the close relationships that have been established with relevant farmers.

**Table 16. Systemic change at the level of businesses and institutions in market access**

| Details   | El Salvador | Guatemala | Honduras  | Nicaragua | Peru      |
|---|-------------|-----------|-----------|-----------|-----------|
| % of informants replicating activities beyond MOCCA target group                                | 0/1: 0%     | 2/3: 67%  | 5/6: 83%  | 0/2: 0%   | 3/3: 100% |
| % of informants who have established new partnerships as a result of MOCCA                      | 0/1: 0%     | 0/3: 0%   | 4/6: 67%  | 1/2: 50%  | 0/3: 0%   |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 0/1: 0%     | 3/3: 100% | 6/6: 100% | 1/2: 50%  | 2/3: 67%  |
| Level of systemic change (Systemic Change Pathway average) <sup>19</sup>                        | 1           | 2.67      | 1.83      | 2         | 3         |

#### 4.2.5 Results by Activity 3: Improved Research

##### 4.2.5.1 Actors, initial results, potential for systemic change

MOCCA's research agenda in coffee has a major focus on varietal testing and breeding, building on MOCCA consortium member WCR's capacity in this area. MOCCA acted swiftly to engage the coffee institutes in the region, under PROMECAFE, to establish the Regional Plant Breeding Center, colloquially referred to as the Breeding Hub. The Hub is a collaboration between WCR, various NCIs, and PROMECAFE, with the headquarters in Honduras' IHCAFE. By October 2019 IHCAFE had been selected as the host for the hub and a cooperation agreement had been signed with WCR. By March 2021 coffee accessions had been transferred to the new breeding hub to begin work and ongoing WCR trials had been incorporated into MOCCA routines and partners. MOCCA had also designed with PROMECAFE a matching grant mechanism for funding research as well as an annual contest to showcase research dissemination best practices. From the point of view of MOCCA staff, one of the major achievements so far in relation to improving the quality of coffee genetic material in the region has been the setting up of this Breeding Hub.

MOCCA has few partners to date actually carrying out coffee research in target countries (4) as shown in the table below. PROMECAFE and WCR are important regional partners in research for MOCCA, supporting work across all countries. WCR is actively managing research plots in all countries, sometimes in partnership with local partners, Ecom in the case of Nicaragua, OFI in the case of Peru and IHCAFE in the case of Honduras. PROMECAFE leads the establishment of the Regional Breeding Hub, hosted by IHCAFE. This is not a surprise given how few entities in each country carry out coffee research. MOCCA

<sup>19</sup> 1. *Incipient*. Commercial partners agree to implement approaches with MOCCA that improve benefits to farmers in their supply chain

2. *Initial*. Commercial partners making investments in expanding approaches benefiting farmers beyond MOCCA

3. *Intermediate*. Commercial partners beginning to apply approaches beyond MOCCA -supported activities

4. *Advanced*. Commercial partners making investments in expanding approaches benefiting farmers beyond MOCCA

5. *Mature*. MOCCA partners & non-partners adopting approaches to benefit farmers in their supply chains, independently of MOCCA

has also been working on setting up a matching fund for research, to be managed by PROMECAFE, which may help to engage other national research entities in the coffee research agenda during the second half of MOCCA.

**Table 17. Results at the level of businesses and institutions**

| El Salvador   | Guatemala | Honduras   | Nicaragua   | Peru   |
|---|-----------|--|---|--|
| # of MOCCA partners participating in Activity             |           |  |   |  |
| 0   | 1         | 1  | 1   | 1  |
| Number of technologies <sup>20</sup>                      |           |  |   |  |
| 19  | 31        | 24   | 53  | 46   |
| Major changes made in their research services under MOCCA |           |  |   |  |
| NA  | n.d.      | Model plots; establishment of Breeding Hub   | 37 model plots with 4 different coffee varieties; trials with farmers to evaluate productivity and resistance to diseases in different places   | Research plots with different coffee varieties   |
| Major achievements in research under MOCCA                |           |  |   |  |
| NA  | n.d.      | MOCCA growers are more up to date with latest research; Model plots for farmers to learn; Breeding Hub | Farmers better able to evaluate the productivity, quality, and adaptability of different varieties to their location; publication of preliminary findings regarding variety trials; farmers better able to keep records about their farm operations | The genetic analysis of the plants helped identify plants with best genetics for seed production for certified seed. |
| Major challenges in research under MOCCA                  |           |  |   |  |
| NA  | n.d.      | Insufficient resources; climate change makes it that pests and diseases are changing; expensive        | Research findings need to be shared more systematically with farmers; partners need to commit to continue with the research plots; insufficient land on which to carry out research.  | Difficult to do the genetic testing beyond MOCCA areas.  |

In Nicaragua, MOCCA has supported research initiatives that seek to monitor the performance of different varieties as part of the broader initiative to promote renovation of coffee farms. Demonstration plots managed in collaboration with exporters have been particularly important for this work. WCR is managing the research plots in Nicaragua following rigorous scientific methods to determine productivity and disease resistance performance of different varieties. They plan on releasing preliminary findings later in

<sup>20</sup> From FAIS indicators through March 2022.

2022. The hope is that these plots can help growers make better decisions with regards to what varieties are most appropriate for their farms.

Even though there are few actors engaged in research, there are key initiatives that will likely be sustainable beyond MOCCA. IHCAFE's work with the Breeding Hub, for instance, will likely continue, as the institution has the capacity to continue with this work. Ongoing trainings on the new technologies will continue to be necessary to make the process sustainable in the long term. Several other organizations are collaborating with the Breeding Hub, including CATIE and ANACAFE. WCR's work with numerous partners will also continue to be relevant independent of MOCCA.

**Table 18. Systemic change at the level of businesses and institutions in research**

| Details:  | El Salvador      | Guatemala | Honduras  | Nicaragua | Peru |
|---|------------------|-----------|-----------|-----------|------|
| % of informants replicating activities beyond MOCCA target group                                | NA <sup>21</sup> | n.d.      | 1/1: 100% | 0/1: 0%   | n.d. |
| % of informants who have established new partnerships as a result of MOCCA                      | NA               | n.d.      | 1/1: 100% | 0/1: 0%   | n.d. |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | NA               | n.d.      | 1/1: 100% | 1/1: 100% | n.d. |
| Level of systemic change (Systemic Change Pathway average) <sup>22</sup>                        | 1                | 1         | 2         | 1.5       | 1    |

<sup>21</sup> NA means that no market system actors were identified as MOCCA partners for this activity in this country.

<sup>22</sup> 1 Incipient: Research partners agree on approaches to improve research and dissemination with MOCCA

2 Initial: Research partners adopting improvements in research (quality and scope) and dissemination of research results to farmers.

3 Intermediate: Research partners adopting improvements to research and dissemination beyond MOCCA supported activities

4 Advanced: Research partners making investments to expand research and dissemination independently of MOCCA

5 Mature: Research partners and non-partners improving research and dissemination relevant to farmers, independently of MOCCA

#### 4.2.5.2 Farmers' access to products of research

Compared to baseline, the share of farmers that reported receiving information about coffee research increased from 16.4% to 35.4% at midline (Table 19), and though we observed this increase in every country, the largest change happened in Peru (from 7.1% at baseline to 37.4% at midline) and Guatemala (from 12.7% at baseline to 41.7% at midline).<sup>23</sup> Among farmers who received this type of information, the main sources were non-governmental organizations (NGOs, 61.4%) and the government (18.1%).

We asked farmers whether they needed to pay to obtain information of coffee research products. In general, accessing such information did not cost them as only 9.5% reported paying to obtain the information. Most farmers said they were able to use the information to make farming decisions and the ones who were not able to use the information, said they could not implement the recommendations (a change from baseline, when most did not consider the information useful).

Only 9.8% of farmers needing technical advice with their coffee crop generally do not seek anyone for advice and of these, 42.5% reported they never clarify their doubts (and doing this was extremely common in Peru and not reported in El Salvador, where most farmers reported going to agro-dealers for advice). When farmers seek technical advice, they usually consult an NGO technician, a neighbor who also grows coffee or a relative, and this varied by country (Table 19). Further, farmers needing technical advice rarely seek the assistance of a government technician, except in El Salvador (and we also observed this trend at baseline). When contacting a technician for advice, farmers usually do it over a cell phone.

Given that to date many farmers have received trainings from the project, when asked about their opinion on the usefulness of the trainings received, most reported they were very useful (53.7%) or useful (42.8%), and this ranking was consistent among Central American countries, except in Peru, where most farmers reported these trainings were useful (Table 19). Despite this, since very few farmers did not find the trainings useful, we can infer that in general, farmers are benefiting from the MOCCA trainings.

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<sup>23</sup> Baseline values for El Salvador, Honduras and Nicaragua were 45.6%, 13.6% and 16.6%, respectively.

**Table 19. Coffee: Access to products of coffee research at midline**

| Details  | El Salvador | Guatemala | Honduras | Nicaragua | Peru | All countries |
|--|-------------|-----------|----------|-----------|------|---------------|
| Farmers (%) who reported ever receiving information about coffee research products | 50.0        | 41.7      | 18.8     | 30.0      | 37.4 | 35.4          |
| Source of this information (%):  |             |           |          |           |      |               |
| Internet   | 0           | 2.1       | 16.2     | 17.7      | 7.5  | 7.1           |
| Neighbor or relative   | 1.2         | 5.2       | 10.8     | 2.9       | 2.2  | 3.7           |
| NGO  | 81.6        | 81.3      | 29.7     | 41.2      | 49.5 | 61.4          |
| Government or extensionist   | 17.2        | 4.2       | 32.4     | 4.4       | 37.6 | 18.1          |
| Other  | 0           | 7.3       | 10.8     | 33.8      | 3.2  | 9.7           |
| Farmers (%) reporting this information cost them                                   | 5.8         | 12.5      | 10.8     | 16.2      | 4.3  | 9.5           |
| Farmers (%) using this information to make farming decisions                       | 95.4        | 93.8      | 78.4     | 89.7      | 92.5 | 91.6          |
| Among farmers not using this information, reason for this (%):                     |             |           |          |           |      |               |
| Was not useful   | 50.0        | 50.0      | 25.0     | 12.5      | 0    | 25.0          |
| Difficult to understand  | 0           | 0         | 25.0     | 12.5      | 16.7 | 12.5          |
| Could not implement the recommendations  | 0           | 33.3      | 50.0     | 50.0      | 66.7 | 43.8          |
| None of the recommendations were needed in my farm                                 | 50.0        | 16.7      | 0        | 0         | 16.7 | 12.5          |
| Other reason   | 0           | 0         | 0        | 25.0      | 0    | 6.3           |
| When in need of technical advice for coffee, farmers (%) contacting...:            |             |           |          |           |      |               |
| No one   | 8.6         | 6.1       | 15.7     | 8.8       | 10.4 | 9.8           |
| A relative   | 4.0         | 21.3      | 14.7     | 10.6      | 8.8  | 12.2          |
| A neighbor with a coffee farm  | 10.3        | 28.7      | 6.1      | 4.0       | 11.2 | 12.4          |
| NGO technician   | 69.5        | 77.4      | 31.5     | 58.6      | 46.6 | 56.6          |
| Government technician  | 23.6        | 6.5       | 0.5      | 0.9       | 11.2 | 8.1           |
| Other  | 1.7         | 1.3       | 41.1     | 23.4      | 38.6 | 21.9          |
| For farmers contacting a technician, most common way to contact them (%):          |             |           |          |           |      |               |
| Visit to their office  | 9.2         | 1.7       | 0        | 0         | 3.2  | 3.1           |
| Call over cellular   | 71.8        | 78.9      | 73.0     | 56.0      | 37.1 | 63.9          |
| E-mail   | 0           | 0         | 0        | 0         | 0    | 0             |
| Wait for them to visit me  | 19.0        | 18.3      | 27.0     | 42.5      | 58.9 | 32.2          |
| Other  | 0           | 1.1       | 0        | 1.5       | 0.8  | 0.8           |

**Table 19. Continued.**

| Details   | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| For farmers contacting no one to seek technical advice, % who...: |             |            |            |            |            |               |
| Never clarify their doubts  | 0           | 21.4       | 35.5       | 35.0       | 92.3       | 42.5          |
| Ask a relative/neighbor/friend for advice                         | 20.0        | 42.9       | 45.2       | 15.0       | 7.7        | 26.4          |
| Go to agro-dealer   | 80.0        | 35.7       | 12.9       | 25.0       | 0          | 24.5          |
| Clarify doubts using other means                                  | 0           | 0          | 6.5        | 25.0       | 0          | 6.6           |
| Farmers (%) reporting MOCCA trainings have been:                  |             |            |            |            |            |               |
| Very useful   | 71.8        | 47.0       | 62.4       | 54.4       | 39.8       | 53.7          |
| Useful  | 28.2        | 47.0       | 33.5       | 42.0       | 57.4       | 42.8          |
| Little useful   | 0           | 5.7        | 4.1        | 3.5        | 2.8        | 3.4           |
| Not useful  | 0           | 0.4        | 0          | 0          | 0          | 0.1           |
| <b>Number of households</b>                                       | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

#### 4.2.6 Results by Activity 4: Strengthening Suppliers of Planting Material

##### 4.2.6.1 Actors, initial results, potential for systemic change

To date, work to strengthen market system actors for provision of high-quality planting material for coffee has centered on four main areas:

1. DNA fingerprinting of seed lots in all five MOCCA target countries, to identify sources of genetically pure seed of multiple varieties. Since WCR Verification requires producing genetically pure seed, verification candidates are provided with the contact information of seed lots with genetically pure seed.
2. WCR Verification training and auditing. For the first time, through MOCCA, WCR Verified candidates receive technical assistance to comply with verification standards, and co-funding to motivate investments required to meet verification standards.
3. Nursery management training. WCR partnered with CATIE to create and deliver a Nursery Management manual and diploma course, delivered to 25 nursery operators. TechnoServe developed and implements the Nursery of Gold training program to smaller nursery operators consisting of eight training modules (two of which focus on business skills) delivered both remotely and in-person by nursery advisors with a curriculum designed by TechnoServe with WCR support.
4. Collaboration with nursery market system actors including PROMECAFE-member NCIs, Ministries of Agriculture, plant health agencies, and others to develop action plans for creating coffee nursery certification requirements and mechanisms accessible to small nurseries MOCCA will invest to implement during the second half of the project.

The training for nurseries has been carried out directly by WCR for large nurseries focused on building capacity towards meeting the *WCR-Verified* standard. Twenty commercial nurseries have been supported to date, of which 14 have been audited and five have received their certificates of verification. CATIE has complemented this work with a certificate course on nursery management for twenty-nine commercial nurseries. TechnoServe has led the work with smaller nurseries with over 558 nurseries in ongoing remote and in person training across all five countries. Since 2021, MOCCA has worked with PROMECAFE to engage member coffee institutes to lead the development of nursery certification procedures for their countries to institutionalize best practices for coffee nurseries. SWOT analyses have been carried out with market system actors in each country except Peru. El Salvador has advanced to the development of an action plan. During the second half of the project, further support from MOCCA will be required to develop the regulatory framework in MOCCA countries for certified planting material for coffee that is accessible to small farmers.

Work to strengthen market system actors providing planting material for coffee began in MOCCA's third semester (by March 2020) with the development of the coffee nursery curriculum comprised of eight modules, which was quickly moved to a virtual format for implementation between April and September 2020 when 156 nurseries were trained. In the following semester, by September 2020, the number of nurseries trained had doubled and WCR had completed their first cycle of training for nursery verification with 9 commercial nurseries. By September 2021 the first coffee nursery from the verification training cohort obtained their verification status and a second cohort was selected. During this semester MOCCA also supported PROMECAFE to engage their member coffee institutes to develop nursery certification procedures for their respective countries to institutionalize best practices for coffee nurseries including genetic assessments to ensure genetic quality is maintained over time. WCR's attempt to support nurseries to clean or purify seed lots will inevitably be a slow process as purifying a particular seed lot takes between 6 and 7 years and an investment of between 10 and 12 thousand dollars.

The WCR Verified program is exclusively working with large nurseries, defined as those producing over 150,000 plants a year. The program has a goal of verifying 25 nurseries in the 5 MOCCA countries throughout the duration of the project. So far eight large nurseries have been audited for verification, of the project target of 25; four have since obtained their certificate of verification. The major challenges to advancing faster in this process vary across countries. In Nicaragua, for example, there is an oligopoly in the coffee plant business. In Honduras, IHCAFE has the monopoly. In El Salvador the government has a planned program to renovate coffee farms, the first step being the approval of the regulations for certified seed. This program could generate a strong demand for certified materials and so large nurseries in El Salvador are interested in becoming providers of certified materials advocated by MOCCA. According to a WCR informant, Peru is generally disorganized in terms of the varieties farmers use, and there is little institutional support for farmers to improve the quality of their genetic materials. In various countries farmers prefer to grow their own plants. In all countries, the traceability of genetic material is minimally regulated or consistent. From the point of view of nursery owners, their primary motivation is to sell the plants they grow, because they are businesses. According to WCR, in the absence of a comprehensive R&R program, the incentives for nurseries to improve the plants they sell are low because demand from farmers will also be low. The reasoning is that farmers are unlikely to want to renovate their plants unless they have comprehensive support and funding to effectively renovate their farms.



*Table 20. Results at the level of businesses and institutions*

| El Salvador   | Guatemala | Honduras   | Nicaragua   | Peru  |
|---|-----------|--|---|---|
| <b># MOCCA partners participating in Activity</b>   |           |  |   |   |
| 1   | 2         | 2  | 2   | 1   |
| <b># nurseries reached</b>  |           |  |   |   |
| 105   | 91        | 84   | 100   | 178   |
| <b># seedlings acquired at verified or certified nurseries</b>  |           |  |   |   |
| 50,332  | 6,290,000 | 250,000  | 3,640,000   | 100,000   |
| <b>Major changes made in their genetic material services under MOCCA</b>  |           |  |   |   |
| Progress in certification of seed varieties and large nurseries; government plant distribution program more technical and less political  | n.d.      | Access to better quality plants; a new program to support the certification of nurseries;  | Training about different varieties available; mapping of nurseries to determine genetic purity; verification support for nurseries  | More interest in genetic origin of plants   |
| <b>Major achievements in genetic material under MOCCA</b>   |           |  |   |   |
| More access to and interest in using certified seed by nursery operators; improved knowledge in nursery management; growing farmer awareness of importance of certified seed  | n.d.      | Certified nurseries; production of better-quality plants; breeding hub; improvement of breeding techniques   | Training on financing options for obtaining better quality genetic material; linking nurseries to new buyers; a nursery verified by WCR, now selling domestically and internationally | More production of genetically pure varieties   |
| <b>Major challenges in genetic material under MOCCA</b>   |           |  |   |   |
| Farmers need to understand benefits of improved planting materials; nurseries aren't seeing better prices or more clients for their better-quality plants; small nurseries do not have enough resources; genetic purity tests are expensive | n.d.      | High costs; need to improve nursery's infrastructure; certify independent seed producers so that there is more access to certified material; certification of seed producers | Raising awareness among farmers regarding the benefits of getting verified genetic material; expensive to verify nurseries; additional funding  | Oftentimes the genetic profile of plants is unknown; mixing of varieties; no hybrids produced |

In all countries, the training related to improving genetical materials has happened through the *Viverista de Oro* program. In one particular case in Nicaragua, a nursery reported duplicating its earnings as a result of the trainings with MOCCA and the new relationships they've built as part of MOCCA network. MOCCA introduced them to new buyers, highlighting their good practices. As a result, they went from selling 60,000 plants to 150,000 plants. The progress for the certification of seeds and small nurseries has been slower. A couple informants commented that the benefits of verifying their nurseries are as yet intangible, and the process is expensive. For now, it is being done because MOCCA partially covers the costs. In terms of the work to improve the quality of genetic material, in Nicaragua there's been a significant amount of work on registering new varieties. In 2017 they had 11 registered varieties, and now there are 19. This is important as certification of genetic material begins with the registration of the material in country.

El Salvador has been particularly interested in promoting the production and use of certified varieties as part of MOCCA. The Salvadorean government directly distributes coffee plants and as part of an upcoming program to be implemented by the MAG through a loan from the IADB<sup>24</sup>, and it will be required that nurseries that source plants for that program will need to be supervised and receive TA from MOCCA. WCR has worked closely with government institutions to analyze the genetic material given to farmers as part of a government program promoting R&R. As a result of trainings with MOCCA, informants claim that more nurseries and farmers are interested in purchasing certified materials. However, there is still a need for more farmer awareness regarding genetic purity and the benefits of purchasing certified seed.

Through MOCCA, WCR did an extensive analysis of the seed sector in El Salvador and identified the best seed producers so that nurseries can source their seeds from them. This has helped provide the technical foundation to make the government plant transfer program more technical and less political, with better traceability mechanisms. There hasn't been work with smaller nurseries, and this is an area that could be explored more. Still, the work that has been done in El Salvador to strengthen the quality of nurseries is noteworthy. One of the challenges nurseries still face is how to make a business model for certified plants sustainable and profitable, given that costs increase when they need to pay for certification and better-quality seeds and inputs. The other challenge is to incorporate smaller nurseries and seed growers into this work, as all of the genetic analysis work has been done with large nurseries. This has been expensive because the material is sent to France or the US for genetic analysis, which is another obstacle for the attempt to better understand the genetic profile of existing varieties quickly. Another difficulty is related with the numerous obstacles and requirements for moving genetic material across borders, which makes this work slow and very bureaucratic.

In Guatemala the production of coffee plants is relatively dynamic and widespread. They have the largest and most important nurseries in Central America, with strong private sector participation. MOCCA subsidizes the genetic analysis of their plants, but there has been some resistance to match the funding. The recurring argument is that plants will become more expensive, so even though nurseries first said they wanted to collaborate with MOCCA, many decided not to participate in the process after all. A related challenge in this regard is related to having the appropriate regulations and public policies that both encourage and help improve traceability and genetic purity.

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<sup>24</sup> <https://www.iadb.org/en/project/ES-L1135>

In spite of the lingering challenges, most informants stated that they plan to continue working on improving the quality of genetic material in the sector. In Peru informants plan to carry forward the work with WCR on the identification of genetic profiles of coffee varieties in different parts of the country. In El Salvador, two informants stated that their nurseries are now only interested in certified or verified seeds and genetic material, a preference that will purportedly continue post-MOCCA. One recurring concern shared by informants is that the sustainability of these initiatives will depend in large part on whether the changes end up being economically viable or not.

**Table 21. Systemic change at the level of businesses and institutions in genetic material**

| Details:  | El Salvador | Guatemala | Honduras  | Nicaragua | Peru      |
|---|-------------|-----------|-----------|-----------|-----------|
| % of informants replicating activities beyond MOCCA target group                                | 2/2: 100%   | n.d.      | 3/3: 100% | 1/3: 3%   | 1/1: 100% |
| % of informants who have established new partnerships as a result of MOCCA                      | 0/2: 0%     | n.d.      | 2/3: 67%  | 0/3: 0%   | 1/1: 100% |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 1/2: 50%    | n.d.      | 3/3: 100% | 2/3: 67%  | 1/1: 100% |
| Level of systemic change (Systemic Change Pathway average) <sup>25</sup>                        | 2           | 1         | 1.3       | 1.3       | 3         |

#### 4.2.6.2 Farmers' willingness to pay for certified genetic materials

A little over one in five farmers reported managing a seedbed in their farm in the 2021-2022 agricultural year (and this was more common in Nicaragua and Peru) and of them, 12% said they bought seed. Additionally, 28.9% of farmers reported managing a nursery (and this was also more common in Nicaragua and Peru) and among them, 18% bought seedlings. Although the overall share of farmers buying genetic materials is low (7.5% of farmers), 58.6% of them said they were willing to pay more for a certified or verified genetic material (Table 22).

<sup>25</sup> 1. Incipient. Market system actors (seed lots, nursery operators, clonal gardens, government policymakers, NCIs, public or private sector auditors and certifiers) agree to collaborate with MOCCA to improve quality of planting material available to farmers.

2. Initial. Market system actors adopting approaches to improve quality of planting material available to farmers

3. Intermediate. Market system actors applying approaches to improve the quality of planting material beyond MOCCA supported activities

4. Advanced. Market system actors making long term investments in approaches that improve the quality of planting material available to farmers beyond MOCCA

5. Mature. MOCCA partner and non-partner market system actors adopting improved approaches to expand access to quality planting material independently of MOCCA

**Table 22. Coffee: Genetic planting material in seedbeds and nurseries, and willingness to pay for certified or verified materials**

| Seedbeds and nurseries in the 2021-2022 agricultural year   | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Farmers (%) managing a coffee seedbed in their farms  | 0.6         | 18.3       | 9.1        | 43.6       | 29.3       | 21.6          |
| Among farmers with seedbed, % buying seed   | 0.0         | 7.1        | 11.1       | 10.1       | 17.8       | 12.0          |
| Farmers (%) managing a coffee nursery in their farms  | 15.5        | 26.1       | 19.8       | 46.3       | 32.1       | 28.9          |
| Among farmers with nursery, % buying seedlings  | 3.7         | 28.3       | 53.9       | 6.7        | 12.5       | 18.0          |
| Farmers (%) buying seed or seedlings  | 0.6         | 8.7        | 11.7       | 6.6        | 8.8        | 7.5           |
| Among farmers buying either seed or seedlings, % willing to pay more for a certified or verified genetic material | n.a.        | 60.0       | 100        | 30.0       | 76.9       | 58.6          |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

#### 4.2.7 Results by Activity 5: Facilitating Access to Finance

##### 4.2.7.1 Actors, initial results, potential for systemic change

MOCCA's budget does not include money for co-financing loans. Instead, the attempt to improve financial services for small-scale farmers has focused on trying to establish alliances with organizations that may be willing to finance the roughly 48,000 farmers MOCCA is working with in the region. The work is therefore more about raising awareness and sharing information about the needs of this group of farmers to access credit. This work has included facilitation of finance to small farmers directly, to farmer organizations and to anchor firms who invest in their small farmer suppliers. MOCCA staff has found that commercial banks, unsurprisingly, are interested in lending to larger scale operations, not small-scale farmers. Thus, MOCCA's major allies for this activity include micro-finance organizations, credit unions, anchor firms, and state banks. Progress with state banks has been slow, but there is still the hope that working with them could open up new financial opportunities for small-scale farmers commonly excluded from the banking system, a benefit which would extend beyond MOCCA. Given the comparatively larger market for coffee than for cacao in the five target countries, the attempt to create new credit opportunities has been relatively more effective in coffee.

Access to finance activities started in MOCCA's fourth semester (by September 2020) with the inclusion of finance in partner agreements with exporters and buyers. In the following semester, 18 agreements were signed with financial institutions to provide finance to small coffee farmers. In that same semester, 2.4 million dollars in finance were disbursed to just under 900 coffee farmers. In the following period, ending September 2021, exporters began to mention loans as part of the results of their partner agreements with MOCCA benefitting coffee farmers, and access to finance increased six-fold in terms of numbers of farmers and lending amounts, the majority being in Nicaragua, mostly with a single exporter.

By the time of this writing (May 2022) numbers for farmers had increased by 60% and for funding amounts by 40%, showing strong continued growth in both of these targets. During the same period, coffee prices rose to almost double what they had been in 2019 and may be part of the reason for the jump in coffee financing.

As shared by MOCCA staff, one of the main achievements of the project to date is that over US \$25 million have been disbursed to 7,817 coffee farmers in the region; 49% of which has come from financial institutions and 51% stemmed from anchor firms. Four financial institutions have granted financing for coffee farmers in MOCCA countries: two in Peru, one in Guatemala and one in Nicaragua. In other cases, MOCCA has successfully collaborated with financial institutions so that they offer credit conditions that are better geared to the realities of small-scale farmers, including preferential interest rates, shorter approval times, flexible payment schedules that take into consideration the coffee cycles, and longer-term loan periods. Fifteen agreements have been signed with financial institution partners by the last MOCCA reporting period to provide increased financial services that are better tailored to the needs of small coffee farmers. Even though many of them have not yet granted loans, new and improved options for coffee farmers now exist. MOCCA has also supported anchor firms in relation to the financial services they offer to the farmers they purchase coffee from. MOCCA also engaged a large number of exporters and coffee roasters (10) to improve their offer of financial services for small coffee farmers. ANACAFE in Guatemala is also involved. Moving forward, MOCCA is hoping to continue collaborating with state banks in Peru, Ecuador and El Salvador to open additional credit opportunities for coffee farmers.

As explained by MOCCA staff, the strategy in relation to financial services has been different in each country, taking into consideration local dynamics. MOCCA does not facilitate credit opportunities directly, it establishes communication with financial entities that could potentially widen financial services for coffee farmers. The close relationship between anchor firms and farmers has, in some cases, opened up new opportunities for credit, as the anchor firm serves as a sort of guarantee. There has also been an attempt to find credit opportunities for nurseries, as they are also in need of additional financing. The country that has most contributed to improving financial services is Nicaragua, as anchor firms there have been particularly influential in securing credit opportunities for farmers. In Honduras, contrary to expectations, it has been difficult to convince either anchor firms or financial institutions to expand credit opportunities for MOCCA farmers. In Peru, the major advances have been the product of an alliance with the Ministry of Agriculture's Fondo AgroPeru, as they have funds destined specifically to R&R. The work has focused on strengthening the capacity of Agrobanco, the state entity that administers this fund, to finance farmers individually. Part of this has involved hiring field credit agents to improve field presence and engagement with farmers, and supporting their transition to digital records, as opposed to paper files which makes accessing farmers in remote areas difficult and time consuming. With MOCCA's support, around 1000 growers obtained credit through Agrobanco.

Despite the generally unfavorable conditions for widening credit opportunities for small-scale farmers, MOCCA has been able to collaborate with several partners in designing new financial products that better suit the needs of this demographic. MOCCA's work is gradually contributing to changing business logics in relation to financing access for coffee farmers in three major ways: (1) new financial products for MOCCA coffee farmers; (2) changes in the models of both financial institutions and anchor firms for granting credit; and (3) improved credit conditions for farmers. With regards to the first point, MOCCA's work with Agrobanco and MIDAGRI has been especially fruitful. MOCCA supported Agrobanco in the design and

implementation of a model that uses financial advisors (*promotores financieros*) to provide advice and support to farmers directly on how to request credit for R&R. They work directly with farmer organizations as well. In Guatemala, for example, a financial institution added a new financial product specifically designed for coffee farmers in such a way that the interest rate is 10 percentage points lower than what was available before. Anchor firms are also playing an important role in facilitating farmer access to financial opportunities, in addition to channeling financing directly. Still, the attempt to encourage financial institutions to offer more favorable credit for small-scale farmers has been challenging and slow. In Honduras, farmers perceive that there are still too few financing opportunities that suit their needs and conditions. In Nicaragua banks are hesitant to offer financing for R&R. The high debt level that exists in El Salvador's coffee sector has meant that finding financing, especially long-term options, has been particularly difficult there.

**Table 23. Results at the level of businesses and institutions**

| El Salvador  | Guatemala  | Honduras  | Nicaragua   | Peru   |
|--|--|---|---|--|
| <b># MOCCA partners participating in Activity</b>  |  |   |   |  |
| 1  | 4  | 6   | 3   | 12   |
| <b># farmers reached<br/>USD loaned</b>  |  |   |   |  |
| 0  | 303<br>USD 779,034   | 369<br>USD 1,005,811  | 3905<br>USD 15,174,019  | 1009<br>USD 2,313,094  |
| <b>Major changes made in their financial services under MOCCA</b>  |  |   |   |  |
| Assessing mechanisms to refinance and reactivate the coffee sector   | Two new financing options for small coffee farmers; support with accounting tools to improve investment capacities   | MOCCA farmers are accompanied and supported   | Financing model specifically designed for small coffee farmers; co-investments so farmers spend less on TA                      | A new credit option created for cooperatives;  |
| <b>Major achievements in financial services under MOCCA</b>  |  |   |   |  |
| No new services, but partners directly working with government institutions to try to create financial services for coffee farmers; financial relief options for some cooperatives | Creation of new financial options for farmers; coffee farmer arrears are below 1.2%  | More growers have access to financing; access to better interest rates  | More farmers are now candidates for certain types of credit; closer relationship with farmers that participate in TA activities | Establishment of new relationships between MOCCA farmers and financial service providers; improved farmer access to credit; alliance with public financial institutions resulted in new credit opportunities |
| <b>Major challenges in financial services under MOCCA</b>  |  |   |   |  |
| Few financing options for coffee farmers, but the government has the political will to reactivate the sector.  | Very few farmers have accessed credit (less than 1% of MOCCA farmers); pending analysis of the viability of most MOCCA farmers as subjects of credit; data secrecy | Long-term financing for R&R; improve interest rates; finding institutions that are willing to continue with the project; lack of land titling presents challenges; low education levels | Progress has been slow; some farmers with bad credit ratings do not receive financing; hesitancy to finance R&R                 | Interest rates from private institutions can be higher than 30%  |

From the point of view of MOCCA staff, El Salvador is the country that most needs help with access to credit. The goal is to try to obtain roughly US \$600 million from global investors to restructure the debt that exists in the coffee sector. It is an immense macro level challenge, and not much progress has been made so far. Even though financial opportunities are insufficient and inadequate, several informants commented that at least the issue is beginning to be addressed and more actors are recognizing the importance of expanding credit opportunities for small-scale farmers. MOCCA has been able to collaborate with an initiative to help indebted cooperatives refinance their loans. More generally, there seems to be a consensus that there is a need for interest rates and credit requirements that better suit the realities of small coffee farmers. In some areas, coffee farmers are simply not interested in requesting loans.

As can be seen in the table below, MOCCA has engaged fifteen financial institutions so as to improve access to finance for farmers. Ten of these have introduced changes in their products or services to better serve small-scale coffee farmers in Peru, Guatemala and Nicaragua. To date, four financial institutions have provided credit to farmers. This is in part because it takes time for farmers to become aware of and decide to access the improved services, loans take time to process, and not all farmers are interested in loans from financial institutions even with the improvements.

***Table 24. Progress with financial institutions in access to finance in coffee***

|   | El Salvador | Guatemala | Honduras | Nicaragua | Peru |
|---|-------------|-----------|----------|-----------|------|
| Partners  | 1           | 2         | 2        | 1         | 9    |
| # that have modified financial services to better serve farmers | 0           | 2         | 1        | 1         | 6    |
| # that have provided finance to farmers                         | 0           | 1         | 0        | 1         | 2    |

Despite the difficulty of opening up new financial opportunities for small-scale coffee farmers and the fact that there is much to be done in all MOCCA countries still, there is some evidence of progress towards systemic change, especially in Peru and Honduras. As can be seen below, they have the highest number of informants reporting that they have established new partnerships as a result of MOCCA, they are replicating their activities beyond MOCCA's target group, and plan to continue offering the newly created or modified financial services.



**Table 25. Systemic change at the level of businesses and institutions in financial services**

| Details   | El Salvador | Guatemala | Honduras  | Nicaragua | Peru     |
|---|-------------|-----------|-----------|-----------|----------|
| % of informants replicating activities beyond MOCCA target group                                | 0/1: 0%     | 1/1: 100% | 2/4: 50%  | 0/3: 0%   | 2/3: 67% |
| % of informants who have established new partnerships as a result of MOCCA                      | 1/1: 100%   | 1/1: 100% | 4/4: 100% | 0/3: 0%   | 1/3: 33% |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 0/1: 0%     | 1/1: 100% | 4/4: 100% | 1/3: 33%  | 2/3: 67% |
| Level of systemic change (Systemic Change Pathway average) <sup>26</sup>                        | 1           | 2         | 1         | 1.33      | 2.7      |

#### 4.2.7.2 Farmers' access to financing

In the agricultural year of reference, few farmers (23.3%) requested and obtained a loan, except in Nicaragua, where 54.2% of farmers asked and obtained a loan (Table 26). Practically no farmer requesting a loan said the loan was denied. These findings are close to the baseline findings. Among farmers obtaining a loan, three sources were most common: micro-financing organizations (or “microfinancieras”; 26.7%), farmer cooperatives (25.5%), and a bank (23.9%), and though the same sources in the same order of importance were reported at baseline, the share of farmers reporting the latter two sources slightly increased at midline. The share of farmers reporting MOCCA anchor firms as the source of the loan (14.3%) was almost identical to the baseline value (of 14.9%). Borrowing from MOCCA anchor firms was not reported in El Salvador, Guatemala and Peru, and was low in Honduras. Obtaining a loan from informal sources (*prestamistas*) was rare (albeit slightly higher in Guatemala).

Since we wanted to learn more details about the largest loan obtained, we asked farmers whether they were willing to provide additional information, or at least the interest rate paid. Of farmers willing to provide additional information, we learned that most (87.5%) used the loan in the coffee crop (except in Guatemala), and the most common use was to purchase inputs for coffee, but this varied by country.

<sup>26</sup> 1. Incipient. Market system actors agree to implement approaches to facilitate farmer access to finance (A2F) with MOCCA.

2. Initial. Market system actors partnering with MOCCA implement approaches that facilitate greater access to finance for farmers (amounts, reach, terms, cost, and scale).

3. Intermediate. MOCCA access to finance partners adopt improvements affecting farmer access beyond MOCCA supported activities

4. Advanced. MOCCA access to finance partners make investments in long term application of improvements that support greater access to short-, medium-, and long-term financing for farmers beyond MOCCA.

5. Matured. MOCCA partners and non-partners adopt approaches to facilitate access to finance for farmers, independently of MOCCA

While every farmer in El Salvador reported using the loan to buy coffee inputs, in Peru most farmers (63%) reported using the loan to renovate coffee. Using the loan to renovate coffee was also reported by 14.4% of farmers in Nicaragua and only 3.2% of farmers in Honduras (Table 27). Although 38.6% of farmers reported no collateral was required to secure the loan, this varied by country. On average, the loan was granted for 23 months (an increase of 10 months over baseline values). Farmers paid this loan in different ways. While in Guatemala, Honduras, Nicaragua and Peru it was more common to pay this loan in cash, in El Salvador it was more common to be directly deducted from the payment of the coffee sales.

Although most farmers (93.1%) reported information about the interest rate paid and whether this interest was per month or per year, we do not report this information as it needs additional cleaning, as the rates were contradictory (i.e., in two countries, the monthly interest rate was higher than the yearly interest rate).

**Table 26. Coffee: Access to and source of financing**

| <b>Financing details</b>   | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All countries</b> |
|--|--------------------|------------------|-----------------|------------------|-------------|----------------------|
| Farmers (%):   |                    |                  |                 |                  |             |                      |
| Requesting a loan and was granted  | 3.5                | 9.6              | 19.8            | 54.2             | 24.5        | 23.3                 |
| Requesting a loan but was denied   | 1.2                | 3.9              | 1.0             | 2.2              | 2.8         | 2.3                  |
| Not requesting a loan  | 95.4               | 87.4             | 79.2            | 43.6             | 72.7        | 74.6                 |
| For farmers being denied a loan, main reason (%):  |                    |                  |                 |                  |             |                      |
| Lack of collateral   | 50.0               | 22.2             | 100             | 0                | 0           | 20.0                 |
| Too indebted   | 0                  | 11.1             | 0               | 0                | 14.3        | 8.0                  |
| Lack of deed for my farm   | 0                  | 0                | 0               | 0                | 0           | 0                    |
| Other reason   | 0                  | 11.1             | 0               | 40.0             | 42.9        | 24.0                 |
| Prefer not to respond  | 50.0               | 55.6             | 0               | 60.0             | 42.9        | 48.0                 |
| For farmers obtaining a loan, source of the loan (%):  |                    |                  |                 |                  |             |                      |
| Bank   | 33.3               | 40.9             | 12.8            | 16.3             | 39.3        | 23.9                 |
| Rural bank   | 0                  | 0                | 2.6             | 0.8              | 8.2         | 2.8                  |
| Micro-financing  | 0                  | 18.2             | 7.7             | 48.0             | 1.6         | 26.7                 |
| Cooperative  | 66.7               | 31.8             | 56.4            | 7.3              | 36.1        | 25.5                 |
| MOCCA anchor firm  | 0                  | 0                | 7.7             | 26.8             | 0           | 14.3                 |
| Informal source ("prestamista")  | 0                  | 9.1              | 2.6             | 0.8              | 0           | 1.6                  |
| Any other source   | 0                  | 0                | 2.6             | 0.8              | 3.3         | 1.6                  |
| For farmers obtaining a loan, % willing to provide additional information                                  | 100                | 55.0             | 76.9            | 73.2             | 75.4        | 73.5                 |
| For farmers not willing to provide additional loan information, % willing to report the interest rate paid | n.a                | 22.2             | 55.6            | 27.3             | 20.0        | 28.8                 |
| <b>Number of households</b>  | <b>174</b>         | <b>230</b>       | <b>197</b>      | <b>227</b>       | <b>249</b>  | <b>1077</b>          |

**Table 27. Coffee: Among farmers with a loan and willing to provide loan information; use of credit, financing requirements, and interest paid**

| <b>Financing details of largest loan</b>          | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All countries</b> |
|---|--------------------|------------------|-----------------|------------------|-------------|----------------------|
| Farmers (%) investing the loan in:                |                    |                  |                 |                  |             |                      |
| Coffee renovation                                 | 0                  | 0                | 3.2             | 14.4             | 63.0        | 23.4                 |
| Coffee rehabilitation                             | 0                  | 0                | 6.5             | 31.1             | 10.9        | 19.0                 |
| Inputs for coffee                                 | 100                | 45.5             | 80.7            | 70.0             | 19.6        | 58.7                 |
| Equipment/tools for coffee                        | 0.0                | 9.1              | 22.6            | 14.4             | 2.2         | 12.0                 |
| Infrastructure (milling, drying, etc.) for coffee | 0                  | 0                | 6.5             | 3.3              | 4.4         | 3.8                  |
| Other uses  | 0                  | 54.6             | 22.6            | 42.2             | 15.2        | 31.5                 |
| Farmers (%) investing the loan on coffee          | 100                | 45.5             | 90.3            | 93.3             | 82.6        | 87.5                 |
| For this loan, % farmers required to provide:     |                    |                  |                 |                  |             |                      |
| No collateral                                     | 16.7               | 18.2             | 22.6            | 36.7             | 60.9        | 38.6                 |
| Mortgage on the farm                              | 33.3               | 36.4             | 25.8            | 12.2             | 19.6        | 18.5                 |
| Guarantee over coffee harvest                     | 0                  | 0                | 0               | 1.1              | 0           | 0.5                  |
| Other collateral                                  | 0                  | 27.3             | 9.7             | 38.9             | 13.0        | 25.5                 |
| Length of the loan (months)                       | 11.0               | 21.6             | 13.1            | 12.7             | 53.7        | 23.1                 |
| Farmers (%) who are paying/paid loan in:          |                    |                  |                 |                  |             |                      |
| Cash  | 16.7               | 81.8             | 32.3            | 45.6             | 84.8        | 54.4                 |
| Deducted from coffee harvest payment              | 83.3               | 18.2             | 3.2             | 2.2              | 6.5         | 7.1                  |
| Other payment mode                                | 0                  | 0                | 61.3            | 46.7             | 2.2         | 33.7                 |
| <b>Number of households</b>                       | <b>6</b>           | <b>11</b>        | <b>31</b>       | <b>90</b>        | <b>46</b>   | <b>184</b>           |

#### 4.2.8 Results by Activity 6: Supporting Trade Association Service Provision

By strengthening national commodity institutes, MOCCA hopes to contribute to long term institutional arrangements that ensure small farmers are represented and served by the sector. In Guatemala and Honduras, where national coffee institutes are well established, MOCCA developed agreements with those entities to strengthen their role in promoting research and strengthening genetic material distribution systems, as well as to improve their capacity for technical assistance to farmers and to support access to high value markets. MOCCA has also engaged with the Sustainable Coffee Platform in Honduras. In El Salvador, MOCCA worked to support the emergent Consejo Salvadoreño del Café to further develop a proposal for a national coffee institute for El Salvador, ensuring its design incorporates lessons learned from other countries and ensures small coffee farmers are adequately served. MOCCA has also supported the Ministry of Agriculture in El Salvador in the design of a fund for renovation in the coffee sector. In Nicaragua, where a coffee institute does not exist, MOCCA engaged a coffee exporter association to explore how to continue to build cohesion and a shared agenda within the sector in support of small farmers. PROMECAFE has been an important partner in this activity as it seeks to better orient its own efforts towards building capacity among its member coffee institutes.

The first MOU with a national coffee institute was signed with the Consejo Salvadoreño del Café by September 2020 to support farmer training, wet mills, to facilitate loans from a national financial institution and to develop a proposal for a national coffee institute. In the following semester an agreement was signed with ANACAFE and radio messaging to farmers was initiated. IHCAFE was supported to adopt MOCCA's training curriculum and train their farmer trainers on its content. NICAFAES was supported to provide mass messaging to farmers about safe coffee harvesting in the context of the COVID pandemic. Work with NCIs in each country was ongoing through March 2022 and during the period an additional agreement was signed with MAG of El Salvador to support development of a renovation fund for the coffee sector.

MOCCA's approach to strengthening NCIs includes strengthening their capacity to provide or facilitate support services for R&R, in addition to strengthening their capacity for coordination within the sector. Below you can see how MOCCA engaged with national institutions to strengthen their capacity across the different MOCCA activities. The areas where MOCCA has engaged with national level sectoral institutions or platforms has been quite varied across countries. In El Salvador and Guatemala there has been collaboration around technical assistance, but in El Salvador the TA has been delivered directly by MOCCA, in coordination with CSC, while in Guatemala MOCCA has supported TA provided directly by ANACAFE via radio and other means. In Guatemala and Honduras MOCCA has worked to strengthen the capacity of ANACAFE and IHCAFE to provide high quality genetic material and engage in research, while in Peru the main collaboration with MIDAGRI has been around finance for the sector. In Nicaragua the collaboration has been focused on broad sectoral coordination but not related to any specific support service delivery to farmers.

**Table 28. NCI functions supported by MOCCA in each country**

| Functions               | El Salvador<br>CSC | Guatemala<br>ANACAFE | Honduras<br>IHCAFE | Nicaragua<br>NICAFAES | Peru<br>MIDAGRI |
|-------------------------|--------------------|----------------------|--------------------|-----------------------|-----------------|
| Technical Assistance    | X                  | X                    |                    |                       |                 |
| Inclusive Market Access |                    |                      |                    |                       |                 |
| Research                |                    | X                    | X                  |                       |                 |
| Genetic Material        |                    | X                    | X                  |                       |                 |
| Financial Services      |                    |                      |                    |                       | X               |
| National Platforms      | X                  | X                    | X                  | X                     | X               |
| Regional Platforms      |                    | X                    | X                  |                       | X               |

From the point of view of IHCAFE, the Honduran NCI, the Breeding Hub has been an especially helpful initiative and technology that will make plant breeding techniques more modern and efficient. The hope is that it will allow for the release of new and improved varieties more quickly. IHCAFE has also been crucial for the development of a plan for nursery certification procedures. Moreover, IHCAFE's gender equity policy and practices are receiving more attention as a result of the collaboration with MOCCA'. Several interviewees commented, however, that there needs to be more evidence of the NCIs relevance for farmers.

In Nicaragua's coffee sector, informants perceive a lack of coordination between public policies and the private sector. NICAFAES, a multi-stakeholder platform grouping exporters, NGOs, cooperatives, and farmer associations created in 2018, is the closest thing to an NCI in Nicaragua. Given the current political atmosphere in Nicaragua, private actors prefer not to comment on the role of state institutions. NICAFAES is composed of private actors and is trying to approach government actors so that public policies can better respond to the needs of the sector. In the case of Nicaragua, Activities 6 and 7 have not been particularly relevant or feasible given the political atmosphere. Work with the private sector has been MOCCA's priority. Still, there have been conversations with public institutions such as INTA and IPSA regarding the certification of nurseries and the mapping of seed producers and nurseries that exist.

Unlike the rest of MOCCA countries, in El Salvador MOCCA has worked particularly closely with the government, and not with the private sector. In El Salvador, a law was passed in late 2021 creating the Coffee Institute of El Salvador (Instituto Salvadoreño del Café), the new NCI for the sector. It will be led by the Ministry of Agriculture. MOCCA has directly supported the process to develop this new entity, including a feasibility study regarding the creation of the Institute. The idea is that the Institute is able to offer consistent high quality technical assistance for coffee farmers and improve research and technology transfer.

No informants in Guatemala had information regarding the attempt to strengthen an NCI or a regional platform. This, perhaps, speaks to the fact that there hasn't been much progress in relation to these two activities. MOCCA's work with ANACAFE in technical assistance has resulted in the widening of the coverage of the radio program El Cafetal. In Peru, MOCCA has been able to collaborate with a multi-stakeholder working group that brings together private actors and public institutions interested in coffee related issues. Still, the hope of strengthening an NCI there hasn't made much progress so far and there isn't a consolidated NCI that is the obvious candidate to work with. There is a National Coffee Board that groups various coffee cooperatives and producer organizations. This organization has lost membership in recent years and has gradually lost relevance and influence in the sector.

**Table 29. Systemic change at the level of businesses and institutions in NCIs**

| Details  | El Salvador  | Guatemala  | Honduras   | Nicaragua   | Peru   |
|--|--|--|--|---|--|
| Major achievements of work with NCIs cited by MOCCA partners     | Feasibility study for the creation of a new NCI: Instituto Salvadoreño del Café; new public policies for the coffee sector passed in 2021; active in investment initiatives; strengthening relationship between public institutions and financial institutions | Strengthening of ANACAFE's technical assistance program; TA through radio  | Introduction of gender equity policies; more focus on research; supporting PROMECAFE; creation of a genetic bank; breeding hub | NICAFES collaborated with a campaign about Covid biosecurity measures | The Ministry of Agriculture (MIDAGRI) is considering working directly with PROMECAFE                                       |
| Major challenges of work with NCIs cited by MOCCA partners       | No regional offices serving farmers; small institution; slow to support farmers with technical assistance.   | ANACAFE's TA is not always sensitive to what farmers need; small-scale farmers often excluded from activities and most of the focus goes to medium and large-scale farmers | Machista structure; share their work more; try to be more relevant for farmers in practice; corruption; politics               | Lack of an NCI  | The National Coffee Board has lost membership in recent years and has gradually lost relevance and influence in the sector |
| Level of systemic change (Systemic Change Pathway) <sup>27</sup> | 2  | 2  | 2  | 1   | 1  |

<sup>27</sup> 1. Incipient. NCIs (or similar organizations) agree to implement or facilitate services with MOCCA that support farmer capacity to conduct R&R and improve farm profitability

2. Initial. NCIs (or similar organizations) adopting approaches to improve provision or facilitation of services (existing or new)

3. Intermediate. NCIs (or similar organizations) applying improvements in provision or facilitation of services beyond MOCCA supported activities

4. Advanced. NCIs (or similar organizations) making investments in long term provision or facilitation of services that support farmers beyond MOCCA

5. MOCCA partner and non-partner NCIs (or similar organizations) adopting improvements in service provision or facilitation independently of MOCCA

#### 4.2.9 Results by Activity 7: Bolster Platforms

PROMECAFE is the regional platform relevant for the coffee sector in MOCCA countries. The objectives in relation to this activity are relatively disperse. In practice, the work so far has centered on the administration of small grants for research purposes. There is also an agreement with PROMECAFE seeking to encourage the diffusion of research findings more systematically. There's a monetary reward for organizations that can demonstrate that they've effectively shared research findings widely. WCR transferred the responsibility to administer these funds to PROMECAFE, but not a single grant has been awarded as of early 2022. The bottleneck seems to relate to PROMECAFE's dependence on the IICA.

Most informants had little knowledge about the relevance and reach of PROMECAFE. A few cited hearing about it in MOCCA events but had little to add beyond that. A couple public institutions from Nicaragua report having meetings with PROMECAFE to discuss norms for seed production and nurseries, but there are no visible achievements yet.

**Table 30. Systemic change at the level of businesses and institutions in regional platforms**

| Details   | Guatemala  | El Salvador | Honduras   | Nicaragua   | Peru   |
|---|--|-------------|--|---|--|
| Major achievements of work with regional platform (PROMECAFE) | Sharing of information and experiences                               | n.d.        | Strategic planning with PROMECAFE;<br>New agreement with IHCAFE to work on nursery and seed certification and support research   | Webinar on research findings with the Central America network | Introduction to their work; MIDAGRI interested in more direct collaboration with PROMECAFE |
| Major challenges of work with regional platform (PROMECAFE)   | The size of the platforms; the voluntary nature of agreements; costs | n.d.        | Make its work more relevant for farmers; most informants were not aware of its work; strengthen regional knowledge exchange networks; collaborate with the national women's platform | Many informants unaware of their work                         |  |

#### 4.2.10 Adoption of farm level practices

##### 4.2.10.1 Coffee shade management

Similar to the baseline, most of the coffee plots had 5%-24% shade (34.7% of all coffee plots) or 25%-39% shade (31.6% of coffee plots), and few plots had <5% or >40% shade (Table 31). However, while having 5%-24% shade was more common in Guatemala, Honduras and Peru, having 25%-39% shade was more common in El Salvador and Nicaragua. In one out of five coffee plots, farmers reported planting shade trees within the two years prior to the interview date (slightly smaller than the share of farmers who reported this at baseline), and in a little over one-half of the plots, farmers pruned the shade trees in the midline year.

**Table 31. Coffee: Adoption of shade management practices at midline**

| Shade management in coffee plots                     | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|--|-------------|------------|------------|------------|------------|---------------|
| Coffee plots (%) with:                               |             |            |            |            |            |               |
| No shade   | 0           | 1.7        | 1.5        | 0.9        | 3.3        | 1.7           |
| <5% shade  | 7.9         | 23.4       | 10.2       | 6.7        | 18.0       | 13.9          |
| 5%-24% shade   | 22.5        | 35.7       | 35.7       | 30.2       | 43.1       | 34.7          |
| 25%-39% shade  | 38.8        | 25.0       | 32.7       | 37.4       | 27.4       | 31.6          |
| 40% or more shade                                    | 30.9        | 14.3       | 19.9       | 24.8       | 8.2        | 18.2          |
| Coffee plots (%) where:                              |             |            |            |            |            |               |
| New shade trees were planted within the last 2 years | 7.3         | 21.4       | 17.3       | 33.3       | 14.5       | 20.7          |
| Shade trees were pruned in the 2021-2022 ag. year    | 34.8        | 56.9       | 57.1       | 53.9       | 56.7       | 53.8          |
| <b>Number of coffee plots</b>                        | <b>178</b>  | <b>364</b> | <b>266</b> | <b>447</b> | <b>427</b> | <b>1682</b>   |

##### 4.2.10.2 Coffee varieties grown and management

While most farmers (54%) reported growing only one coffee variety, 30.2% of farmers grew two varieties and less than 15% of farmers grew three or more varieties (Table 32). However, as illustrated in Figure 1, while most farmers in El Salvador and Nicaragua only grew one variety, a higher share of farmers in Guatemala and Honduras grew up to two varieties and in Peru up to three varieties. Because of this, we present information about the names and share of farmers growing the three most commonly reported coffee varieties. Overall, Catimores were grown the most (78.4% of farmers), followed by Lempira (69.7%) and far behind by Caturra (40.4%), which is consistent with baseline results (Table 32).

In El Salvador, the three most commonly grown varieties were Cuscatleco, Pacas and Sarchimor. This is different than the main three varieties reported at baseline. In Guatemala, the three most common varieties were Catuai, Catimor and Caturra (same ones reported at baseline but in different order). In Honduras, the most common varieties were Catimores including Lempira and IHCAFE 90. Catimor was the most grown 'variety' in Nicaragua and Peru. Catimor is a family of leaf rust tolerant varieties, rather than

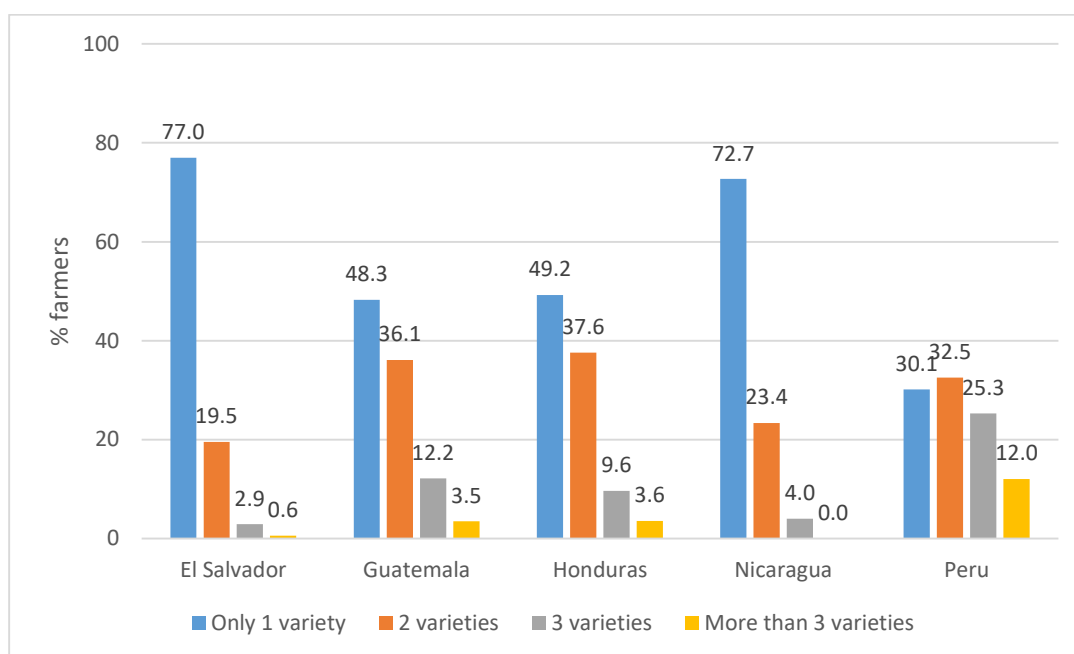


a variety itself, and the fact that many farmers in several countries utilize this term when naming their variety suggest that more needs to be done to teach them about the proper names of the varieties they grow.

**Table 32. Coffee: Varieties most commonly grown at midline**

| Details of coffee varieties                                      | El Salvador       | Guatemala      | Honduras         | Nicaragua        | Peru           | All countries  |
|--|-------------------|----------------|------------------|------------------|----------------|----------------|
| Farmers (%) growing:   |                   |                |                  |                  |                |                |
| Only 1 variety   | 77.0              | 48.3           | 49.2             | 72.7             | 30.1           | 54.0           |
| 2 varieties  | 19.5              | 36.1           | 37.6             | 23.4             | 32.5           | 30.2           |
| 3 varieties  | 2.9               | 12.2           | 9.6              | 4.0              | 25.3           | 11.5           |
| More than 3 varieties  | 0.6               | 3.5            | 3.6              | 0                | 12.0           | 4.3            |
| Name (and % coffee area) of the most commonly planted varieties: |                   |                |                  |                  |                |                |
| Variety 1  | Cuscatleco (87.9) | Catimor (63.9) | Lempira (70.8)   | Catimor (90.7)   | Catimor (76.3) | Catimor (78.4) |
| Variety 2  | Paca (84.1)       | Caturra (62.4) | IHCAFE 90 (59.4) | Parainema (31.5) | Caturra (25.4) | Caturra (40.4) |
| Variety 3  | Sarchimor (63.7)  | Catuai (66.4)  | Catimor (67.7)   | Lempira (35.6)   | Pache (24.4)   | Lempira (69.7) |
| Other varieties  | 68.05             | 44.42          | 33.2             | 45.8             | 18.1           | 42.6           |
| <b>Number of households</b>                                      | <b>174</b>        | <b>230</b>     | <b>197</b>       | <b>227</b>       | <b>249</b>     | <b>1077</b>    |

\*1 ha (hectare) = 10,000 square meters



**Figure 1. Number of coffee varieties grown at midline, by country**

On average, farmers reported growing 9,630 coffee trees, with a planting density of 4,772 trees/ha. Most (86.7%) of the trees were productive and the coffee plantations had an average minimum age of 5.3 years and an average maximum age of 7.6 years (if we estimate the average unweighted age using these two values, we obtain 6.45 years, which is slightly younger than the 6.39 years estimated at baseline, suggesting farmers have renovated coffee). These indicators vary by country, as reported in Table 33. Of these differences, it is worth noting that, like in the baseline, when we estimate the average unweighted age of the coffee crop, we see that coffee trees in Guatemala are the oldest (7.6 years vs. 8.3 years at baseline, suggesting older trees were renovated in this country) and in Nicaragua are the youngest (5.7 years vs. 4.7 years at baseline, suggesting no young trees have been renovated, which is something we would expect).

**Table 33. Coffee: Characteristics of the coffee crop at midline**

| Details of coffee varieties              | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|--|-------------|------------|------------|------------|------------|---------------|
| # of trees planted                       | 3,439       | 5,237      | 9,666      | 16,656     | 11,581     | 9,630         |
| # of trees planted/ha                    | 3,311       | 5,896      | 5,065      | 4,751      | 4,585      | 4,772         |
| % of productive trees                    | 92.1        | 80.9       | 89.4       | 78.9       | 93.0       | 86.7          |
| Average minimum age (yr) of coffee trees | 5.4         | 6.1        | 5.5        | 4.3        | 5.4        | 5.3           |
| Average maximum age (yr) of coffee trees | 7.3         | 9.2        | 7.5        | 7.1        | 7.1        | 7.6           |
| <b>Number of households</b>              | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

#### 4.2.10.3 Coffee renovation & rehabilitation, and evaluation of plants in main coffee plot

In the agricultural year of reference, 14.9% of farmers renovated coffee, which is much smaller than the share of farmers who reported this in the baseline year. However, 25.1% of farmers reported they have renovated coffee since the baseline year (Table 34). For both these indicators, it was slightly more common to renovate in Nicaragua. Of the almost 15% of farmers who reported renovating coffee in the agricultural year of reference, 16.7% said they did this based on a production diagnostic, only 6.3% reported buying plants from a certified nursery and one-half of the farmers said they obtained plants from their own farm. Buying plants from a certified nursery was reported only in Honduras, Guatemala and Peru.

Of the farmers selecting plants from their own farm, only one of every five farmers reported selecting plants with 4-6 pairs of mature leaves, one of the key MOCCA indicators. Further, one-half of farmers who renovated coffee in the year of reference said they did this because of low coffee yields and on average, they renovated 1,181 trees (and the number of trees renovated was highest in Nicaragua and lowest in Guatemala. Interviewed farmers estimated that they still need to renovate 550 coffee trees, which represent 7.8% of all coffee trees in their coffee plots. The share of coffee trees that still need to be renovated was highest in El Salvador and lowest in Peru. Finally, almost every farmer considers important to renovate coffee.

**Table 34. Coffee: Adoption of renovation practices at midline**

| Renovation practices  | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Farmers (%) who renovated coffee anytime since the baseline*                                  | 21.4        | 21.7       | 17.8       | 33.0       | 29.3       | 25.1          |
| Of these farmers, % considering their knowledge level of renovation is medium to high         | 97.3        | 92.0       | 97.1       | 93.3       | 95.9       | 94.8          |
| Of these farmers, % who usually use a farm diagnosis to decide whether to renovate            | 35.1        | 6.0        | 11.4       | 16.0       | 17.8       | 16.7          |
| Farmers (%) who renovated coffee in the 2021-2022 ag. year                                    | 12.1        | 23.5       | 14.7       | 34.4       | 18.5       | 21.2          |
| Of farmers renovating coffee in 2021-2022 ag. year:   |             |            |            |            |            |               |
| % renovating based on production diagnostic tool  | 50          | 22.2       | 18.8       | 29         | 24.6       | 26.3          |
| % buying plants from a certified nursery  | 0           | 14.8       | 13.8       | 0          | 13         | 7.9           |
| % obtaining plants from their own farm  | 0           | 27.8       | 27.6       | 83.3       | 71.7       | 53.1          |
| Of farmers selecting plants from own farm, % selecting plants with 4-6 pairs of mature leaves | 0           | 46.7       | 37.5       | 32.3       | 33.3       | 234.7         |
| % renovating coffee because of low yields   | 85.7        | 33.3       | 62.1       | 46.2       | 45.7       | 48.7          |
| Coffee trees renovated  | 624.5       | 945.5      | 1,550.5    | 2,661.8    | 1,013.6    | 1,569.9       |
| Coffee trees that need to be renovated  | 438.4       | 553.5      | 877.4      | 1,977.3    | 1,163.4    | 1,035.2       |
| % of coffee trees that need to be renovated**   | 14.1        | 11         | 8.9        | 13.3       | 10.4       | 11.5          |
| Farmers (%) who consider it is important to renovate coffee                                   | 92.5        | 98.3       | 95.9       | 97.4       | 95.6       | 96.1          |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

\*One missing observation for El Salvador

\*\*17 missing observations: 14 missing in Nicaragua, 2 in Honduras, 1 in Nicaragua

In the agricultural year of reference, 63% of farmers reported they had implemented at least one rehabilitation practice on coffee, which has remained unchanged compared to baseline values (Table 35). Rehabilitation was more common in Peru (72.7%), followed by Nicaragua (71.8%), Honduras (60.4%), Guatemala (54.4%) and El Salvador (49.4%). Of farmers rehabilitating coffee, only 6.1% reported they made this decision based on a production diagnostic and using a production diagnostic was more common in Nicaragua and practically non-existent in all other countries. All farmers in El Salvador, Guatemala, Honduras and Peru implemented a single pruning method, while in Nicaragua it was more common for farmers to implement two or more pruning methods. The most common pruning methods were normal pruning (63.2%) and stumping (42.6%). However, in Central America, the share of farmers implementing these two methods was relatively similar, while in Peru, there was a large difference in the share of farmers doing these, and normal pruning was the most common method. It was rare for farmers to implement two or more pruning methods as only 11.4% did this.

Most farmers (74%) reported pruning <25% of their coffee trees and only almost one out of five farmers pruned 25%-50% of their coffee trees. Although we observed this trend in most countries, in Peru more farmers had to prune more coffee trees. Finally, almost every farmer considers important to rehabilitate coffee.

As mentioned in section 2.3.5, to better analyze the changes between baseline and midline adoption rates for renovation and rehabilitation practices, we prepared a panel dataset and analyzed the differences on these two indicators using the two rounds of information. As Table 36 shows, the differences in the adoption rates of renovation practices were statistically significant only in Nicaragua and Peru, and for all countries combined, where we noticed a decrease in the share of farmers doing renovation at midline. This could be for many reasons including, for example, that farmers who had already renovated coffee since baseline may not need to renovate more coffee (or fewer farmers need to renovate) at midline. In contrast, in most countries, the differences in the rate of adoption of rehabilitation practices were not statistically significant except for El Salvador, where we observed an increase in this rate (at midline). Despite this, when disaggregated by type of pruning, we observe statistical differences in most countries. In all countries except El Salvador, the share of farmers doing normal pruning increased at midline. Further, in Honduras and Nicaragua we also observe that the share of farmers doing stumping increased at midline, as did the share of farmers doing stress formation pruning in Peru. In practice, normal pruning and stumping were the most common rehabilitation methods implemented by coffee farmers.

**Table 35. Coffee: Adoption of rehabilitation practices at midline**

| Rehabilitation practices  | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Farmers (%) who rehabilitated (pruned) coffee trees in the 2021-2022 ag. year                                   | 49.4        | 54.4       | 60.4       | 71.8       | 72.7       | 62.6          |
| Of farmers rehabilitating, % rehabilitating based on production assessment                                      | 1.2         | 0.8        | 3.4        | 18.4       | 2.8        | 6.1           |
| Of farmers who use a production assessment to decide whether to prune, % implementing a single pruning method   | 100         | 100        | 100        | 46.7       | 100        | 61.0          |
| Of farmers who use a production assessment to decide whether to prune, % implementing 2 or more pruning methods | 0           | 0          | 0          | 53.3       | 0          | 39.0          |
| Of farmers who pruned coffee, % using these pruning methods:  |             |            |            |            |            |               |
| Normal pruning  | 46.5        | 54.4       | 63.9       | 54.6       | 84.5       | 63.2          |
| Rejuvenation  | 2.3         | 0          | 13.5       | 5.5        | 5.5        | 5.5           |
| Stumping  | 39.5        | 48.0       | 56.3       | 55.8       | 19.3       | 42.6          |
| Stress formation ( <i>formación de agobio</i> )   | 3.5         | 0          | 0          | 0.6        | 1.7        | 1.0           |
| Of farmers using any of the above pruning methods, % implementing 2 or more of them                             | 5.2         | 3.5        | 20.3       | 17.2       | 10.8       | 11.4          |
| Of farmers who pruned coffee, % pruning:  |             |            |            |            |            |               |
| <25% of coffee trees  | 89.5        | 78.4       | 69.8       | 79.1       | 61.9       | 74.0          |
| 25%-50% of coffee trees   | 12.8        | 26.4       | 26.9       | 16.6       | 26.0       | 22.3          |
| 51%-75% of coffee trees   | 0           | 6.4        | 5.0        | 8.0        | 14.4       | 7.9           |
| >75% of coffee trees  | 0           | 2.4        | 7.6        | 9.8        | 17.7       | 8.9           |
| Farmers (%) who consider it is important to rehabilitate coffee   | 97.1        | 97.4       | 97.0       | 98.2       | 95.2       | 96.9          |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

*Table 36. Panel data analysis: Coffee renovation and rehabilitation*

| Variable  | El Salvador |            |          | Guatemala  |            |          | Honduras   |            |          | Nicaragua  |            |         | Peru       |            |           | All countries |             |          |
|---|-------------|------------|----------|------------|------------|----------|------------|------------|----------|------------|------------|---------|------------|------------|-----------|---------------|-------------|----------|
|   | LB          | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value | LB         | LI         | p-value   | LB            | LI          | p-value  |
| Farmers (%) who renovated coffee trees              | 10.3        | 12.1       | 0.6114   | 17.3       | 24.1       | 0.0778   | 12.8       | 14.9       | 0.5588   | 42.7       | 34.4       | 0.0672* | 33.1       | 18.5       | 0.0002*** | 24.4          | 21.3        | 0.0887*  |
| Farmers (%) who rehabilitated (pruned) coffee trees | 37.4        | 49.4       | 0.0231** | 55.0       | 55.9       | 0.8483   | 63.6       | 60.5       | 0.5325   | 74.4       | 71.8       | 0.5263  | 76.6       | 72.6       | 0.3033    | 62.9          | 63.0        | 0.9642   |
| Normal pruning                                      | 41.5        | 46.5       | 0.546    | 34.7       | 53.7       | 0.003*** | 49.2       | 63.6       | 0.024**  | 40.8       | 54.6       | 0.012** | 61.1       | 84.4       | 0.000***  | 47.1          | 63.0        | 0.000*** |
| Rejuvenation  | 0           | 2.3        | 0.219    | 0          | 0          | n.a      | 11.3       | 13.6       | 0.594    | 4.7        | 5.5        | 0.746   | 4.7        | 5.6        | 0.722     | 4.6           | 5.5         | 0.459    |
| Stumping  | 40.0        | 39.5       | 0.954    | 37.2       | 48.8       | 0.068    | 38.7       | 56.8       | 0.005*** | 44.4       | 55.8       | 0.037** | 16.3       | 19.4       | 0.433     | 33.6          | 42.8        | 0.000*** |
| Stress formation ( <i>formación de agobio</i> )     | 4.6         | 3.5        | 0.728    | 0          | 0          | n.a      | 0          | 0          | n.a      | 0.6        | 0.6        | 0.980   | 1.1        | 1.7        | 0.014**   | 0.9           | 1.0         | 0.783    |
| <b>Number of households</b>                         | <b>174</b>  | <b>174</b> |          | <b>220</b> | <b>220</b> |          | <b>195</b> | <b>195</b> |          | <b>227</b> | <b>227</b> |         | <b>248</b> | <b>248</b> |           | <b>1064</b>   | <b>1064</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

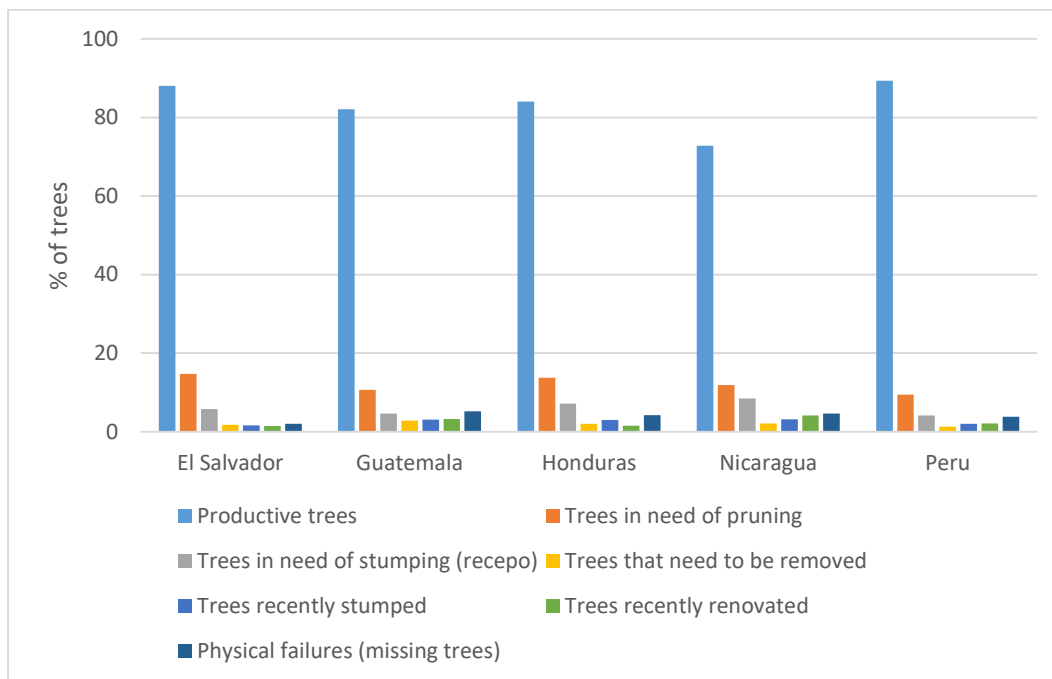
As for the baseline, enumerators visited (together with the farmer) the main coffee plot, as determined by the plot where farmers dedicate most time implementing agricultural practices. The objective of this visit was to measure the coffee area and make a diagnosis of the coffee trees, following Aguilar and Guharay (2002). With this diagnosis, we were able to determine the share of productive trees, trees in need of pruning, in need of stumping, which need to be removed, recently stumped, recently renovated, and physical failures (i.e., missing trees). The results of this field visit are in Table 37. The main coffee plot had an average of 1.53 ha, and this area was smallest in Guatemala (0.7 ha) and largest in Nicaragua (2.37 ha). There were approximately 6,638 coffee trees in this plot (roughly 4,338 trees/ha, a large increase from baseline, suggesting more review of the data may be necessary), ranging from 3,121 trees in El Salvador to 10,498 trees in Nicaragua. We also present median values because we suspect outlier values are pulling the mean up. A little over 83% of the trees were productive (range: 72.8% in Nicaragua to 89.4% in Peru), 11.9% needed pruning, 6.0% needed stumping, 2.0% need to be removed (or renovated), 2.6% were recently renovated or and the same share was recently stumped, and 4.1% were missing (all these values are very similar to baseline values). This suggests that roughly 17.8% of the trees need rehabilitation (sum of the ones that need pruning + stumping) and 6.1% need renovation (sum of the ones that need to be removed + physical failures). Figure 2 illustrates that the same trend is observed in every country.

**Table 37. Coffee: Technician's evaluation of the main coffee plot, at midline**

| <b>Evaluation details</b>            | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All countries</b> |
|--------------------------------------|--------------------|------------------|-----------------|------------------|-------------|----------------------|
| Area (ha) of the main coffee plot    | 0.93               | 0.7              | 1.65            | 2.37             | 1.85        | 1.53                 |
| # coffee trees (median) in this plot | 2,080              | 2,000            | 4,500           | 7,000            | 6,300       | 4,000                |
| # coffee trees (mean) in this plot   | 3,121              | 3,531            | 7,685           | 10,498           | 7,632       | 6,638                |
| Percent of:                          |                    |                  |                 |                  |             |                      |
| Productive trees                     | 88                 | 82.1             | 84              | 72.8             | 89.3        | 83.1                 |
| Trees in need of pruning             | 14.7               | 10.6             | 13.7            | 11.9             | 9.4         | 11.8                 |
| Trees in need of stumping (recepto)  | 5.8                | 4.6              | 7.1             | 8.4              | 4.1         | 5.9                  |
| Trees that need to be removed        | 1.7                | 2.8              | 2.0             | 2.0              | 1.3         | 2                    |
| Trees recently stumped               | 1.6                | 3.0              | 2.9             | 3.1              | 2.0         | 2.6                  |
| Trees recently renovated             | 1.4                | 3.2              | 1.5             | 4.1              | 2.0         | 2.5                  |
| Physical failures (missing trees)    | 2.07               | 5.2              | 4.2             | 4.6              | 3.8         | 4.1                  |
| <b>Number of households</b>          | <b>174</b>         | <b>230</b>       | <b>197</b>      | <b>227</b>       | <b>249</b>  | <b>1077</b>          |

\*1 ha (hectare) = 10,000 square meters





**Figure 2. Outcome of evaluation of coffee trees in the main plot, by country**

#### 4.2.10.4 Seedbed and nursery management

In this section we discuss four of the practices described in the MOCCA curriculum, along with additional information about seedbed and nursery management. At midline, 21.6% of farmers reported they managed coffee seedbeds (Table 38), a drop from the share of farmers who reported doing this at baseline. As in the baseline, managing a seedbed within the farm was extremely rare in El Salvador (practically non-existent) and not common in Honduras. In contrast, having a seedbed was surprisingly high in Nicaragua. Among farmers who managed seedbeds in their farms, 15.8% said they selected the seeds for planting, and of them, most reported selected from highly productive plants, or purchasing genetic material from a certified/verified nursery as well as selecting plants considering environmental factors, pests and diseases incidence, and market demand. Further, only 18.3% of farmers reported preparing substrate mix for seed germinators (a decrease from the 31% reporting this at baseline), and almost one-half of the farmers included at least 30% sand in this mix, but none were doing the optimal MOCCA-recommended practice of mixing 50% sand, 30% of organic matter and 20% soil. Two out of three farmers preparing substrate mix disinfected the mix using any method, and only one out of three farmers disinfected it using MOCCA recommendations (of using boiling water or solarization), and doing the latter was more common in Peru.

**Table 38. Coffee: Management of coffee seedbeds at midline**

| Practices implemented in the 2021-2022 ag. year   | El Salvador | Guatemala | Honduras | Nicaragua | Peru | All countries |
|---|-------------|-----------|----------|-----------|------|---------------|
| Farmers (%) managing a coffee seedbed in their farms  | 0.6         | 18.3      | 9.1      | 43.6      | 29.3 | 21.6          |
| Amount (kg) of seed planted   | 0           | 2.4       | 1.3      | 13.5      | 0.8  | 7.0           |
| Farmers (%) selecting coffee seeds for planting   | 0           | 13.5      | 8.1      | 36.6      | 26.9 | 18.3          |
| Of farmers selecting coffee seeds for planting, % who selected from highly productive plants, OR purchases genetic material from a certified/verified nursery | n.a.        | 90.3      | 93.8     | 85.5      | 83.6 | 86.3          |
| Of farmers selecting coffee seeds for planting, % who selected plants considering environmental factors, pests & diseases incidence, and market demand        | n.a.        | 92.9      | 78.6     | 94.6      | 90.7 | 91.8          |
| Farmers (%) preparing substrate mix for seed germinators  | 0           | 17.0      | 7.6      | 33.9      | 26.5 | 18.3          |
| Of farmers preparing substrate mix, % that includes at least 30% sand   | n.a.        | 30.8      | 86.7     | 23.4      | 74.2 | 46.7          |
| Of farmers preparing substrate mix, % that uses MOCCA-recommended mix (50% sand, 30% org. matter, 20% soil)   | n.a.        | 0         | 0        | 0         | 0    | 0             |
| Of farmers (%) preparing substrate mix, %:  |             |           |          |           |      |               |
| That disinfect substrate mix with any method  | n.a.        | 56.4      | 33.3     | 74.0      | 71.2 | 66.5          |
| That follows MOCCA recommendations (solarization or boiling water)  | n.a.        | 15.4      | 13.3     | 19.5      | 66.7 | 34.0          |
| For farmers with seedbeds or acquiring coffee seed, seed source (%):  |             |           |          |           |      |               |
| Purchased   | 0           | 7.1       | 11.1     | 10.1      | 17.8 | 12.0          |
| Free seed   | 0           | 23.8      | 11.1     | 7.0       | 6.8  | 10.3          |
| Selected from outstanding trees in their farm   | 0           | 66.6      | 72.2     | 67.6      | 67.1 | 67.3          |
| Selected from any tree in their farm  | 0           | 0         | 11.1     | 7.0       | 10.9 | 7.3           |
| Obtained from NGO or government program   | 100         | 2.3       | 0        | 7.0       | 0    | 3.8           |
| Obtained from other sources   | 0           | 4.7       | 0        | 3.0       | 1.3  | 2.5           |

**Table 38. Continued**

| Practices implemented in the 2021-2022 ag. year                           | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| For farmers buying coffee seed:   |             |            |            |            |            |               |
| % who know where they can acquire certified or verified planting material | 0           | 0          | 100        | 5.0        | 61.5       | 53.5          |
| % purchasing certified or verified seed                                   | 0           | 0          | 100        | 40.0       | 53.8       | 46.4          |
| Amount (kg) of seed purchased   | 0           | 1.5        | 6.2        | 3.2        | 5.2        | 4.2           |
| Price paid per kg   | 0           | 62,3       | 310,0      | 412,5      | 210,8      | 265,5         |
| % stating the seed quality was good or excellent                          | 0           | 66.6       | 100        | 100        | 92.3       | 92.8          |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

Similar to baseline, the most common source of seed for germinators in every country except El Salvador (because practically no farmer reported managing a seedbed in this country) was selecting it from outstanding trees from their farm. Other, sources were purchasing seed (12%), getting it for free (10.3%), selecting it from any tree in their farm (7.3%), obtaining it from NGOs or government programs (3.9%), among other sources (Table 38). Purchasing seed was slightly more common in Peru. Of farmers buying coffee seed, 53.6% knew where to acquire certified or verified planting material and 46.4% reported they bought certified or verified seed. This was surprisingly high in Honduras, where all farmers reported that, and no farmer reported this in El Salvador or Guatemala. On average, farmers purchased 4.2 kg of seed and almost every farmer reported the seed quality was good or excellent, except in Guatemala, where only two out of three farmers reported the latter.

Roughly 29% of farmers reported managing a coffee nursery in their farms in the 2021-2022 agricultural year (an increase from the 19.4% who reported this at baseline), and the share of farmers reporting this was highest in Nicaragua (46.3%), followed by Peru (32.1%), Guatemala (26.1%), Honduras (19.8%) and El Salvador (15.5%) (Table 39). Of farmers managing a nursery, only 11.2% reported selecting coffee plants from their farms for transplanting (except in El Salvador, where no farmer did this), and of these, 41.3% selected plants free of pests and diseases and chose vigorous plants (a good level of practice implementation according to MOCCA's curricula), and only 23.9% did the optimal MOCCA-recommended practice of selecting plants free of pests and diseases, and choosing vigorous plants, and choosing plants with 4-6 pairs of mature leaves.

As we can see, in every country except El Salvador and Honduras, the most common source of plants was their own seedbeds (practically the same share as in the baseline). While in El Salvador getting free seedlings was the most common source of plants, in Honduras it was buying seedlings. Of farmers buying seedlings (18%), most farmers (41.1%) reported buying from a non-certified nursery, but this varied by country. While buying from non-certified sources (includes non-certified nurseries and neighbors) was the main source of plants in most countries, in Peru, the most common source was buying from a certified

nursery. Farmers reported managing a little over 1,800 seedlings and most (85.5%) said the quality of the seedlings was good or excellent. Finally, as stated above, only in Peru was common to buy from certified nurseries, and in Central America, only in Honduras and Nicaragua two out of three farmers reported knowing where to acquire verified or certified materials, while no farmer reported knowing this in El Salvador, and only 7.1% of farmers knew this in Guatemala, clearly suggesting more work is needed in this topic.

**Table 39. Coffee: Management of coffee nurseries at midline**

| Practices implemented in the 2021-2022 ag. year   | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Farmers (%) managing a coffee nursery in their farms  | 15.5        | 26.1       | 19.8       | 46.3       | 32.1       | 28.9          |
| # seedlings (plants)  | 1,666.7     | 4,421.4    | 1,946.9    | 3,690.0    | 3,209.2    | 3,533.6       |
| Farmers (%) selecting coffee plants from their farm for transplant (renovation or replacement), and % farmers...:         | 0           | 6.52       | 4.06       | 28.6       | 13.2       | 11.2          |
| Choosing plants free of pests and diseases AND choosing vigorous/robust plants  | n.a.        | 40.0       | 12.5       | 50.7       | 30.3       | 41.3          |
| Choosing plants free of pests and diseases AND choosing vigorous/robust plants AND plants with 4-6 pairs of mature leaves | n.a.        | 13.3       | 0          | 30.7       | 21.2       | 23.9          |
| For farmers with nurseries or acquiring coffee seedlings, % reporting:  |             |            |            |            |            |               |
| Seedlings coming from own seedbeds  | 0           | 63.3       | 41.0       | 86.6       | 75         | 65.9          |
| Buying the seedlings  | 3.7         | 28.3       | 53.8       | 6.6        | 12.5       | 18.0          |
| Obtaining seedlings for free (NGO, relatives, friends, etc.)  | 96.3        | 11.6       | 5.1        | 3.8        | 6.2        | 14.1          |
| Obtaining seedlings from other sources  | 0           | 0          | 0          | 2.8        | 6.2        | 2.5           |
| For farmers buying coffee seedlings, % reporting this source:   |             |            |            |            |            |               |
| Neighbor  | 0           | 41.1       | 19.0       | 71.4       | 20.0       | 32.1          |
| Certified nursery   | 0           | 17.6       | 14.2       | 14.2       | 60.0       | 23.2          |
| Non-certified nursery   | 100         | 41.1       | 66.6       | 14.2       | 0          | 41.0          |
| Other source  | 0           | 0          | 0          | 0          | 20.0       | 3.5           |
| For farmers buying coffee seedlings:  |             |            |            |            |            |               |
| Amount (#) of seedlings purchased   | 50          | 1,031.4    | 2,261.9    | 1,608.3    | 2,581.9    | 1,814.6       |
| % stating the seedlings quality was good or excellent   | 100         | 93.7       | 90.4       | 57.1       | 80         | 85.4          |
| For farmers not buying from certified nurseries, % who know where to acquire certified or verified plants                 | 0           | 7.1        | 66.6       | 66.6       | 0          | 39.5          |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

#### 4.2.10.5 Coffee nutrition

In this section we discuss eight of the practices described in the MOCCA curriculum, and for each, we provide information about how farmers are implementing these practices, according to the MOCCA curricula. We also discuss additional indicators related to the crop nutrition.

##### **Fertilizing based on nutritional deficiencies**

Most farmers (88.3%) reported applying fertilizers in the agricultural year of reference, and fewer farmers in Peru and El Salvador reported they applied fertilizer (Table 40). Although fertilizing based on nutritional deficiencies was not common as 23.1% of farmers reported doing this, this share slightly increased compared to the baseline (of roughly 20% of farmers). Fertilizing based on nutritional deficiencies was less common in Guatemala and practically inexistent in El Salvador, suggesting room for improvement in this indicator for MOCCA implementers. Of farmers fertilizing based on nutritional deficiencies, only 30.9% use soil analyses (a decrease of 9 percentage points from baseline), which is the optimal MOCCA-recommended practice. The country where the highest share of farmers fertilizes based on nutritional deficiencies was Honduras (34.9%, a decrease from baseline), though just 33.3% of these farmers conducted soil analyses (or 11.6% of all farmers who fertilize<sup>28</sup>). Following Honduras was Peru (32.7%, an increase from baseline), where 35.3% of farmers fertilizing based on plant nutritional deficiencies conducted soil analyses (or 11.5% of farmers who fertilize). The country with the lowest share of farmers fertilizing based on nutritional needs was El Salvador, where <1% of farmers do so.

##### **Frequency and timing of fertilization of young, non-productive plants**

Roughly 65% of farmers reported having young, non-productive plants (Table 40). Of farmers fertilizing, 59% fertilized young, non-productive plants (i.e., 91% of farmers with young plants), and of these, 11.1% applied fertilizer three times per year and only 1.8% fertilized them four times a year (the optimal MOCCA-recommended practice), a decrease from baseline. The country with the most optimal frequency of fertilization was Peru (4%), while the country with the lowest number of farmers applying fertilizer four times per year was El Salvador (0%). While 6.1% of farmers fertilized 3 times during the rainy season, <1% applied four times during the rainy season.

##### **Frequency and timing of fertilization of productive plants**

Almost every farmer (98.2%) reported having productive trees (Table 40). Of farmers fertilizing, most (96.1%) fertilized these trees, a sharp increase from baseline (when 64.4% reported this), and 61.5% of coffee farmers fertilized productive plants two times per year while only 7.2% fertilized them three times per year (the optimal MOCCA-recommended practice), a decrease from baseline. The country with the highest share of farmers applying fertilizer to productive plants at an optimal frequency was Guatemala (12.8%), while the country with the lowest share of farmers applying fertilizer to productive plants at an optimal frequency was Peru (1.5%). MOCCA evaluates the timing and fertilizer dosage applied to productive plants in the same way it does for young, non-productive plants. While 55.6% of farmers fertilized two times during the rainy season, 4.3% applied three times during the rainy season.

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<sup>28</sup> Estimated multiplying the share of farmers fertilizing based on nutritional deficiencies times the share of farmers conducting soil analyses.

**Table 40. Coffee: Adoption of crop nutrition practices at midline**

| <b>Crop nutrition practices adopted</b>   | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All countries</b> |
|---|--------------------|------------------|-----------------|------------------|-------------|----------------------|
| Farmers (%) applying fertilizer in the 2021-2022 ag. year   | 79.8               | 90.4             | 95.9            | 91.1             | 83.5        | 88.3                 |
| Of farmers who applied fertilizer, % that do so based on nutritional deficiencies                                       | 0.72               | 12.9             | 34.9            | 28.0             | 32.6        | 23.1                 |
| Of farmers who apply fertilizer based on nutritional deficiencies, % who do so based on visual characteristics of plant | 100                | 48.1             | 66.6            | 91.3             | 64.7        | 70.4                 |
| Of farmers who apply fertilizer based on nutritional deficiencies, % who do so using soil analyses                      | 0                  | 55.5             | 33.3            | 12.0             | 35.2        | 30.9                 |
| Of farmers fertilizing, % with young non-productive plants in their farm  | 67.6               | 75.9             | 60.8            | 64.2             | 54.3        | 64.4                 |
| Of farmers fertilizing, % fertilizing young non-productive plants   | 48.9               | 75               | 59.7            | 59.4             | 48.5        | 58.9                 |
| Of farmers fertilizing young non-productive plants, % who do so 3 times a year  | 5.8                | 12.8             | 12.3            | 12.2             | 8.9         | 11.0                 |
| Of farmers fertilizing young non-productive plants, % who do so 4 times a year  | 0                  | 1.2              | 0.8             | 2.4              | 3.9         | 1.7                  |
| Of farmers fertilizing young non-productive plants, %:  |                    |                  |                 |                  |             |                      |
| Fertilizing 3 times during the rainy season   | 5.8                | 11.5             | 3.5             | 4.8              | 1.9         | 6.0                  |
| Fertilizing 4 times during the rainy season   | 0                  | 1.2              | 0               | 0                | 0.9         | 0.5                  |
| Of farmers fertilizing, % with productive plants in their farm  | 95.6               | 98.5             | 98.4            | 98.0             | 99.5        | 98.2                 |
| Of farmers fertilizing, % fertilizing productive plants   | 93.5               | 93.7             | 97.8            | 96.1             | 98.5        | 96.1                 |
| Of farmers fertilizing productive plants, % who do so 2 times a year  | 71.5               | 70.2             | 75.6            | 49.2             | 45.8        | 61.4                 |
| Of farmers fertilizing productive plants, % who do so 3 times a year  | 2.31               | 12.8             | 9.1             | 9.0              | 1.4         | 7.2                  |
| Of farmers fertilizing productive plants, %:  |                    |                  |                 |                  |             |                      |
| Fertilizing 2 times during the rainy season   | 71.5               | 70.7             | 76.2            | 43.2             | 24.3        | 55.5                 |
| Fertilizing 3 times during the rainy season   | 2.3                | 12.3             | 2.1             | 3.5              | 0.4         | 4.2                  |

**Table 40. Continued**

| <b>Crop nutrition practices adopted</b>  | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b>            | <b>Nicaragua</b>   | <b>Peru</b>              | <b>All countries</b> |
|--|--------------------|------------------|----------------------------|--------------------|--------------------------|----------------------|
| Of farmers fertilizing, % fertilizing the:   |                    |                  |                            |                    |                          |                      |
| Partial amount required  | 17.2               | 11.5             | 6.3                        | 22.2               | 7.2                      | 12.7                 |
| Full amount required   | 69.7               | 57.2             | 79.3                       | 58.9               | 28.8                     | 57.6                 |
| Of farmers fertilizing, % spreading the fertilizer:  |                    |                  |                            |                    |                          |                      |
| Randomly close to roots  | 0.7                | 12.9             | 7.4                        | 37.2               | 18.7                     | 16.6                 |
| Applying fertilizer at the recommended location -- under the treetop or in fertilization band                                | 94.2               | 87.5             | 95.7                       | 66.6               | 47.6                     | 76.8                 |
| Of farmers fertilizing, % applying these cost-reducing, alternative fertilization inputs recommended by MOCCA:               |                    |                  |                            |                    |                          |                      |
| Using at least one method to reduce fertilization costs (organic fertilizer prepared with farm waste, OR dilutes fertilizer) | 99.2               | 99.5             | 100                        | 95.6               | 94.2                     | 97.5                 |
| Using two or more methods to reduce fertilization costs (organic fertilizer with farm waste AND dilutes fertilizer)          | 0.7                | 3.3              | 12.7                       | 1.9                | 25.4                     | 9.3                  |
| Of farmers applying fertilizer, %:   |                    |                  |                            |                    |                          |                      |
| Applying only chemical fertilizers   | 92.8               | 97.1             | 100                        | 99.0               | 52.8                     | 87.8                 |
| Applying only organic fertilizers  | 7.1                | 25               | 19.0                       | 8.7                | 96.1                     | 33.2                 |
| Applying chemical and organic fertilizers  | 0                  | 22.1             | 19.0                       | 7.7                | 49.0                     | 21.0                 |
| Applying microorganisms  | 0                  | 0                | 1.06                       | 0                  | 0                        | 0.2                  |
| Most commonly used fertilizer according to the amount applied, and...:   |                    |                  |                            |                    |                          |                      |
| % farmers applying this fertilizer   | 15-15-15<br>29.5   | 20-20-0<br>20.19 | Formula<br>Química<br>30.1 | 20/05/2020<br>48.7 | Guano<br>de isla<br>33.6 | 20/05/2020<br>10.6   |
| # times it was applied during the 2021-2022 agricultural year  | 1.5                | 1.7              | 1.9                        | 1.6                | 1.6                      | 1.6                  |
| <b>Number of households</b>  | <b>174</b>         | <b>230</b>       | <b>197</b>                 | <b>227</b>         | <b>249</b>               | <b>1077</b>          |

### **Fertilization dosage**

Of farmers fertilizing, 12.7% applied a partial dosage and 57.6% applied the entire dosage (optimal MOCCA-recommended practice) required by plants as per MOCCA recommendations. The country where the highest share of farmers adopted an optimal dosage was Honduras (79.4%), while the country where the lowest share of farmers adopted an optimal dosage of fertilizer was Peru (28.9%).

## Location of fertilizer application

When considering whether farmers are applying the fertilizer in the best location, where the plant will be best able to make use of it, a good level of adoption corresponds to using a broadcast application near the roots, while an optimal level of adoption corresponds to applying it directly under the treetop (*la copa*), or if diluting fertilizer, or applying in the fertilization band. 76.9% of farmers reported applying the fertilizer under the treetop or in the fertilization band (optimal adoption), and most of the remaining farmers broadcasted it randomly close to the roots (good adoption). However, almost every farmer in Honduras and El Salvador reported an optimal level of fertilizer application form (Table 40), which suggests that MOCCA should not dedicate efforts to train farmers on this technique in these countries.

## Use of alternative methods to reduce fertilization costs

Most (97.6%) of farmers applied at least one method to reduce fertilization costs— including the use of organic fertilizer prepared with farm waste, mountain microorganisms, coffee pulp, or diluted fertilizer, and only 9.4% of farmers applied two or more of these methods, the optimal MOCCA-recommended practice. The latter was highest in Peru (25.5%), followed by Honduras and far behind the rest of the countries.

## Other fertilization practices

Most (87.8%) farmers applied only chemical fertilizers, and the application of these was lowest in Peru (52.9%), which is consistent with baseline findings. Only one of every three farmers applied only organic fertilizer (its use was more common in Peru), and 21% of farmers applied both organic and chemical fertilizers. Practically no farmer reported applying microorganisms (Table 40).

### 4.2.10.6 Control of pests and diseases in coffee

Next, we discuss several the practices described in the MOCCA curriculum. Roughly one out of four farmers (quite similar to baseline values) reported they implemented a pest & disease monitoring system in the agricultural year of reference, and the proportion of farmers reporting this was highest in Nicaragua (44.9%) and lowest in El Salvador (8.1%) (Table 41). However, only 14.2% of farmers implemented the optimal MOCCA-recommended practice of applying a standardized pest & disease sampling protocol, which was more common in Guatemala, Honduras and Nicaragua, and least common in Peru and El Salvador.

43.6% of farmers reported insect pests affected their coffee crop, and incidence of insect pests was higher in Honduras and Peru and lowest in Guatemala. Of farmers reporting insect pests affected their crop, most (94%) reported using methods to control them, and only 2.5% implemented the optimal MOCCA-recommended practice of using more than one method for each pest identified (most used only one method).

The incidence of diseases was higher than the incidence of insect pests, as 85.3% of farmers reported this. Of these farmers, most (92.2%) used methods to control diseases, and most farmers (71%) used only one method to control diseases, while practically no farmer (1.9% only) used more than one method of



control. Finally, 42.6% of farmers reported an incidence of berry borer in their coffee crop, and this incidence was highest in Honduras and Peru and lowest in Guatemala (Table 41). Of these farmers, 38.3% did field evaluations to control this insect pest, and doing this was more common in Nicaragua (78.5%), followed by Guatemala (53.9%), Honduras (36.1%), El Salvador (23.4%) and Peru (19%).

**Table 41. Coffee: Adoption of integrated pest management practices at midline**

| <b>Integrated Pest Management (IPM)<br/>MOCCA-promoted practices</b>                       | <b>El<br/>Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All<br/>countries</b> |
|--|------------------------|------------------|-----------------|------------------|-------------|--------------------------|
| Farmers (%) implementing any pest & disease monitoring system                              | 8.1                    | 26.1             | 26.4            | 44.9             | 21.3        | 26.1                     |
| Farmers (%) monitoring pests & diseases using a standardized sampling protocol             | 1.2                    | 20.9             | 20.3            | 22.0             | 5.2         | 14.2                     |
| Farmers (%) reporting insect pests affected their crop                                     | 36.8                   | 24.8             | 62              | 37.0             | 57          | 43.6                     |
| Of farmers reporting pests affecting their crop, % utilizing methods to control them       | 81.3                   | 93.0             | 91.8            | 98.8             | 99.3        | 94.0                     |
| Of farmers using control methods, % using 1 method for each pest identified                | 80.8                   | 60.4             | 69.6            | 62.7             | 69.5        | 68.5                     |
| Of farmers using control methods, % using more than one method for each pest identified    | 7.7                    | 0.0              | 1.8             | 6.0              | 0.0         | 2.5                      |
| Farmers (%) reporting diseases affected their crop   | 69.5                   | 90.4             | 92.4            | 95.2             | 77.1        | 85.3                     |
| Of farmers reporting diseases affecting their crop, % utilizing methods to control them    | 90.1                   | 86.1             | 92.9            | 93.5             | 97.9        | 92.2                     |
| Of farmers using control methods, % using 1 method for each disease identified             | 85.3                   | 71.0             | 69.2            | 62.9             | 72.9        | 71.0                     |
| Of farmers using control methods, % using more than one method for each disease identified | 3.7                    | 0.0              | 1.2             | 5.0              | 0.0         | 1.9                      |
| Farmers (%) reporting berry borer incidence, and % farmers...:                             | 36.8                   | 22.6             | 61.9            | 34.8             | 57.0        | 42.6                     |
| Doing field evaluations to control berry borer   | 23.4                   | 53.9             | 36.1            | 78.5             | 19.0        | 38.3                     |
| <b>Number of households</b>  | <b>174</b>             | <b>230</b>       | <b>197</b>      | <b>227</b>       | <b>249</b>  | <b>1077</b>              |

When estimating how many farmers reported either insect pests or diseases affected their crop (Table 42), we noticed that 91.9% of farmers reported this, and reporting this was less common in El Salvador. Of these farmers, 53.9% applied pesticides, and the use of pesticides was practically only reported in Central America. 58.2% of farmers reported using authorized products to control insect pests and diseases.

While the two most commonly reported insect pests were berry borer (46.4%) and fumagina (ants, 0.6%), the most common diseases were leaf rust (70.9%) and anthracnose (18.7%). Reporting incidence of two diseases was more common than reporting incidence of two insect pests (Table 42).

**Table 42. Coffee: Use of pesticides and main pests affecting coffee in the 2021-2022 ag. Year**

| Characteristics   | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Farmers (%) reporting insect pests or diseases affected their coffee crop                 | 77.0        | 92.2       | 94.4       | 97.8       | 94.8       | 91.9          |
| Among these farmers, % applying pesticides (for insects or diseases)                      | 65.7        | 69.3       | 68.8       | 76.1       | 0.85       | 53.9          |
| Among these farmers, % using products authorized by the Phytosanitary Service             | 59.0        | 70.3       | 74.7       | 82.0       | 11.4       | 58.2          |
| Among these farmers, main insect pests or diseases affecting the coffee crop (% farmers): |             |            |            |            |            |               |
| Berry borer   | 47.8        | 24.5       | 65.6       | 35.6       | 60.2       | 46.4          |
| Leaf rust   | 87.3        | 88.7       | 94.6       | 46.4       | 50.0       | 70.9          |
| Anthracnose (muerte descendente)  | 11.9        | 31.6       | 15.1       | 28.4       | 4.7        | 18.7          |
| Coffee spot/berry blotch/brown eye spot (mancha de hierro)                                | 0           | 12.7       | 1.1        | 14.4       | 0          | 6.3           |
| Leaf spot (gotera)  | 0           | 1.4        | 0          | 4.5        | 12.3       | 4.2           |
| Fumagina (ants)   | 0           | 0.9        | 0          | 1.8        | 0          | 0.6           |
| Other   | 0           | 11.3       | 1.6        | 39.2       | 31.4       | 19.0          |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

#### 4.2.10.7 Coffee harvest

Most farmers (96.7%) harvested coffee in the year of reference (Table 43). Of farmers harvesting coffee, 58.7% did so selectively and very few farmers reported harvesting when the field sampling shows 75% of ripe cherries (3.9% of farmers), or 85% of ripe cherries plus doing *repela and pepena* to reduce risk of berry borer (6.9% of farmers), which are two MOCCA-promoted practices. These results suggest that MOCCA can still help farmers adopt these practices to reap the benefits of their implementation, in terms of quality and quantity of coffee harvested.

Overall, most farmers (85.6%) did the *repela and pepena* practice, and doing this was significantly less common in El Salvador, where only 54.3% of farmers did it, suggesting the project can do more to increase the number of farmers who implement this practice in this country. Of farmers implementing this practice, although three out of four farmers separated empty beans, ripe beans and flowers before delivering the coffee to the buyer, practically no farmer used a *cerezometro* (an instrument that facilitates the harvest process by indicating the optimal ripe range for harvesting) to facilitate quality control, and no farmer reported using a *refractometro* or *brazalete* to facilitate quality control. Because of this, the project could also dedicate efforts to promote the use of these tools to improve the quality of the coffee that is harvested.

42.3% of farmers reported the harvest evaluated in the year of reference corresponded to a high-production year, and this was quite low in Honduras. Only 19.2% of farmers estimated their harvest using a protocol to measure the number of coffee fruits per bud, and this average was mostly driven by the high share of farmers reporting this in Nicaragua, as doing this was less common in all other countries (Table 43).

As discussed above, the average coffee area was 2.06 ha. Of this area, farmers harvested 10,941 kg of cherry coffee, equivalent to 1,995 kg of green coffee, ranging from 567 kg green coffee in El Salvador to 3,875 kg green coffee in Honduras (Table 43). Since we collected data before the harvest was completed, we inquired whether the values reported included estimations of harvest. Only in Guatemala farmers reported this, and 25% of them said the values they reported did include estimations of the amount to be harvested. Further, since we anticipated many farmers would do *repela and pepena*, we inquired whether the total harvest reported included this lower-quality coffee values. Although most (59.7%) farmers did say the total harvest reported combined the quantity harvested from *repela and pepena* plus the main harvest, the total volume of *repela and pepena* represented only 12% of the total amount harvested in cherry. We wanted to know this because it has implications in the income farmers may get from selling coffee, and knowing this will help with the interpretation.

**Table 43. Coffee: Harvest practices and amount harvested at midline**

| Details  | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|--|-------------|------------|------------|------------|------------|---------------|
| % farmers harvesting coffee in the 2021-2022 ag. year  | 87.9        | 97.3       | 96.9       | 99.1       | 99.6       | 96.6          |
| Of farmers harvesting, % doing so selectively  | 41.1        | 79.4       | 45.5       | 67.1       | 53.3       | 58.6          |
| Of farmers doing selective harvest, % who conduct field sample indicating 75% of ripe cherries   | 9.5         | 6.1        | 0,0        | 2.65       | 2.27       | 3.9           |
| Of farmers doing selective harvest, % who conduct field sample indicating 85% of ripe cherries AND <i>repela</i> and <i>pepena</i> to reduce risk of berry borer | 41.2        | 4.4        | 2.3        | 3.97       | 0          | 6.8           |
| % farmers implementing <i>repela</i> & <i>pepena</i> practices   | 54.3        | 86.2       | 85.3       | 99.1       | 92.3       | 85.6          |
| Among farmers implementing <i>repela</i> & <i>pepena</i> , %:  |             |            |            |            |            |               |
| Separating empty beans, ripe beans and flowers before delivering the coffee to the buyer   | 22.9        | 68.9       | 80.4       | 93.7       | 81.2       | 76.1          |
| Using <i>cerezometro</i> to facilitate quality control   | 0           | 0.52       | 0          | 3.14       | 0.8        | 1.1           |
| Using <i>refractometro</i> or <i>brazalete</i> to facilitate quality control   | 0           | 0          | 0          | 0          | 0          | 0             |
| % farmers estimating harvest using a protocol to measure the number of coffee fruits per bud   | 2.6         | 0.8        | 22.5       | 52         | 13.7       | 19.2          |
| % farmers reporting the midline year was a high-production year  | 58.8        | 35.2       | 8.3        | 43.1       | 63.7       | 42.2          |
| Coffee area (ha)*  | 0.9         | 0.9        | 2.02       | 3.5        | 2.5        | 2.06          |
| Total amount of cherry coffee harvested (kg)   | 3,110.2     | 5,135.5    | 8,983.4    | 21,256.4   | 13,207.5   | 10,941.3      |
| Total amount of green coffee (equivalent) harvested (kg)   | 567         | 936.2      | 1,637.7    | 3,875.0    | 2,407.7    | 1,994.6       |
| % farmers reporting the amount harvested includes estimations  | n.a         | 25,0       | n.a        | n.a        | n.a        | n.a           |
| % farmers reporting the amount harvested includes low quality ( <i>repela</i> & <i>pepena</i> ) coffee   | 24.2        | 67.4       | 50.3       | 84.4       | 59.3       | 59.7          |
| Share (%) of the total amount harvested in cherry that corresponds to low quality ( <i>repela</i> & <i>pepena</i> ) coffee                                       | 5.2         | 12.8       | 10.3       | 16.2       | 8.3        | 12.0          |
| <b>Number of households</b>  | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

\*1 ha (hectare) = 10,000 square meters

#### 4.2.10.8 Post-harvest coffee activities

As previously stated, most farmers harvested coffee in the year of reference. Of these farmers, 78.3% classified coffee cherries after the harvest (an increase from baseline), and doing this was significantly less common in Guatemala and Nicaragua (Table 44). Further, 65.6% of farmers reported milling coffee in their farms, also an increase from the 55.2% of farmers who reported this at baseline. Milling coffee in the farm was more common in Nicaragua (99.6%) and Peru (94%), and least common in El Salvador (2.6%). The case of Peru is surprising, as the share of farmers who reported milling in the farm increased drastically from the baseline value of 9.3%.

Of farmers milling coffee in their farms, almost everyone (98.7%) removed the pulp the same day the coffee was harvested, and practically no farmer did the optimal MOCCA-recommended practice of removing and transporting the pulp without water. These results are similar to the ones reported at baseline.

Of farmers milling coffee in their farms, practically everyone reported fermenting coffee beans and of them, 13.9% fermented coffee for <12 hrs and most (86.1%) did the optimal MOCCA-recommended practice of fermenting coffee for >12 hrs, which is similar to the baseline findings. Further, 85.4% of these farmers reported drying coffee beans, and 51.6% of farmers drying beans did so in a patio with no infrastructure and 44.8% did the optimal MOCCA-recommended practice of drying in a patio with infrastructure. The latter results varied by country.

Roughly 80% of farmers drying coffee beans verified the bean moisture, and doing this was very common in all countries except Nicaragua. Of farmers who verified the bean moisture, most (92.3%) did so using touch and visual methods to estimate 12% moisture, and very few (7.7%) did the optimal MOCCA-recommended practice of using touch and an instrument.

Using water for milling can have large environmental impacts and learning about the treatment given to the waste water is important. Two out of three farmers milling coffee in their farms treated waste water from wet milling (a slight increase from baseline), and doing this was more common in Peru (87.6% of farmers did this), followed by Nicaragua (63.4%), Honduras (60.7%), Guatemala (38.1%) and El Salvador (25%). Of farmers treating water from milling, 86% managed the waste water in a treatment system or reservoir (although no farmer reported doing this in El Salvador and few farmers did this in Guatemala).

The share of farmers who treated waste water from other activities decreased from 95.7% at baseline to 56.2% at midline (Table 44). Finally, 84% of farmers treated pulp waste, and of them, 62% reported having infrastructure to prepare compost using the coffee pulp, which is the optimal practice recommended by MOCCA. The latter was more common in Peru than in any other country.

**Table 44. Coffee: Adoption of post-harvest and processing practices at midline**

| <b>Post-harvest and processing MOCCA-promoted practices</b>  | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All countries</b> |
|--|--------------------|------------------|-----------------|------------------|-------------|----------------------|
| % farmers harvesting coffee in the 2021-2022 ag. year  | 87.9               | 97.3             | 96.9            | 99.1             | 99.6        | 96.6                 |
| Of farmers harvesting, % classifying coffee cherries after the harvest                                   | 98.6               | 64.7             | 83.7            | 60.4             | 89.9        | 78.2                 |
| Of farmers harvesting, % milling coffee in the farm  | 2.6                | 46.8             | 61.2            | 99.5             | 93.9        | 65.6                 |
| <b>Of farmers milling coffee in the farm:</b>  |                    |                  |                 |                  |             |                      |
| % removing pulp same day it was harvested  | 100                | 98.1             | 97.4            | 98.6             | 99.5        | 98.6                 |
| % removing and transporting pulp without water (i.e., dry method)  | 0                  | 0.9              | 3.4             | 0                | 0           | 0.7                  |
| % farmers fermenting coffee beans  | 100                | 99.0             | 96.5            | 99.5             | 100         | 99.1                 |
| Of farmers fermenting coffee, % who fermented for <12 hrs  | 0                  | 0.9              | 36.2            | 22.4             | 0.8         | 13.8                 |
| Of farmers fermenting coffee, % who fermented for more than 12 hrs                                       | 100                | 99.0             | 63.7            | 77.5             | 99.1        | 86.1                 |
| % farmers drying coffee beans  | 100                | 100              | 60.6            | 76.3             | 99.5        | 85.3                 |
| Of farmers drying coffee, % who dried in a patio (no infrastructure)                                     | 0                  | 74.2             | 9.8             | 59.6             | 49.1        | 51.6                 |
| Of farmers drying coffee, % who dried in a patio (with infrastructure)                                   | 100                | 25.7             | 90.1            | 40.3             | 41.8        | 44.7                 |
| Of farmers drying coffee, % verifying coffee bean moisture   | 100                | 86.6             | 90.1            | 45.6             | 99.1        | 80.1                 |
| Of farmers measuring moisture, % who measured using touch and visual methods up to 12%                   | 25                 | 87.9             | 90.6            | 84.6             | 98.2        | 92.2                 |
| Of farmers measuring moisture, % who measured using touch and an instrument up to 12%                    | 75                 | 12.0             | 9.3             | 15.3             | 1.7         | 7.7                  |
| % farmers treating waste water from wet milling  | 25                 | 38.1             | 60.6            | 63.3             | 87.5        | 67.0                 |
| Of farmers treating water from wet milling, % who manages this water in a treatment system or reservoirs | 0                  | 25.0             | 88.7            | 91.5             | 93.6        | 86.0                 |
| % farmers treating any other waste water   | 0                  | 28.5             | 61.5            | 45.5             | 77.2        | 56.2                 |
| % farmers treating pulp waste  | 100                | 91.4             | 76.9            | 69.2             | 98.2        | 84.0                 |
| Of farmers treating pulp waste, % who has infrastructure to make pulp compost                            | 50                 | 28.1             | 47.7            | 41.9             | 95.6        | 62.0                 |
| <b>Number of households</b>  | <b>174</b>         | <b>230</b>       | <b>197</b>      | <b>227</b>       | <b>249</b>  | <b>1077</b>          |

#### 4.2.10.9 Coffee quality and certifications

Regarding farmers' knowledge of their coffee quality, 30.9% knew what the concept of physical yield factor was, which is a 73% increase from the 17.9% who reported this at baseline. However, this average is driven by farmers in Peru, who understood more this concept than farmers in Central America, which suggests work is still needed in this region. Farmers knowing this concept reported an average physical yield factor of 89.9, an increase from the value of 64.5 reported at baseline, suggesting an improvement in the coffee quality. However, only 17.4% of farmers (vs. 15.1% at baseline) reported they received a higher price due to this factor (Table 45).

When asked about their cup grade, roughly one out of four farmers (a very small increase from the 21.7% who reported this at baseline) knew their cup grade, and the average cup grade was 82.4 (almost identical to the average reported at baseline). However, 30.5% of these farmers reported receiving a premium due to their cup grade (Table 45), which is a large increase from the 11.7% who reported this at baseline, which could be because the project is influencing the (better) price farmers are receiving, or because farmers are now better informed of what is included in the price they receive, and know if that price includes a premium (as this was one of the reasons listed for the low values observed at baseline). The latter was mostly driven by farmers in Peru and Honduras, most likely because in these two countries, farmers reported the highest cup grade values. In contrast, in Nicaragua and El Salvador, where farmers reported the lowest cup grade, no farmer reported receiving a premium due to this quality factor.

Roughly 61% of farmers knew three or more characteristics that determine the coffee quality, and knowing this was slightly more common in Nicaragua. 41% of farmers reported they have at least one certification, a small increase from the 38.3% who reported this at baseline. The most common certifications were the same as for the baseline, and were Organic (60.8%), UTZ/Rainforest Alliance (41%) and Fair Trade (26.8%), and this varied by country (Table 45). No farmer in El Salvador reported having a farm certification and few farmers in Guatemala reported this. In contrast, in Peru is where most farms (96% of midline sampled farmers) are certified. Finally, almost one out of four farmers have an investment plan based on the use of record keeping formats, and this was more common in Nicaragua and Peru.

**Table 45. Coffee: Cup quality and farm certifications at midline**

| <b>Cup quality and certifications</b>   | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All countries</b> |
|---|--------------------|------------------|-----------------|------------------|-------------|----------------------|
| Farmers (%) who know what is a physical yield factor                          | 8.6                | 15.6             | 16.7            | 14.1             | 87.1        | 30.9                 |
| Of these, average physical yield factor*                                      | 80.7               | 38.7             | 1.2             | 812.9            | 76.6        | 89.9                 |
| Of these, % who have received a premium due to this factor                    | 0                  | 11.1             | 0               | 18.8             | 22.1        | 17.4                 |
| Of farmers receiving a premium, average premium received (US\$/100-lb sack)   | n.a                | 1.6              | n.a             | 4.3              | 4.7         | 4.4                  |
| Farmers (%) aware of their cup grade (taza)                                   | 6.9                | 5.2              | 15.3            | 0.9              | 82.7        | 24.3                 |
| Of these, average cup grade**   | 70.6               | 75.6             | 83.3            | 70               | 83.3        | 82.4                 |
| Of these, % receiving price premium due to cup quality                        | 0                  | 8.3              | 16.6            | 0                | 35.9        | 30.5                 |
| Of farmers receiving a premium, average premium received (US\$/100-lb sack)   | n.a                | n.a              | 13.0            | n.a              | 11.6        | 11.7                 |
| Farmers (%) knowing 3 or more physical characteristics that determine quality | 49.43              | 57.8             | 58.8            | 79.7             | 55.8        | 60.8                 |
| Farmers (%) with farm certifications  | 0                  | 11.3             | 43.1            | 40               | 95.9        | 40.9                 |
| Organic certification   | 0                  | 0                | 68.2            | 14.2             | 82.4        | 60.7                 |
| Fair trade certification  | 0                  | 0                | 50.5            | 21.9             | 23          | 26.7                 |
| FLO certification   | 0                  | 0                | 7.06            | 0                | 7.1         | 5.2                  |
| FLO-organic certification   | 0                  | 0                | 16.4            | 0                | 15.06       | 11.3                 |
| UTZ/Rainforest Alliance certification   | 0                  | 88.4             | 36.4            | 53.8             | 32.6        | 41                   |
| CLAC certification  | 0                  | 0                | 2.4             | 9.9              | 0           | 2.5                  |
| Other certifications  | 0                  | 23.              | 11.7            | 13.1             | 2           | 7.4                  |
| Farmers (%) with investment plan based on the use of record keeping formats   | 6.9                | 20.4             | 8.6             | 41.4             | 37.7        | 24.5                 |
| <b>Number of households</b>   | <b>174</b>         | <b>230</b>       | <b>197</b>      | <b>227</b>       | <b>249</b>  | <b>1077</b>          |

\*71 missing observations: 5 missing in Salvador, 23 missing in Guatemala, 17 missing in Honduras, 25 missing in Nicaragua, 1 missing in Peru

\*\*4 missing observations: 2 missing in Guatemala, 1 missing in Nicaragua, 1 missing in Peru

#### 4.2.10.10 Coffee yields and sales

As previously stated, 96.7% of interviewed farmers harvested coffee and, as shown in Table 46, 90.2% of farmers sold coffee, and this varied by country. While in most countries most farmers sold coffee in the year of reference at the time of the interview, this was not the case in El Salvador because 63 farmers reported they had not yet sold coffee when they were interviewed. The latter happens because farmers can deliver the coffee to the buyer (for processing), and can wait until executing the sale (with the expectation of obtaining better prices).

Due to inconsistencies in the sales and income data reported by some farmers, which we could not clean on time for this report, we used the data from 83.3% of farmers to estimate the remaining variables in



Table 46.<sup>29</sup> The estimated yield for the coffee harvested was 927 kg of green coffee/ha, ranging from 555 kg/ha in El Salvador to 1,133 kg/ha in Nicaragua. These yields suggest an increase from the yields observed at baseline; however, we do not discuss this variable now, as we prefer to discuss it using the panel data results in section 4.2.11.1. It is possible that part of this increase is explained by the fact that, at midline, we sampled farmers who had received at least one MOCCA training, which could be systematically different from farmers who still needed to receive trainings (e.g., better located), hence, influencing midline results upward; while another part can be explained by the increased adoption levels for some practices, which have had an effect on yields.

Farmers sold an average of 1,928 kg of green coffee when we estimate this for farmers with positive sales, and an average of 1,791 kg of green coffee when we estimate this for all farmers reported selling coffee (i.e., including zero for farmers in El Salvador and Guatemala, where some farmers had not sold coffee at the time of the interview). The former average suggests a significant increase from the 1,706 kg reported at baseline. However, the latter average suggests a small increase from baseline. The most appropriate comparison would be the latter, as this was how we estimated this value for the baseline. Because of this, in the remaining variables we only interpret values that include zero sales.

The amount farmers sold is equivalent to selling 793 kg of green coffee/ha. Selling coffee generated an average gross annual income of US\$6,949, equivalent to US\$3,181/ha, an increase from baseline most likely due to higher yields and possibly better prices at midline.

When asked about the buyers, we observe that farmers reported selling only 5.7% of the total volume sold to a MOCCA anchor firm, which is surprising. Further analysis of this information is necessary to better understand this result, and cross check it with monitoring data will help clarify this result.

We discuss changes between baseline and midline for these indicators in section 4.2.11.1.

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<sup>29</sup> The percentage points difference between the % of farmers who sold coffee and the % included in the estimations indicate in which countries we had more problems with data quality—the larger the difference, the more problems we had.

**Table 46. Coffee: Yields, sales, and buyers at midline**

| Details   | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Coffee area (ha)*   | 1.0         | 0.9        | 2.0        | 3.5        | 2.6        | 2.1           |
| Farmers (%) who sold coffee in the 2021-2022 ag. year               | 51.7        | 94.4       | 97.0       | 99.1       | 99.6       | 90.2          |
| Of farmers who sold, % included in the sales and income estimations | 51.2        | 81.3       | 87.8       | 91.2       | 96.8       | 83.3          |
| Amount of green coffee sold (kg)                                    | 718         | 878        | 1,321      | 3,391      | 2,367      | 1,928         |
| Amount of green coffee sold (kg), including zero sales              | 421         | 848        | 1,321      | 3,391      | 2,367      | 1,791         |
| Coffee yields:  |             |            |            |            |            |               |
| Kg harvested/ha (green coffee)                                      | 555         | 969        | 865        | 1,133      | 981        | 927           |
| Kg sold/ha (green coffee)   | 717         | 780        | 712        | 1,004      | 930        | 853           |
| Kg sold/ha (green coffee), including zero sales                     | 420         | 754        | 712        | 1,004      | 930        | 793           |
| Income from coffee sales:   |             |            |            |            |            |               |
| US\$  | 2,350       | 3,689      | 7,800      | 11,554     | 9,056      | 7,460         |
| US\$, including zero sales  | 1,502       | 3,565      | 7,800      | 11,554     | 9,056      | 6,949         |
| US\$/ha   | 2,279       | 3,398      | 3,956      | 3,417      | 3,541      | 3,414         |
| US\$/ha, including zero sales                                       | 1,463       | 3,284      | 3,956      | 3,417      | 3,541      | 3,181         |
| Share (%) of coffee sold to:  |             |            |            |            |            |               |
| MOCCA anchor firm   | 0.0         | 3.7        | 5.3        | 5.9        | 9.6        | 5.7           |
| Intermediary  | 24.8        | 81.2       | 22.3       | 8.1        | 15.1       | 29.5          |
| Local market  | 1.1         | 1.0        | 0.0        | 0.5        | 1.2        | 0.8           |
| Cooperative or farmer organization                                  | 46.6        | 0.8        | 48.8       | 0.2        | 1.4        | 14.6          |
| Other buyers  | 2.2         | 1.1        | 0.6        | 0.4        | 0.5        | 0.8           |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

#### 4.2.10.11 Panel data analysis of the adoption of key coffee indicators

About the adoption of key practices, from the 18 indicators we evaluated with a panel analysis, we observed statistically significant differences in 12 of them (in the combined—all countries— analysis), with an increase in the implementation of 8 of the 12 practices at midline (hence a decrease in 4 practices), and this varied by country (Table 47). While the share of farmers covering the space between coffee rows with residues from weeding, applying fertilizer in the year of reference, fertilizing the full amount required, using only chemical fertilizers, using only organic fertilizers, reporting diseases affected their crop, using at least one method to control each disease identified, and with farm certifications increased at baseline, the share of farmers applying herbicides, implementing pests and disease monitoring systems, reporting insect pests affected their crop, and using at least one method to control each pest identified decreased at midline.

For these 18 indicators, the differences varied by country. In El Salvador, we observed a reduction in the share of farmers implementing dead or live/green cover in their coffee plots, covering the space between rows with weeding residues, applying fertilizers, fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of the plant or using soil analysis results, applying only organic fertilizers, or both chemical and organic fertilizers, and with farm certifications (practically no farmer had certifications at baseline, and no farmer reported this at midline). Despite this, we observed an increase at midline in the share of farmers fertilizing the full amount required by the crop, and using at least one control method for each disease affecting their crop. In Guatemala, compared to baseline, at midline there was a decrease in the share of farmers implementing live/green cover in their crop, using herbicides, implementing pests and disease monitoring systems, and using at least one method for each disease affecting their crop. In this country the share of farmers using dead cover in their crop, covering the space between rows with weeding residues, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of plant, applying chemical and/or organic fertilizers, and with farm certifications (and also the incidence of insect pests increased at midline).

In Honduras, we observed a reduction in the share of farmers implementing dead or live/green cover in their coffee plots, using herbicides, fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of plant, applying both chemical and organic fertilizers, implementing pests and disease monitoring systems, and using at least one method to control either insects or diseases. In contrast, the share of farmers fertilizing the full amount required by the trees, and applying only chemical or organic fertilizers increased at midline. In Nicaragua, the share of farmers using herbicides, fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of the plant, and controlling pests decreased at midline. In contrast, we observed an increase in the use of live/green cover, covering the coffee rows with weeding residues, applying fertilizers, applying chemical or organic fertilizers, implementing pests and disease monitoring systems, and controlling diseases. In Peru, while the share of farmers using at least one method to control pests and diseases decreased at midline, the share of farmers implementing green/live cover in their plots, using herbicides, fertilizing based on nutritional deficiencies and doing it based on visual characteristics of plant, applying only chemical or organic fertilizers, and with farm certifications increased.

*Table 47. Panel data analysis of the adoption of key coffee indicators*

| Farmers (%)   | El Salvador |            |          | Guatemala  |            |          | Honduras   |            |          |
|---|-------------|------------|----------|------------|------------|----------|------------|------------|----------|
|   | LB          | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  |
| Implementing dead cover in their coffee plots   | 67.2        | 45.4       | 0.000*** | 28.3       | 60.4       | 0.000*** | 66.5       | 57.4       | 0.062*   |
| Implementing live/green cover in their coffee plots   | 15.5        | 4.0        | 0.000*** | 17.0       | 11.3       | 0.082*   | 53.3       | 27.9       | 0.000*** |
| Covering space between coffee rows with residues from weeding                                       | 84.5        | 64.4       | 0.000*** | 72.2       | 94.8       | 0.000*** | 86.3       | 87.8       | 0.653    |
| Using herbicides  | 4.6         | 4.0        | 0.792    | 37.4       | 17.4       | 0.000*** | 19.3       | 10.7       | 0.016**  |
| Applying fertilizer in the year of reference  | 87.4        | 79.9       | 0.060*   | 90.0       | 90.4       | 0.875    | 93.4       | 95.9       | 0.263    |
| Fertilizing based on nutritional deficiencies   | 9.2         | 0.6        | 0.000*** | 9.6        | 11.7       | 0.461    | 52.3       | 33.5       | 0.000*** |
| Fertilizing based on nutritional deficiencies and doing it based on visual characteristics of plant | 5.2         | 0.6        | 0.010**  | 2.2        | 5.7        | 0.054*   | 38.6       | 22.3       | 0.000*** |
| Fertilizing based on nutritional deficiencies and doing it using soil analyses                      | 4.6         | 0.0        | 0.004*** | 7.4        | 6.5        | 0.705    | 13.3       | 11.2       | 0.514    |
| Fertilizing the full amount required  | 43.7        | 55.7       | 0.024**  | 44.8       | 51.7       | 0.136    | 59.4       | 76.1       | 0.000*** |
| Applying only chemical fertilizers  | 69.5        | 74.1       | 0.3418   | 78.7       | 87.8       | 0.008*** | 60.9       | 95.9       | 0.000*** |
| Applying only organic fertilizers   | 12.6        | 5.7        | 0.026**  | 1.7        | 22.6       | 0.000*** | 7.1        | 18.3       | 0.008*** |
| Applying chemical and organic fertilizers   | 5.2         | 0.0        | 0.002*** | 9.6        | 20.0       | 0.001*** | 25.4       | 18.3       | 0.013**  |
| Implementing any pest & disease monitoring system   | 12.1        | 8.0        | 0.213    | 39.1       | 26.1       | 0.003*** | 44.7       | 26.4       | 0.000*** |
| Reporting insect pests affected their crop  | 37.9        | 36.8       | 0.825    | 17.8       | 24.8       | 0.068*   | 66.5       | 61.9       | 0.345    |
| Using 1 method for each pest identified   | 25.3        | 24.1       | 0.804    | 16.5       | 13.9       | 0.437    | 54.8       | 39.6       | 0.002*** |
| Reporting diseases affected their crop  | 68.4        | 69.5       | 0.817    | 90.4       | 90.4       | 1        | 87.8       | 92.4       | 0.129    |
| Using 1 method for each disease identified  | 42.5        | 53.4       | 0.041**  | 84.8       | 55.2       | 0.000*** | 72.1       | 59.4       | 0.007*** |
| With farm certifications  | 1.7         | 0.0        | 0.082*   | 4.3        | 11.3       | 0.005*** | 41.1       | 43.1       | 0.6841   |
| <b>Number of households</b>   | <b>174</b>  | <b>174</b> |          | <b>230</b> | <b>230</b> |          | <b>197</b> | <b>197</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*); LB=baseline, LI=midline

Table 47. Continued

| Farmers (%)   | Nicaragua  |            |          | Peru       |            |          | All countries |             |          |
|---|------------|------------|----------|------------|------------|----------|---------------|-------------|----------|
|   | LB         | LI         | p-value  | LB         | LI         | p-value  | LB            | LI          | p-value  |
| Implementing dead cover in their coffee plots   | 61.2       | 64.3       | 0.497    | 79.1       | 79.5       | 0.912    | 60.3          | 62.7        | 0.249    |
| Implementing live/green cover in their coffee plots   | 23.8       | 34.4       | 0.013**  | 30.5       | 47.0       | 0.000*** | 27.9          | 26.3        | 0.3832   |
| Covering space between coffee rows with residues from weeding                                       | 55.5       | 75.3       | 0.000*** | 62.2       | 59.4       | 0.5214   | 70.9          | 76.3        | 0.005*** |
| Using herbicides  | 75.3       | 67.0       | 0.049**  | 0.0        | 4.4        | 0.000*** | 28.1          | 21.4        | 0.000*** |
| Applying fertilizer in the year of reference  | 85.9       | 91.2       | 0.077*   | 81.5       | 83.5       | 0.556    | 87.4          | 88.3        | 0.000*** |
| Fertilizing based on nutritional deficiencies   | 16.3       | 25.6       | 0.015**  | 21.4       | 27.3       | 0.117    | 21.4          | 20.4        | 0.596    |
| Fertilizing based on nutritional deficiencies and doing it based on visual characteristics of plant | 13.7       | 23.3       | 0.007*** | 10.4       | 17.7       | 0.020**  | 13.6          | 14.4        | 0.619    |
| Fertilizing based on nutritional deficiencies and doing it using soil analyses                      | 2.6        | 3.1        | 0.779    | 11.3       | 9.6        | 0.5484   | 7.9           | 6.3         | 0.1472   |
| Fertilizing the full amount required  | 54.2       | 53.7       | 0.925    | 24.5       | 24.1       | 0.917    | 44.6          | 50.9        | 0.003*** |
| Applying only chemical fertilizers  | 82.4       | 90.3       | 0.013*   | 3.6        | 44.6       | 0.000*** | 57.4          | 77.6        | 0.000*** |
| Applying only organic fertilizers   | 0.4        | 7.9        | 0.000*** | 40.2       | 80.7       | 0.000*** | 13.1          | 29.4        | 0.000*** |
| Applying chemical and organic fertilizers   | 3.1        | 7.0        | 0.054*   | 37.8       | 41.4       | 0.410    | 16.9          | 18.7        | 0.284    |
| Implementing any pest & disease monitoring system   | 35.2       | 44.9       | 0.035**  | 22.9       | 21.3       | 0.666    | 31.2          | 26.1        | 0.009*** |
| Reporting insect pests affected their crop  | 44.9       | 37.0       | 0.086*   | 67.1       | 57.0       | 0.020*** | 47.1          | 43.5        | 0.100*   |
| Using 1 method for each pest identified   | 32.6       | 22.9       | 0.021**  | 56.2       | 39.4       | 0.000*** | 37.5          | 28.0        | 0.000*** |
| Reporting diseases affected their crop  | 96.0       | 95.2       | 0.643    | 59.8       | 77.1       | 0.000*** | 80.5          | 85.3        | 0.002*** |
| Using 1 method for each disease identified  | 0.0        | 60.4       | 0.000*** | 77.5       | 55.9       | 0.000*** | 47.0          | 55.0        | 0.073*   |
| With farm certifications  | 33.0       | 40.1       | 0.1195   | 81.9       | 96.0       | 0.000*** | 34.6          | 40.9        | 0.003*** |
| <b>Number of households</b>   | <b>227</b> | <b>227</b> |          | <b>249</b> | <b>249</b> |          | <b>1077</b>   | <b>1077</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*); LB=baseline, LI=midline

#### 4.2.10.12 Determinants of adoption of renovation & rehabilitation practices at midline

In this section we present regression results of factors influencing the likelihood of adopting renovation and rehabilitation practices at midline, and we only interpret the main statistically significant results for each country. Further, the reason why the explanatory variables in the midline regressions (both renovation and rehabilitation) are different than the ones in the baseline regressions is because at midline, we collected information for a reduced number of variables (vs. baseline). Because of this, we suggest interpreting these results with caution, as part of the effect could be explained by factors for which we do not have midline data.

#### Renovation

The factors affecting the likelihood of implementing **renovation** practices in the coffee farm vary by country. Table 48 presents the Probit regression results (marginal effects) for each country separately, and for all countries combined, and Annex Table 1 presents descriptive statistics of the variables included in this regression.

In El Salvador, only one of the evaluated factors had a statistically significant influence in the probability of implementing renovation practices: the number of coffee trees (positive effect). As the number of coffee trees increases, farmers are more likely to implement renovation practices. This could be because farmers may be replacing (old) trees, and while the new ones grow, leave the old trees in the field until it is time to remove them.

In Guatemala, three of the evaluated factors had a statistically significant influence in the probability of implementing renovation practices: the number of coffee trees grown (positive effect at a decreasing rate), the coffee age (negative effect), and receiving technical information about coffee research products through an NGO or government (negative effect). The effect of the number of coffee trees on this indicator was already explained for El Salvador and the same applies here. However, after certain number of trees (which we could not estimate), this effect starts to have a negative impact on this indicator. Unexpectedly, as trees become older, farmers were less likely to renovate them. One possible explanation is that trees are not old enough to require renovation (the average age was 7.5 years, see Annex Table 1), and although the quadratic effect of this variable was not statistically significant, if we use it to estimate the inflection point after which farmers would start renovating coffee, we estimate that when the coffee trees reach 45.8 years, the likelihood of renovation becomes positive. Surprisingly, receiving information of coffee research from NGOs or government negatively affects the likelihood of doing renovation. It is not clear why this is the case, but we suspect this may be driven by the fact that few farmers (35.4%, Table 19) reported receiving such information, thus making a case for MOCCA to increase the flow of information to farmers.

In Honduras, only one factor affected the probability of doing renovation: the number of coffee varieties grown (positive effect). This variable is not straightforward to interpret. For example, one may assume that farmers who grow more varieties, may be renovating coffee to start growing only one variety (hopefully resistant to rust and with good market value), so the management becomes simpler. However, one could also argue that they are further diversifying the number of varieties grown to reduce risk of harvest losses. Since we did not ask which varieties farmers were renovating to, we cannot be sure of why we observed this result.

**Table 48. Renovation Regressions results. Marginal Effects**

| <b>VARIABLES</b>   | <b>(1)</b><br><b>El Salvador</b> | <b>(2)</b><br><b>Guatemala</b> | <b>(3)</b><br><b>Honduras</b> | <b>(4)</b><br><b>Nicaragua</b> | <b>(5)</b><br><b>Peru</b> | <b>(6)</b><br><b>All countries</b> |
|--|----------------------------------|--------------------------------|-------------------------------|--------------------------------|---------------------------|------------------------------------|
| Sex of HH head (1=male)  | -0.007<br>(0.056)                | 0.013<br>(0.065)               | -0.053<br>(0.067)             | -0.041<br>(0.085)              | -0.055<br>(0.056)         | -0.014<br>(0.029)                  |
| Coffee area (Ha)   | 0.121<br>(0.197)                 | -0.056<br>(0.115)              | -0.025<br>(0.088)             | 0.011<br>(0.154)               | 0.015<br>(0.097)          | -0.007<br>(0.034)                  |
| Coffee area squared  | -0.065<br>(0.064)                | 0.021<br>(0.023)               | 0.001<br>(0.005)              | 0.004<br>(0.013)               | -0.003<br>(0.012)         | 0.002<br>(0.002)                   |
| Number of coffee varieties   | 0.089*<br>(0.052)                | -0.052<br>(0.040)              | 0.100***<br>(0.038)           | 0.038<br>(0.062)               | 0.074***<br>(0.019)       | 0.066***<br>(0.015)                |
| Number of coffee trees   | -0.000<br>(0.000)                | 0.000**<br>(0.000)             | 0.000<br>(0.000)              | 0.000<br>(0.000)               | 0.000<br>(0.000)          | 0.000<br>(0.000)                   |
| Number of coffee trees squared   | 0.000<br>(0.000)                 | -0.000*<br>(0.000)             | 0.000<br>(0.000)              | -0.000<br>(0.000)              | -0.000<br>(0.000)         | -0.000<br>(0.000)                  |
| Coffee age   | -0.011<br>(0.015)                | -0.028*<br>(0.017)             | -0.002<br>(0.030)             | -0.121*<br>(0.071)             | -0.008<br>(0.036)         | -0.029***<br>(0.008)               |
| Coffee age squared   | 0.000<br>(0.000)                 | 0.001<br>(0.001)               | 0.000<br>(0.002)              | 0.005<br>(0.005)               | -0.001<br>(0.003)         | 0.001**<br>(0.000)                 |
| Altitude   | 0.001<br>(0.001)                 | -0.000<br>(0.001)              | 0.001<br>(0.002)              | 0.001<br>(0.001)               | 0.001<br>(0.001)          | 0.000<br>(0.000)                   |
| Altitude squared   | -0.000<br>(0.000)                | 0.000<br>(0.000)               | -0.000<br>(0.000)             | -0.000<br>(0.000)              | -0.000<br>(0.000)         | -0.000<br>(0.000)                  |
| <i>Number of trainings received</i>  | 0.068<br>(0.076)                 | 0.035<br>(0.054)               | 0.036<br>(0.041)              | 0.086<br>(0.052)               | 0.010<br>(0.047)          | 0.050**<br>(0.020)                 |
| <i>Number of trainings received squared</i>                                | -0.005<br>(0.005)                | -0.001<br>(0.005)              | -0.003<br>(0.004)             | -0.008*<br>(0.004)             | 0.001<br>(0.005)          | -0.004**<br>(0.002)                |
| Owens land (1=yes)   |                                  | 0.237<br>(0.153)               |                               | -0.091<br>(0.084)              | -0.108*<br>(0.059)        | -0.050<br>(0.039)                  |
| HH member migrated within last 6 months (1=yes)                            | 0.066<br>(0.124)                 | -0.175<br>(0.115)              | 0.045<br>(0.077)              | -0.008<br>(0.101)              | 0.120<br>(0.087)          | 0.007<br>(0.043)                   |
| Access to credit (1=yes)   | 0.121<br>(0.136)                 | -0.014<br>(0.105)              | -0.167<br>(0.113)             | -0.040<br>(0.071)              |                           | -0.038<br>(0.041)                  |
| Received technical information about coffee thru NGO or government (1=yes) | -0.091<br>(0.066)                | -0.127*<br>(0.072)             | 0.004<br>(0.067)              | 0.064<br>(0.071)               | 0.000<br>(0.053)          | -0.020<br>(0.029)                  |
| Control country  |                                  |                                |                               |                                |                           | Yes                                |
| <b>Observations</b>  | <b>159</b>                       | <b>179</b>                     | <b>138</b>                    | <b>168</b>                     | <b>224</b>                | <b>871</b>                         |

In Nicaragua, one factor had a statistically significant effect on the likelihood of renovating coffee: the age of the coffee trees (negative effect). As in Guatemala, as trees become older, farmers were less likely to renovate them in Nicaragua. The explanation is similar to the one provided before, and relates to the fact that trees are not old enough in Nicaragua to require renovation (the average age was 5.7 years, see Annex Table 1), and although the quadratic effect of this variable was not statistically significant, if we use it to estimate the inflection point after which farmers would start renovating coffee, we estimate that when the coffee trees reach 26.6 years, the likelihood of renovation becomes positive.

Finally, in Peru, two factors had a statistically significant effect on the probability of implementing renovation practices at midline: the number of coffee varieties grown (positive effect) and owning land

(negative effect). Since the effect of the number of varieties can be explained with the same reason as for Honduras and El Salvador, we only interpret the effect of owning land. Owning land usually is an indicator of wealth, and the negative effect suggests that farmers who own a land may not need to renovate because their plantations are possibly well maintained (due to the potential additional resources they have), thus making it less necessary to renovate. Confirming this will require further analysis.

## Rehabilitation

The factors affecting the likelihood of implementing **rehabilitation** practices in the coffee farm vary by country. Table 49 presents the Probit regression results (marginal effects) for each country separately, and for all countries combined, and Annex Table 2 presents descriptive statistics for these variables.

In El Salvador, three variables had a significant effect on the likelihood of rehabilitating coffee: the number of coffee trees (positive effect), the coffee age (positive effect), and the altitude (positive effect at a decreasing rate). As the number of trees in the farm increase, farmers are more likely to rehabilitate coffee, which can be explained because larger farms require more management, including pruning to maintain a healthy and productive crop. As coffee trees become older, farmers are more likely to rehabilitate, which is expected as when trees become older, they demand more pruning and other practices to maintain them health and productive. Although this positive effect will most likely start to decrease at some point (which one would expect, as when trees are too old, it may be better to renovate them instead of continue pruning them), we cannot estimate this inflection point because the quadratic term in the regression was not statistically significant (though it had the correct sign). Finally, farmers with farms located at higher altitudes are more likely to rehabilitate, possibly because the coffee crop requires medium altitudes to grow better, and is at these elevations when more pruning may be needed. This is true up to 2,478 m.a.s.l.,<sup>30</sup> after which the likelihood of rehabilitation decreases (most likely because the trees grow slower, hence requiring less pruning).

In Guatemala, four factors had a statistically significant influence in the probability of implementing rehabilitation practices: the number of coffee varieties grown (positive effect), the age of the coffee trees (positive effect at a decreasing rate), owning a land (negative effect), and if a household member migrated six months prior to the interview (negative effect). Farmers who reported growing more varieties also reported doing more rehabilitation practices, most likely because they need to care for varieties requiring different management, and know how to do this, hence pruning more to maximize their productivity. As coffee trees become older, the likelihood of implementing rehabilitation practices increase, which is understandably as when trees become older, they demand more pruning and other practices to maintain them health and productive. However, after the coffee reaches 28.8 years of age, farmers are less likely to rehabilitate, possibly because it becomes too expensive to do this, or it is not worth doing it (and making it more attractive to renovate the coffee). Farmers owning land are less likely to rehabilitate, and it is not clear why this variable (which can be used as a proxy for wealth), has this effect. Finally, migration of household members negatively affects the probability of rehabilitating coffee, most likely because fewer member means fewer family labor available to work on farm.

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<sup>30</sup> In this and any other variable that is shown with zeros (in any regression), we estimated the inflection points using the values in the table, but containing 10 decimals, which we do not show.



**Table 49. Rehabilitation Regressions results. Marginal Effects**

|  | (1)                  | (2)                  | (3)                | (4)                  | (5)                  | (6)                  |
|--|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|
| <b>VARIABLES</b>   | <b>El Salvador</b>   | <b>Guatemala</b>     | <b>Honduras</b>    | <b>Nicaragua</b>     | <b>Peru</b>          | <b>All countries</b> |
| Sex of HH head (1=male)  | -0.045<br>(0.065)    | -0.036<br>(0.067)    | 0.025<br>(0.089)   | -0.018<br>(0.084)    | -0.028<br>(0.064)    | -0.020<br>(0.033)    |
| Coffee area (Ha)   | -0.380<br>(0.250)    | 0.237<br>(0.145)     | 0.084<br>(0.132)   | -0.034<br>(0.119)    | 0.049<br>(0.094)     | 0.009<br>(0.041)     |
| Coffee area squared  | 0.071<br>(0.074)     | -0.052<br>(0.042)    | -0.007<br>(0.009)  | 0.002<br>(0.006)     | -0.003<br>(0.012)    | -0.001<br>(0.003)    |
| Number of coffee varieties   | 0.049<br>(0.074)     | 0.145***<br>(0.043)  | 0.060<br>(0.055)   | -0.086<br>(0.059)    | 0.062**<br>(0.028)   | 0.079***<br>(0.020)  |
| Number of coffee trees   | 0.000**<br>(0.000)   | -0.000<br>(0.000)    | -0.000<br>(0.000)  | 0.000<br>(0.000)     | 0.000<br>(0.000)     | 0.000<br>(0.000)     |
| <i>Number of coffee trees squared</i>                                      | -0.000<br>(0.000)    | 0.000<br>(0.000)     | 0.000<br>(0.000)   | -0.000<br>(0.000)    | 0.000<br>(0.000)     | 0.000<br>(0.000)     |
| Coffee age   | 0.077***<br>(0.022)  | 0.093***<br>(0.026)  | 0.084<br>(0.052)   | 0.110**<br>(0.051)   | 0.123***<br>(0.030)  | 0.066***<br>(0.008)  |
| Coffee age squared   | -0.001<br>(0.001)    | -0.003***<br>(0.001) | -0.005<br>(0.003)  | -0.006*<br>(0.003)   | -0.006***<br>(0.002) | -0.002***<br>(0.000) |
| Altitude   | 0.004***<br>(0.001)  | -0.000<br>(0.001)    | 0.002<br>(0.002)   | 0.002***<br>(0.001)  | -0.003<br>(0.002)    | 0.001**<br>(0.000)   |
| Altitude squared   | -0.000***<br>(0.000) | 0.000<br>(0.000)     | -0.000<br>(0.000)  | -0.000***<br>(0.000) | 0.000<br>(0.000)     | -0.000**<br>(0.000)  |
| <i>Number of trainings received</i>  | 0.086<br>(0.084)     | 0.090<br>(0.057)     | 0.000<br>(0.054)   | -0.120**<br>(0.052)  | 0.158***<br>(0.047)  | 0.019<br>(0.022)     |
| <i>Number of trainings received squared</i>                                | -0.005<br>(0.006)    | -0.006<br>(0.005)    | -0.002<br>(0.005)  | 0.009**<br>(0.004)   | -0.017***<br>(0.005) | -0.001<br>(0.002)    |
| Owns land (1=yes)  |                      | -0.252**<br>(0.125)  | -0.214<br>(0.412)  | 0.017<br>(0.080)     | 0.045<br>(0.072)     | -0.024<br>(0.051)    |
| HH member migrated within last 6 months (1=yes)                            | -0.171<br>(0.214)    | -0.181*<br>(0.095)   | -0.189*<br>(0.104) | -0.222**<br>(0.087)  | 0.011<br>(0.115)     | -0.206***<br>(0.049) |
| Access to credit (1=yes)   |                      | 0.118<br>(0.100)     | 0.036<br>(0.107)   | 0.193***<br>(0.065)  |                      | 0.180***<br>(0.051)  |
| Received technical information about coffee thru NGO or government (1=yes) | -0.002<br>(0.100)    | 0.021<br>(0.085)     | 0.128<br>(0.086)   | -0.012<br>(0.070)    | 0.116*<br>(0.063)    | 0.075**<br>(0.033)   |
| Control country  |                      |                      |                    |                      |                      | Yes                  |
| <b>Observations</b>  | <b>155</b>           | <b>179</b>           | <b>140</b>         | <b>168</b>           | <b>224</b>           | <b>871</b>           |

In Honduras, only one factor had a statistically significant effect on the probability of implementing rehabilitation practices: if a household member migrated six months prior to the interview (negative effect). We can explain this effect using the same reasons already listed for as for Guatemala, thus, we do not elaborate on them.

Five factors affect the likelihood of implementing rehabilitation practices in Nicaragua: the age of coffee trees (positive effect at a decreasing rate), the altitude where the farm is located (positive effect at a decreasing rate), the number of MOCCA trainings received (negative effect at an increasing rate), if a household member migrated six months prior to the interview (negative effect), and having access to credit (positive effect). As coffee trees become older, the likelihood of implementing rehabilitation practices increases, until the coffee reaches 19.2 years of age, after which farmers are less likely to rehabilitate. As in El Salvador, farmers with farms located at higher altitudes in Nicaragua are more likely to rehabilitate, possibly because the coffee crop requires medium altitudes to grow better, and is at these elevations when more pruning may be needed. This is true up to 1,732 m.a.s.l., after which the likelihood of rehabilitation decreases. Surprisingly, the number of trainings farmers attend negatively affect the likelihood of renovation until 13 trainings, after which this likelihood becomes positive. This may be because farmers learn better when pruning is necessary, and may be learning about other practices they could implement, thus better timing their pruning practices. The effect of migration can be explained with the same reasons as the ones provided for Honduras. Finally, the positive effect of credit on rehabilitation is straightforward, as farmers with a loan have more cash at hand to invest in maintaining the crop.

In Peru, four factors had a statistically significant effect on the probability of implementing rehabilitation practices: the number of coffee varieties grown (positive effect), the age of the coffee trees (positive effect at a decreasing rate), the number of MOCCA trainings received (positive effect at a decreasing rate), and obtaining information of coffee research products from NGOs or Government (positive effect). Like before, we will only discuss variables that have not been discussed before (as the explanation is the same), or that have the opposite effect. Regarding the age of the coffee trees, the likelihood of rehabilitation increases until coffee trees reach 20.2 years of age, after which this likelihood starts to decrease, for the reasons previously explained for other countries. Contrary to what we found in Nicaragua, participating in MOCCA trainings increases the likelihood of doing rehabilitation, up to 9.4 trainings, after which the effect becomes negative, possibly because farmers have less time to work in their farms. Finally, farmers who reported receiving technical information from NGOs or government were more likely to prune, possibly because they are better informed about how to do these practices.

#### 4.2.10.13 Exploratory econometric analysis of the effect of training model and number of training sessions on the number of practices adopted and yields: Coffee in Nicaragua

After the submission of this report, CIAT conducted an exploratory analysis of the effect of the training model used to train farmers and the number of training sessions received by farmers, on two outcome variables: the number of practices adopted and yields. We did this only for Nicaragua. While three of these variables are self-explanatory, the training model refers to the MOCCA-promoted training model, which in coffee includes local trainers (from the village), conducting both group trainings at demonstrative plots and individual follow up technical visits to farmers, and the use of the CREAR methodology (common to train adult people) to teach MOCCA's curricula. From now on, we refer to this as the MOCCA model. In this variable, we compare the MOCCA model with other models used by anchor firms to train farmers. We expect that the MOCCA model will have a positive significant effect on outcome variables as it allows for higher interaction between project implementers and beneficiary farmers.

For this analysis, we used panel data for 227 farmers from Nicaragua, who were interviewed both at baseline (2020-2021) and midline (2022). Descriptive statistics show that farmers trained with the MOCCA model (47.1% of farmers) received a higher number of trainings. Although we noted an increase (between baseline and mid line) in the number of practices adopted and yields according to the training model used (New Annex Table 1), regression analysis showed that these differences were statistically significant for the number of practices adopted (New Annex Table 3) but not for yields (New Annex Table 4): farmers trained with the MOCCA model adopted (roughly 5.4) more practices. Other variables that positively affected the number of practices adopted were having access to credit and having received information from research products from NGOs/Government.

Finally, as the results show (New Annex Table 3 and New Annex Table 4), the number of trainings received by farmers has no statistically significant effect on the number of practices adopted or yields. Descriptive statistics of the regression variables are in New Annex Table 2.

#### 4.2.11 Key farm level MOCCA indicators

In this section we present a summary of key results that are of particular interest to USDA and MOCCA. We first present average results at the country level, then we disaggregate these results by sex of the household head and by the size of the coffee area. In the annex tables (Annex Table 3 thru Annex Table 7) we present similar results, disaggregated by anchor firm for each country. However, we provide the latter information as a reference only, since the evaluation of the MOCCA project was designed the country and project level, and the sample is (hence the results are) not representative at the anchor firm level.

##### 4.2.11.1 By country

On average, sampled farmers reported growing 2.1 ha with coffee, ranging from 0.9 ha in Guatemala to 3.5 ha in Nicaragua (Table 50). Farmers reported harvesting 927 kg of green coffee per hectare (equivalent to 14.3 qq/mz), which is much higher than the 665kg/ha (or 10.2 qq/mz) reported at baseline. Yields were highest in Nicaragua (1,133 kg green coffee/ha) and lowest in El Salvador (555 kg green coffee/ha).

Only 15% of farmers stated they had access to financing for agriculture, a small increase from the 11.6% who reported this at baseline. Similar to baseline results, it was in Nicaragua where accessing financing for agriculture was most common (37% reported this a midline vs. 38.4% at baseline).

The amount of green coffee sold in the year of reference ranged from 421 kg (vs. 369 kg at baseline) in El Salvador to 3,391 kg (vs. 2,907 kg at baseline) in Nicaragua, with an average of 1,791 kg (vs. 1,706 kg at baseline) in the five countries. We observed a similar trend in the value of annual coffee sales, which averaged slightly above US\$6,949 (vs. US\$4,939 at baseline) for all countries, ranging from US\$1,502 (vs. US\$1,601 at baseline) in El Salvador to US\$11,554 (vs. US\$7,685 at baseline) in Nicaragua. These two variables directly depend on the coffee area planted, and the latter also depends on the price received. Finally, 42.6% of farmers reported selling part of their coffee to MOCCA's anchor firms (although as discussed above, the volume sold was small), an increase from the 30% who reported this at baseline. It is surprising that most farmers in Peru reported selling part of their coffee to firms participating in the project, and almost no farmer reported this in El Salvador.

*Table 50. Coffee: MOCCA key indicators for USDA by country, at midline*

| Key USDA indicators   | El Salvador | Guatemala  | Honduras   | Nicaragua  | Peru       | All countries |
|---|-------------|------------|------------|------------|------------|---------------|
| Yield (kg green coffee/ha)*   | 555.3       | 969.2      | 865.0      | 1132.7     | 981.0      | 927.2         |
| Coffee area (ha)  | 1.0         | 0.9        | 2.0        | 3.5        | 2.6        | 2.1           |
| Farmers (%) with access to financing for agriculture                  | 3.5         | 2.2        | 14.2       | 37.0       | 15.3       | 15.0          |
| Value of annual coffee sales (US\$) (with zero sales)                 | 1,502       | 3,565      | 7,800      | 11,554     | 9,056      | 6,949         |
| Annual amount of coffee sold (kg green coffee) (with zero sales)      | 421         | 848        | 1,321      | 3,391      | 2,367      | 1,791         |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 0.6         | 16.1       | 23.9       | 64.3       | 91.6       | 42.6          |
| <b>Number of households</b>   | <b>174</b>  | <b>230</b> | <b>197</b> | <b>227</b> | <b>249</b> | <b>1077</b>   |

Similar to what we did for renovation and rehabilitation, we constructed a panel data using the midline and baseline samples, to better analyze variables related to coffee area, production, yields and sales (Table 51). In doing this, we realized that one of the commands used to estimate the coffee area at baseline for El Salvador did not work properly for 38 households. Because of this, the baseline area was much higher (almost three times higher) than what was actually reported by farmers; hence, yields were lower. We corrected this for the panel analysis. We did not observe this problem in the remaining countries. As we see in the table, of the five indicators, only the coffee area was statistically significantly lower at midline. We suspect this is because of complications we faced during the registration of baseline data which may require additional cleaning (prior to endline evaluation).

The changes in the indicators evaluated using the panel varied by country. The reduction in the area (at midline) was driven by a sharp decrease in the reported coffee area in Guatemala and Honduras only, as in the rest of the countries, the differences were not statistically significant at the 10% level. Yields were statistically significantly higher at midline in all countries except Honduras, and for the countries with statistically significant differences, yields increased an average of 61% over the baseline values. The amount of coffee sold was statistically higher at midline in all countries except Honduras, and the income from coffee sales was higher in all countries.

*Table 51. Coffee: Panel analysis results of yields and sales, by country*

| Variables analyzed                                     | El Salvador |            |          | Guatemala  |            |          | Honduras   |            |          | Nicaragua  |            |          |
|--|-------------|------------|----------|------------|------------|----------|------------|------------|----------|------------|------------|----------|
|  | LB          | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  | LB         | LI         | p-value  |
| Coffee area (ha)                                       | 1.17        | 0.98       | 0.174    | 1.27       | 0.94       | 0.011**  | 3.05       | 2.02       | 0.028**  | 3.58       | 3.51       | 0.808    |
| Coffee production (kg green coffee)                    | 281         | 568        | 0.000*** | 785        | 936        | 0.270    | 1,974      | 1,638      | 0.304    | 2,632      | 3,875      | 0.009*** |
| Coffee yields (kg green coffee harvested/ha)           | 303         | 555        | 0.000*** | 607        | 969        | 0.000*** | 795        | 864        | 0.219    | 744        | 1,133      | 0.000*** |
| Annual amount of coffee sold (kg green coffee sold/ha) | 290         | 420        | 0.016**  | 801        | 934        | 0.057*   | 813        | 760        | 0.398    | 846        | 1,087      | 0.008*** |
| Value of annual coffee sales (US\$/ha)                 | 1,033       | 1,464      | 0.022**  | 1,907      | 4,326      | 0.000*** | 2,218      | 6,943      | 0.004*** | 1,974      | 6,070      | 0.042**  |
| <b>Number of households</b>                            | <b>174</b>  | <b>174</b> |          | <b>230</b> | <b>230</b> |          | <b>197</b> | <b>197</b> |          | <b>227</b> | <b>227</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

Table 51. Continued.

| Variables analyzed                                     | Peru       |            |          | All countries |             |          |
|--|------------|------------|----------|---------------|-------------|----------|
|  | LB         | LI         | p-value  | LB            | LI          | p-value  |
| Coffee area (ha)                                       | 2.70       | 2.56       | 0.311    | 2.40          | 2.06        | 0.006*** |
| Coffee production (kg green coffee)                    | 1,813      | 2,408      | 0.000*** | 1,567         | 1,995       | 0.001*** |
| Coffee yields (kg green coffee harvested/ha)           | 673        | 991        | 0.000*** | 642           | 930         | 0.000*** |
| Annual amount of coffee sold (kg green coffee sold/ha) | 778        | 969        | 0.000*** | 731           | 869         | 0.000*** |
| Value of annual coffee sales (US\$/ha)                 | 2,558      | 4,308      | 0.003*** | 1,993         | 4,709       | 0.000*** |
| <b>Number of households</b>                            | <b>249</b> | <b>249</b> |          | <b>1077</b>   | <b>1077</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

#### 4.2.11.2 By sex

Table 52 presents five of the key indicators discussed above, disaggregated by sex of household head. Although we observe statistically significant differences for four indicators when we average the information across all countries, these differences vary by country. Overall, male-headed households obtained higher yields (975kg/ha vs. 812 kg/ha), planted more area with coffee (2.32 ha vs. 1.59 ha), obtained a higher value of annual coffee sales (US\$7,846 vs. US\$4,865), and a higher share of them sold coffee to anchor firms participating in MOCCA (45.6% vs 35.4%). In El Salvador and Guatemala, we observed statistically significant differences for the coffee area and value of annual coffee sales, and in both countries, male-headed households were better off. None of these indicators show statistically significant differences between male- vs. female-headed households in Honduras. In Nicaragua, male-headed households planted more area with coffee, but had less access to financing for agriculture, compared to female-headed households. Finally, in Peru, male-headed households planted more area with coffee, obtained higher yields and higher value of annual coffee sales.

#### 4.2.11.3 By size of coffee area

We present results for three of the above indicators disaggregated by the size of the coffee area, comparing two groups: farmers with <5 ha (92.9% of sampled farmers) and farmers with >5 ha (7.1% of sampled farmers) of coffee (Table 53). Farmers with larger coffee areas reported a higher value of annual coffee sales, which is understandable as generally, the volume harvested (and sold) is larger as the area increases. Larger farmers reported growing an average of 5.54 ha of coffee, compared to only 1.61 ha for farmers with <5 ha. We observed this same statistically significant trend for the value of annual coffee sales in all countries except El Salvador, where none of the differences in these indicators were statistically significant.<sup>31</sup> Finally, we observed that the differences in the average coffee area between these two groups was largest in Honduras (1.44 ha vs. 12.45 ha; an 11.01 ha difference) and smallest in Peru (2.36 ha vs. 6.46 ha; a 4.09 ha difference).

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<sup>31</sup> Given the large differences in the area planted and value of sales, we suspect issues with the values, which will require further cleaning (possibly outliers are affecting the mean test).

*Table 52. Coffee: MOCCA indicators for USDA by sex of household head, at midline*

| Key USDA indicators   | El Salvador |            |         | Guatemala |            |           | Honduras  |            |         |
|---|-------------|------------|---------|-----------|------------|-----------|-----------|------------|---------|
|   | Female      | Male       | p-value | Female    | Male       | p-value   | Female    | Male       | p-value |
| Yield (kg green coffee/ha)  | 541.9       | 566.3      | 0.764   | 916.6     | 992.6      | 0.4863    | 817.2     | 884.8      | 0.433   |
| Coffee area (ha)  | 0.83        | 1.22       | 0.062*  | 0.60      | 1.11       | 0.000***  | 2.04      | 2.09       | 0.93    |
| Farmers (%) with access to financing for agriculture                  | 2.7         | 4.0        | 0.6359  | 2.8       | 1.9        | 0.6947    | 13.8      | 14.4       | 0.5165  |
| Value of annual coffee sales (US\$) (with zero sales)                 | 1,128       | 1,779      | 0.0976* | 2,002     | 4,319      | 0.0019*** | 7,389     | 7,976      | 0.7493  |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 0.00        | 0.01       | 0.319   | 18.1      | 15.2       | 0.596     | 19.0      | 25.9       | 0.280   |
| <b>Number of households</b>   | <b>74</b>   | <b>100</b> |         | <b>72</b> | <b>158</b> |           | <b>58</b> | <b>139</b> |         |

Table 52. Continued.

| Key USDA indicators   | Nicaragua |            |         | Peru      |            |          | All countries |            |          |
|---|-----------|------------|---------|-----------|------------|----------|---------------|------------|----------|
|   | Female    | Male       | p-value | Female    | Male       | p-value  | Female        | Male       | p-value  |
| Yield (kg green coffee/ha)  | 968.8     | 1173.9     | 0.2541  | 874.9     | 1020.3     | 0.007*** | 812.4         | 975.1      | 0.000*** |
| Coffee area (ha)  | 2.86      | 3.65       | 0.080*  | 2.17      | 2.71       | 0.002*** | 1.59          | 2.32       | 0.000*** |
| Farmers (%) with access to financing for agriculture                  | 48.9      | 34.1       | 0.0795* | 13.4      | 15.9       | 0.6179   | 13.6          | 15.5       | 0.417    |
| Value of annual coffee sales (US\$) (with zero sales)                 | 9,300     | 12,133     | 0.1851  | 6,948     | 9,858      | 0.000**  | 4,865         | 7,846      | 0.000*** |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 57.8      | 65.9       | 0.326   | 92.5      | 91.2       | 0.731    | 35.4          | 45.6       | 0.002*** |
| <b>Number of households</b>   | <b>45</b> | <b>182</b> |         | <b>67</b> | <b>182</b> |          | <b>316</b>    | <b>761</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters



*Table 53. Coffee: MOCCA indicators for USDA by coffee area, at midline*

| Key USDA indicators                                      | El Salvador |          |         | Guatemala  |          |          | Honduras   |           |          |
|--|-------------|----------|---------|------------|----------|----------|------------|-----------|----------|
|  | ≤5 ha       | >5 ha    | p-value | ≤5 ha      | >5 ha    | p-value  | ≤5 ha      | >5 ha     | p-value  |
| Yield (kg green coffee/ha)                               | 558.1       | 340.1    | 0.540   | 961.1      | 1412.8   | 0.236    | 872.9      | 736.2     | 0.417    |
| Coffee area (ha)   | 0.91        | 10.85    | 0.195   | 0.85       | 6.70     | 0.000*** | 1.44       | 12.45     | 0.000*** |
| Value of annual coffee sales (US\$)<br>(with zero sales) | 1,376       | 12,380   | 0.289   | 2,901      | 37,625   | 0.000*** | 5,948      | 36,255    | 0.000*** |
| <b>Number of households</b>                              | <b>172</b>  | <b>2</b> |         | <b>226</b> | <b>4</b> |          | <b>186</b> | <b>11</b> |          |

Notes: ha = hectares; p-values in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

Table 53. Continued.

| Key USDA indicators                                      | Nicaragua  |           |          | Peru       |           |          | All countries |           |          |
|--|------------|-----------|----------|------------|-----------|----------|---------------|-----------|----------|
|  | ≤5 ha      | >5 ha     | p-value  | ≤5 ha      | >5 ha     | p-value  | ≤5 ha         | >5 ha     | p-value  |
| Yield (kg green coffee/ha)                               | 1133.0     | 1131.5    | 0.993    | 985.1      | 900.5     | 0.556    | 919.2         | 1030.5    | 0.210    |
| Coffee area (ha)   | 2.28       | 8.21      | 0.000*** | 2.36       | 6.46      | 0.000*** | 1.61          | 8.54      | 0.000*** |
| Value of annual coffee sales (US\$)<br>(with zero sales) | 7,738      | 26,384    | 0.000*** | 8,352      | 22,607    | 0.000*** | 5,368         | 27,483    | 0.000*** |
| <b>Number of households</b>                              | <b>180</b> | <b>46</b> |          | <b>237</b> | <b>12</b> |          | <b>1001</b>   | <b>76</b> |          |

Notes: ha = hectares; p-values in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

## 5 Results for cacao

### 5.1 Contextual changes affecting the cacao sector independent of MOCCA

From the point of view of informants, the major factors that have affected the cacao sector in recent years include: the COVID – 19 pandemic, the rising cost of inputs, migration patterns, climate change, new cadmium policies, and the Eta and Iota hurricanes. Covid-19 directly affected the frequency and nature of the technical assistance offered in all countries. In Guatemala and Ecuador, informants cited that certain logistical and export costs increased as a result of COVID-19. In all countries the rising cost of inputs affected farmers directly. Additionally, farmers in the region are confronting new European expectations regarding cadmium levels that require that farmers learn about cadmium management. In South America, especially Peru, zero deforestation commitments are forcing farmers to modify some of their practices. In Ecuador, there is growing interest in traceability initiatives. According to MOCCA staff, improving productivity is a key concern for most cacao farmers in all countries.

In Central America, the hurricanes caused significant material harms and increased the prevalence of plagues and diseases in cacao farms. According to informants, growers lost somewhere between 40-60% of their cacao crop due to disease the year of the hurricane and around 50% during the following harvest. This made fulfilling market commitments challenging and complying with quality standards difficult. Informants in Nicaragua commented that climate change has pushed some coffee farmers to switch to cacao. The presence of gangs in certain areas of Central American countries has had direct implications for the willingness of farmers to invest in the cacao sector. Many people have decided to migrate, for security and economic reasons. The high emigration rates from Central American countries caused labor shortages in the cacao sector.

### 5.2 Project Results

#### 5.2.1 MOCCA's engagement by actor and country

MOCCA partners with 114 market system actors in cacao, ranging from 10 in El Salvador to 32 in Peru. MOCCA's engagement with cacao market system actors is quite diverse across countries. Only few exporters, importers or chocolate makers are engaged as partners in just three countries – Ecuador and Peru which are by far the largest cacao economies, and Guatemala where there is a partnership with a single small (yet important for Guatemala) exporter and their associated importer. Producer organizations, on the other hand, are key MOCCA partners in all six countries. In Ecuador and Nicaragua MOCCA works with several cooperatives directly. In Honduras MOCCA works with a federation of cooperatives to reach thirteen base level cooperatives. In Peru, MOCCA also works with a second-tier farmer organization to reach twenty base level cooperatives, alongside their partnership with exporters. In the case of El Salvador and Guatemala, cacao focused producer organizations are fewer and engaged through NGOs and exporters who are MOCCA partners, as well as directly by MOCCA in country teams. National research organizations have been engaged in all six countries, and regional or global research partners have also been engaged and connected with national partners. Eight financial institutions have been engaged, six in Ecuador and two in Peru, though only two to date have actually provided finance for the cacao sector, only in Ecuador. Ministries of agriculture are engaged in three out of six countries, coincidentally in those that have the largest cacao economies (Ecuador, Peru and Honduras). NGOs are also engaged in particular in El Salvador where the cacao sector is still quite emergent, in Guatemala to

support engagement with farmers and in Nicaragua to support research and nursery development. Of the total of 114 partners, 68 are downstream from farmers (actors who purchase cacao, often also providing services) while 36 are upstream (providing services and inputs to farmers but not buying their cacao).

*Table 54. MOCCA partners for cacao, by actor type and country*

| Actor Type                         | Ecuador   | El Salvador | Guatemala | Honduras  | Nicaragua | Peru      | Regional | Total      |
|------------------------------------|-----------|-------------|-----------|-----------|-----------|-----------|----------|------------|
| Exporters                          | 4         |             | 1         |           |           | 2         |          | 5          |
| Chocolatier/<br>Importer           | 2         |             | 1         |           |           |           |          | 2          |
| Producer<br>organizations          | 6         | 3           | 7         | 14        | 7         | 21        |          | 47         |
| Research<br>Institutions           | 2         | 1           | 2         | 1         | 1         | 3         | 3        | 10         |
| Financial<br>Institutions          | 6         |             |           |           |           | 2         |          | 9          |
| NCIs and<br>public<br>institutions | 2         | 1           | 2         | 2         | 2         | 2         | 1        | 6          |
| NGOs/<br>Projects                  | 1         | 5           | 1         | 1         | 2         | 2         | 1        | 6          |
| Others                             |           |             |           |           |           |           |          |            |
| <b>Total</b>                       | <b>23</b> | <b>10</b>   | <b>14</b> | <b>18</b> | <b>12</b> | <b>32</b> | <b>5</b> | <b>114</b> |

The kinds of activities in which different kinds of actors are engaged also varies by country. We see exporters for example playing an important role in technical assistance and market access in Ecuador and Peru, as well as Guatemala, but less so in Nicaragua and Honduras. Exporters also engage in activities related to genetic material and access to finance, and in Ecuador an association of cacao exporters is active in strengthening national platforms for coordination. Farmer organizations are largely focused on technical assistance, market access, and also support access to improved planting material. Second tier farmer organizations in Peru and Honduras are also engaged to strengthen national sectoral platforms. Research institutions are supporting farmer training through training of technicians and community promoters; they support market access by building capacity for improving quality through post-harvest practices; they support access to genetic material through strengthening the conservation of genetic material in global, national and local cacao collections and nurseries, as well as supporting research and research dissemination through data collection, information sharing, scientific events, newsletters and scientific publications. Financial institutions have been engaged in access to finance including assessment of potential clients in cacao and product development. Ministries of agriculture have been similarly engaged across MOCCA activities depending on their mandate, to support farmer training, strengthening of nurseries and the regulatory framework for genetic material, development of public financial instruments for cacao farmers, as well as strengthening national platforms and coordination within the sector. NGOs are playing an important role in El Salvador and parts of Guatemala to engage cacao farmers not affiliated with strong producer organizations. In all countries MOCCA coordinates efforts with other major cacao projects, and in Nicaragua an NGO leads technical support for cacao nurseries and supports research.

## 5.2.2 General characteristics of farmers

### 5.2.2.1 Farmers' households

Taking joint decisions about how to use the income from cacao sales remains uncommon. Overall, most heads made the decision by themselves (54.1% of male heads plus 17.9% female heads), only in 28% of the households other members made this decision, and only in 18% of the households (regardless of who is the head) a female makes this decision. For the latter variable, female participation comes mostly from female-headed households (either because the head makes the decision or another female member makes the decision), as only in 0.2% of male-headed households a female decides how to use the income from cacao sales. These percentages are higher than 60% in Ecuador and El Salvador (60.7% and 65.4%). The producers consult different sources to make decisions about the uses of the cacao income; however, in this case, most households, this decision was not consulted with anyone (59.2%) and it is exceptionally high in El Salvador (82.7%). Overall MOCCA countries, it is most common to consult with other females' member (24%) and males (13.7%) (Table 55).

In less than 10% of households, a household member had migrated within twelve months before the interview. Migration was slightly higher in Honduras (16.1%) and Peru (12.7%). For those households who reported migration, on average, two members had left the household, and in almost one-third of these households, at least one member migrated to another country. Not surprisingly, the share of households reporting the latter was highest in Nicaragua, where migration is a social problem driven by many factors, including the political situation. Despite this, few households (9.1%) reported receiving remittances in the 12 months preceding the interview. On average, compared to the baseline, the countries increased the subsidies received from the government or NGOs (from 20.7% to 27.5%). This was more noted in Peru (from 34.5% in the baseline to 61% currently). However, 51.8% received off-farm work income in this country, well above the average percentage for all countries (30.6%) (Table 55).

*Table 55. Cacao: household characteristics Cacao*

| Household (HH) characteristics  | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Households (%) where decision of how to use the income from cacao sales was made by:          |            |             |           |           |           |            |               |
| Male HH head only   | 60.7       | 65.4        | 45.7      | 48.2      | 56.0      | 50.7       | 54.1          |
| Female HH head only   | 16.8       | 19.2        | 23.9      | 26.8      | 16.0      | 15.0       | 17.9          |
| Other HH member   | 22.4       | 15.4        | 30.4      | 25.0      | 28.0      | 34.3       | 28.1          |
| A female (either a female head or female member)  | 16.8       | 19.2        | 23.9      | 26.8      | 17.3      | 15.0       | 18.0          |
| Households (%) where decision of how to use the income from cacao sales was consulted with:   |            |             |           |           |           |            |               |
| No one  | 70.1       | 82.7        | 71.7      | 58.9      | 56.0      | 46.5       | 59.2          |
| Other male HH member  | 8.4        | 11.5        | 10.9      | 12.5      | 10.7      | 18.8       | 13.7          |
| Other female HH member  | 21.5       | 3.8         | 13.0      | 28.6      | 30.7      | 29.1       | 24.0          |
| Other person outside the HH   | 0.0        | 1.9         | 2.2       | 0.0       | 1.3       | 5.2        | 2.6           |
| % HH where at least one member migrated within last 12 months:                                | 7.5        | 1.9         | 4.3       | 16.1      | 9.3       | 12.7       | 9.8           |
| Among HH where a member migrated, # members who migrated                                      | 1.5        | 1.0         | 1.5       | 1.3       | 3.1       | 2.2        | 2.0           |
| Among HH where a member migrated, % HHs with at least one member migrating to another country | 12.5       | 100.0       | 50.0      | 100.0     | 42.9      | 0.0        | 27.8          |
| Among HH where a member migrated to another country, % HH where members migrated to:          |            |             |           |           |           |            |               |
| Prefer not to answer  | 0          | 100         | 0         | 0         | 0         | n.a.       | 6.7           |
| USA   | 100        | 0           | 0         | 100       | 66.7      | n.a.       | 80.0          |
| Mexico  | 0          | 0           | 100       | 0         | 0         | n.a.       | 6.7           |
| Canada  | 0          | 0           | 0         | 0         | 0         | n.a.       | 0.0           |
| Central American country  | 0          | 0           | 0         | 0         | 33.3      | n.a.       | 6.7           |
| South American country  | 0          | 0           | 0         | 0         | 0         | n.a.       | 0             |
| Europe  | 0          | 0           | 0         | 0         | 0         | n.a.       | 0             |
| Other region  | 0          | 0           | 0         | 0         | 0         | n.a.       | 0             |
| % HH receiving income from off-farm work  | 29.0       | 23.1        | 28.3      | 51.8      | 22.7      | 31.0       | 30.6          |
| % HH receiving subsidy from the government or NGOs  | 3.7        | 25.0        | 6.5       | 0         | 1.3       | 61.0       | 27.5          |
| % HH receiving remittances  | 2.8        | 17.3        | 4.3       | 28.6      | 2.7       | 8.5        | 9.1           |
| <b>Number of households</b>   | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

#### 5.2.2.2 Farm characteristics

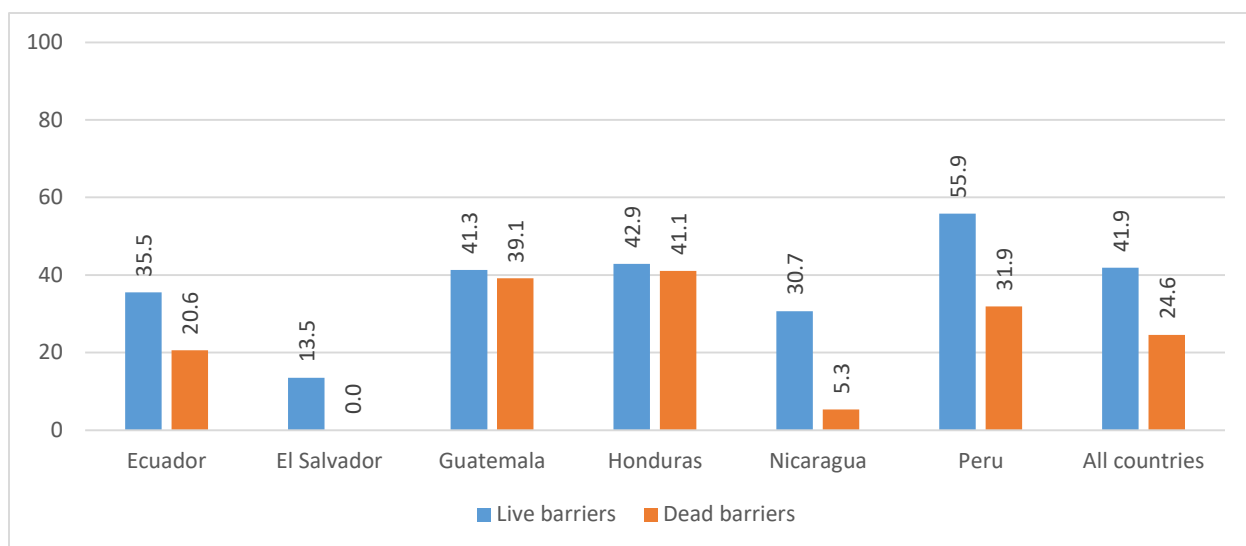
For the midterm evaluation, we only requested information for plots where cacao was grown (including existing and new ones). As a result, farmers reported an average cacao plot area of 2.03 ha, slightly lower than the baseline (2.4 ha). The apparent differences in the average cacao area between baseline and midline could be explained because of external factors such as the two hurricanes that affected Central America in late 2019 or the increase in input costs, which may have caused abandonment of some cacao area, or internal factors such as the fact that we only interviewed a sub-sample of baseline farmers. In El Salvador, farmers reported growing the lowest cacao area (0.96 ha), and in Ecuador, the highest (3.23 ha).

Most than 80% of farmers have only one cacao plot. In Nicaragua, this percentage is higher (92%); 26.1% and 10.9% of farmers in Guatemala have more than two or three plots, respectively. Only 14.6% of farmers in all countries established new cacao plots since the baseline; Peru stands out with 33.3% compared to El Salvador (3.8%), with the lowest percentage.

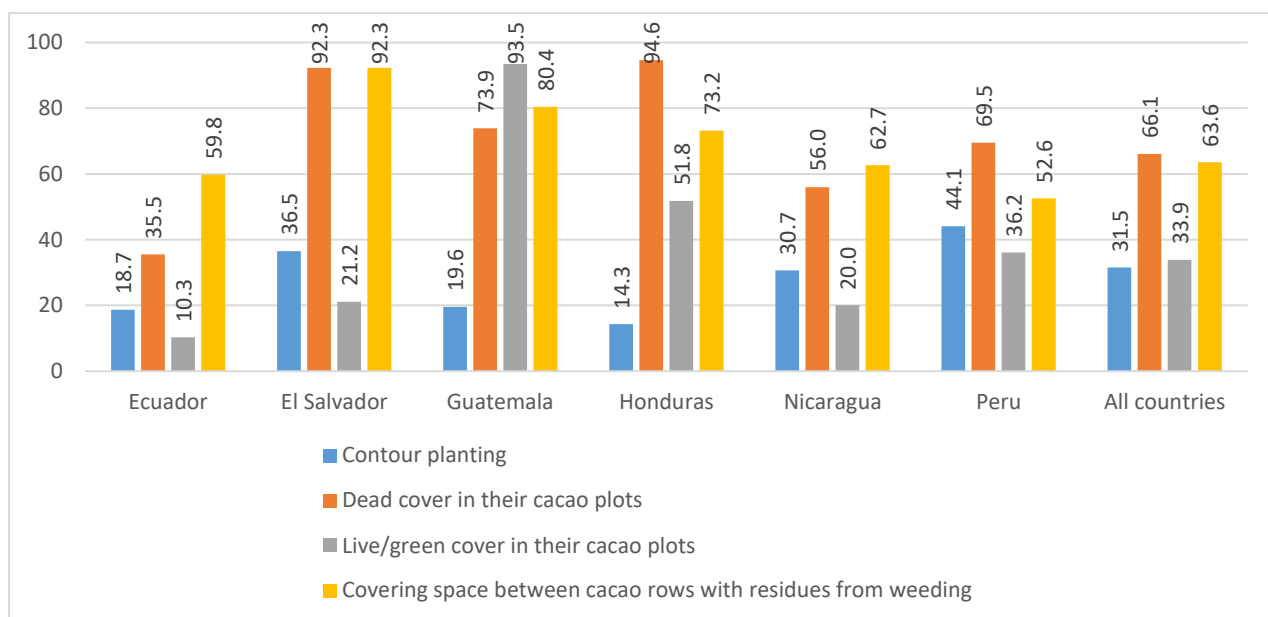
On average, 44.4% of farmers reported doing a production diagnosis of their cacao crop (except for Guatemala). Figure 3, and Figure 4 give an overview of practices used to manage the barriers and coverages of the cacao plantation. The live and dead barriers are implemented, on average, by 41.9% and 24.6% of producers, respectively. El Salvador is the exception; only 13.5% implement the first practice, and no one does the latter. A high percentage of farmers implement some kind of applied floor management practices. 66.1% of farmers use dead cover in their cacao plots, 63.6% cover space between cacao rows with residues from weeding, 33.9% of farmers cover live/green in their cacao plots, and 31.5% implement contour planting practices. In general, Ecuador and Nicaragua have the lowest percentage of implementation, Honduras has the highest percentage of farmers adopting dead covering practices (94.6 %), followed by Guatemala with the implementation of live/green cover (93.5%). Figure 5 describes the percentage of farmers implementing cost-saving practices to control weeds. Less than 50% of producers implement these types of practices. The most common is the use of weed-wacker (or trimmer) by 47% of the farmers, which is exceptionally high in Peru (85.4%), despite this being a practice not promoted by MOCCA. Scheduling weeding activities has a percentage of 33.2% of the producers. Only 5.3% of producers use herbicides, and in Guatemala and Honduras no farmer reported using this input (Table 56), which is not surprising as the use of herbicides is not a practice promoted by MOCCA.

**Table 56. Cacao: farm characteristics in the 2021-2022 agricultural year**

| Farm characteristics   | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Total area (ha)* in plots with cacao                                   | 4.77       | 2.13        | 1.33      | 4.08      | 12.80     | 12.16      | 8.12          |
| Total cacao area (ha)  | 3.23       | 0.96        | 1.04      | 1.63      | 1.64      | 2.13       | 2.03          |
| Households (%) with:   |            |             |           |           |           |            |               |
| One cacao plot   | 71.0       | 96.2        | 63.0      | 80.4      | 92.0      | 84.5       | 81.8          |
| Two cacao plots  | 25.2       | 3.8         | 26.1      | 7.1       | 8.0       | 12.2       | 14.0          |
| Three or more cacao plots  | 3.7        | 0.0         | 10.9      | 12.5      | 0         | 3.3        | 4.2           |
| Share (%) of new cacao plots established since the baseline            | 4.7        | 3.8         | 8.7       | 5.4       | 8.0       | 33.3       | 16.6          |
| Farmers (%) doing a production diagnosis of their cacao crop           | 47.7       | 19.2        | 0.0       | 12.5      | 45.3      | 66.7       | 44.4          |
| Farmers (%) implementing:  |            |             |           |           |           |            |               |
| Live barriers  | 35.5       | 13.5        | 41.3      | 42.9      | 30.7      | 55.9       | 41.9          |
| Dead barriers  | 20.6       | 0.0         | 39.1      | 41.1      | 5.3       | 31.9       | 24.6          |
| Contour planting   | 18.7       | 36.5        | 19.6      | 14.3      | 30.7      | 44.1       | 31.5          |
| Dead cover in their cacao plots  | 35.5       | 92.3        | 73.9      | 94.6      | 56.0      | 69.5       | 66.1          |
| Live/green cover in their cacao plots                                  | 10.3       | 21.2        | 93.5      | 51.8      | 20.0      | 36.2       | 33.9          |
| Covering space between cacao rows with residues from weeding           | 59.8       | 92.3        | 80.4      | 73.2      | 62.7      | 52.6       | 63.6          |
| Farmers (%) implementing these cost-saving practices to control weeds: |            |             |           |           |           |            |               |
| Use of weed-wacker (or trimmer)  | 59.8       | 9.6         | 0.0       | 7.1       | 4.0       | 85.4       | 47.0          |
| Scheduling weeding activities  | 28.0       | 21.2        | 8.7       | 7.1       | 44.0      | 46.9       | 33.2          |
| Selective weed control   | 10.3       | 36.5        | 8.7       | 10.7      | 18.7      | 32.4       | 22.4          |
| Use of herbicides  | 6.5        | 1.9         | 0.0       | 0.0       | 4.0       | 8.5        | 5.3           |
| Among HH using herbicides, % applying it focalized/using a screen      | 100.0      | 100.0       | n.a.      | n.a.      | 100.0     | 27.8       | 55.2          |
| <b>Number of households</b>  | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

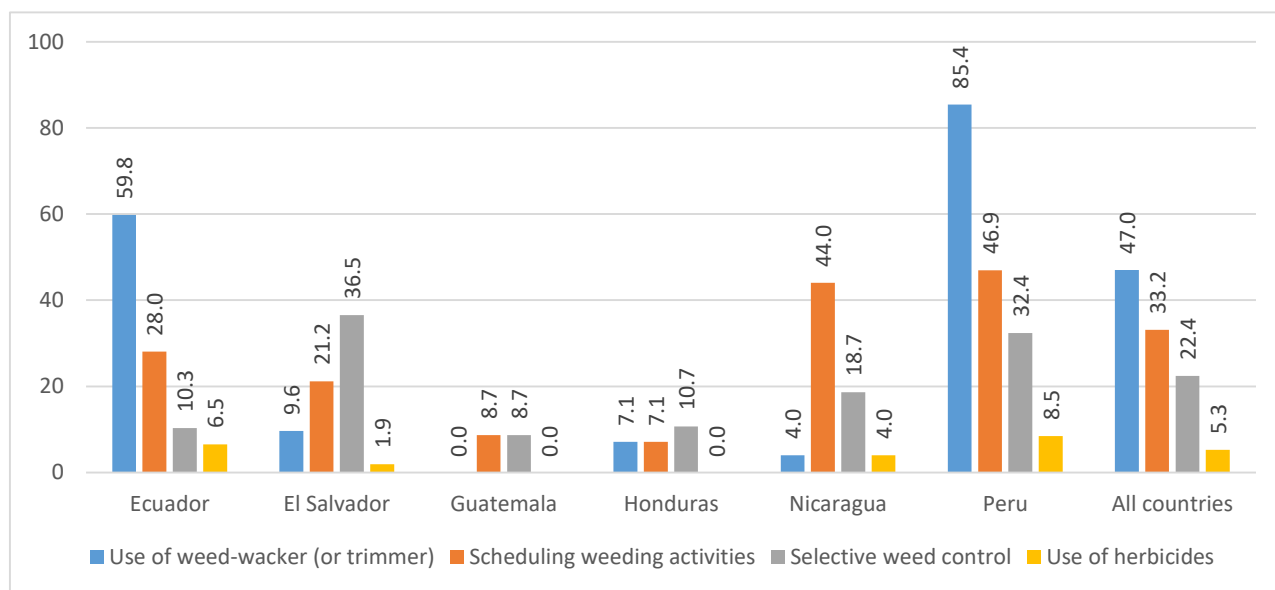


**Figure 3. Cacao farmers (%) implementing barriers**



**Figure 4. Cacao farmers (%) implementing floor management practices**





**Figure 5. Cacao farmers (%) implementing these cost-saving practices to control weeds.**

Similar to the baseline, most farmers reported owning their land with a deed (51.7%). Inclusive, for the three Central American countries, this percentage is > 70% (except in Honduras, 28.6%). Owning land without a deed or not having land was more common in Peru; 61% of the farmers reported not owning land. The differences by gender of the household head vary per country, while in Honduras, Nicaragua, and Peru the females have a higher percentage of owners with the deed in Guatemala and especially in El Salvador, the gap is bigger (72.7% vs 90.2%) (Table 57).

*Table 57. Cacao: Land tenure in the 2021-2022 agricultural year*

|                          | Ecuador |      |       | El Salvador |      |       | Guatemala |      |       | Honduras |      |       | Nicaragua |      |       | Peru   |      |       | All countries |      |       |
|--------------------------|---------|------|-------|-------------|------|-------|-----------|------|-------|----------|------|-------|-----------|------|-------|--------|------|-------|---------------|------|-------|
| Land tenure (% HH)       | Female  | Male | Total | Female      | Male | Total | Female    | Male | Total | Female   | Male | Total | Female    | Male | Total | Female | Male | Total | Female        | Male | Total |
| Owning land with deed    | 87.0    | 88.1 | 87.9  | 72.7        | 90.2 | 86.5  | 66.7      | 71.0 | 69.6  | 31.6     | 27.0 | 28.6  | 85.7      | 73.8 | 76.0  | 30.0   | 15.3 | 18.8  | 53.8          | 51.1 | 51.7  |
| Owning land without deed | 21.7    | 14.3 | 15.9  | 27.3        | 9.8  | 13.5  | 33.3      | 32.3 | 32.6  | 63.2     | 70.3 | 67.9  | 14.3      | 16.4 | 16.0  | 22.0   | 20.9 | 21.1  | 28.8          | 23.0 | 24.4  |
| Not owning land          | 0       | 1.2  | 0.9   | 0           | 0    | 0     | 0         | 0    | 0     | 5.3      | 2.7  | 3.6   | 0         | 11.5 | 9.3   | 48.0   | 65.0 | 61.0  | 18.9          | 27.6 | 25.5  |
| Number of households     | 23      | 84   | 107   | 11          | 41   | 52    | 15        | 31   | 46    | 19       | 37   | 56    | 14        | 61   | 75    | 50     | 163  | 213   | 132           | 417  | 549   |

### 5.2.3 Results by Activity 1: Farmer Training

Technical assistance in cacao under MOCCA is carried out largely in coordination with farmer organizations, followed by exporters and NGOs, with research organizations supporting content development and training of technical assistance providers, including technicians and community extension workers. The strategy, however, has important variants by country. In Ecuador, Honduras, Nicaragua and Peru, technical assistance is largely implemented by farmer organizations, complemented by exporters in Ecuador and Peru. In El Salvador, the main technical assistance partners are NGOs and in Guatemala MOCCA works with both an exporter and an NGO. The overall strategy for technical assistance in cacao is based on strengthening the capacity of technicians and community extension agents to serve farmers. This is done through formal training in cacao as well as through a suite of mobile enabled information, training and extension tools called Cacao Móvil.

MOCCA engaged CATIE, a regional higher education and research institution with a long history in cacao, to develop, together with national partners, a formal training course in cacao for technical assistance providers. The primary goal in the context of the project was to develop and disseminate a standard curriculum for cacao with a focus on R and R. The long-term goal was to build the capacity of national institutions (universities, research and training institutes) to deliver high level formal training in cacao for TA providers moving forward. In partnering with national educational institutions, the project deposits the training content in those institutions for future delivery and use. This Cacao Diploma course was carried out in five MOCCA countries with six different national partners, training 154 participants. The course has since been replicated in two countries led by national partners and CATIE with no additional support from MOCCA.

Community extension workers provide technical assistance to cacao farmers on farm but also remotely using cellphones (both feature and smart) to share information, train farmers and respond to technical assistance needs. Community extension workers are from cacao producing communities, often members of cacao growing families themselves. They train others in a cascade model to ensure additional farmers benefit from the trainings. Many children of cacao farmers have been incorporated as extension workers, which is important for generational shifts and continuity of the farming endeavor. They are selected in collaboration with cacao cooperatives and building their capacity to serve farmers and the capacity of farmer organizations to select, train and retain these (often young) community based service providers is at the heart of this model to make technical assistance sustainable and effective by ensuring highly qualified providers are available where farmers live and are integrated into the local organizational structure of the sector, and connected among themselves, with farmers and with national and regional experts through their phones and mobile networks. MOCCA made significant investments in updating the content of Cacao Móvil resources to include recent research results, and in expanding the content to include more topics related to R and R as well as cadmium.

Technical assistance with cacao farmers kicked off in the fourth semester of the project, after April 2020 with the signing of numerous agreements with partners across the region to serve 20,000 cacao farmers. In that same semester, training started with 3102 cacao farmers. In the fifth semester, after October 2020, more agreements were signed with farmer organizations, exporters and NGOs to provide technical assistance to farmers. The number of farmers trained almost doubled, and then doubled again in the sixth semester, reaching 16,214 farmers by September 2021 and 22,603 farmers by March 2022. By that time,

500 community extension workers had been engaged and trained in the use of the cacao curriculum and mobile toolkit, including digital literacy.

**Table 58. Results at the level of businesses and institutions**

| Ecuador  | El Salvador   | Guatemala   | Honduras  | Nicaragua  | Peru  |
|--|---|---|---|--|---|
| <b># MOCCA partners participating in Activity</b>  |   |   |   |  |   |
| 15   | 5   | 2   | 14  | 9  | 25  |
| <b># Farmers reached<sup>32</sup></b>  |   |   |   |  |   |
| 6449   | 1786  | 851   | 1527  | 2975   | 9015  |
| <b>Major changes made in their TA services under MOCCA</b>   |   |   |   |  |   |
| Many more themes covered; use of technology; more follow-up and continuity   | Continuous and programmed TA sessions; incorporation of new themes to the curriculum  | Improved technical capacity; more personnel; focus on post-harvest techniques; more continuity; more influence in organizations                             | Use of Cacao Móvil technology; informants say that the content has generally stayed the same  | TA offered more regularly; more themes covered; working with more youth; more farmers reached; some partners carrying out TA for the first time  | Incorporation of new knowledge and themes;  |
| <b>Major achievements in TA under MOCCA</b>  |   |   |   |  |   |
| New and updated knowledge acquired; better understanding of pruning, fertility and cacao attributes; cadmium reduction strategies; Cacao Móvil has helped obtain information quickly; financial literacy | Farmers that are new to cacao have been exposed to a variety of cacao management practices; more frequent TA; elaboration of organic inputs | High participation rates in trainings; applied work in model plots; better ability to describe cacao flavor profiles; community technicians better prepared | Training of trainers; use of technology for sharing knowledge; elaboration of organic fertilizers; better post-harvest practices; keeping up motivation in the field schools                        | Adoption of new techniques; greater understanding of organic techniques; one cooperative increased its membership; new market access opportunities; more women trained; better understanding of cadmium management; productivity improvements; more knowledgeable TA providers   | New and updated knowledge acquired; closer relationship between anchor firms and farmers; focus on agroforestry; more diploma trainings   |
| <b>Major challenges in TA under MOCCA</b>  |   |   |   |  |   |
| Obtaining financing; lack of irrigation systems; insufficient inputs; lack of tools; including more youth; transportation difficulties; expensive inputs; increasing yields                              | Relatively small TA team; very basic understanding of the sector; sustainability of the TA once MOCCA ends                                  | Climate change; insufficient labor availability; improve genetic material; strengthen commercialization   | Productivity challenges due to recent hurricanes; low motivation due to low productivity; sustainability of quality technical assistance; reaching more farmers; improving genetic quality of trees | Farmers need financing; reticence to introduce novel practices; generational shifts; sustainability of the technical team; remoteness of some farms; opportunities to observe examples of well managed farms; farmers often lack tools and inputs to implement practices learned | Remoteness of farming regions; old age of farmers; more practical training on farms; Covid policies; motivate people to receive training; |

<sup>32</sup> From MOCCA Report April to September 2021

Like in the coffee sector, the technical assistance work with cacao farmers had to quickly adapt to the mobility restrictions introduced in the context of the COVID-19 pandemic. WhatsApp and other online training tools, especially Cacao Móvil, were crucial for TA during the early months of the pandemic. Cacao Móvil has been key in expanding the number and quality of themes addressed in trainings. In Ecuador, for example, the use of the app allowed for addressing 13 themes, as opposed to the 6 themes that were covered prior to MOCCA. Young farmers were especially able to take advantage of these tools, while some older farmers had difficulty with this training model. Since June of 2021 TA activities have been increasingly held in person and in the field. The exact timing and frequency of group and in person activities varied somewhat by country depending on the lingering restrictions.

Technical assistance work has been carried out through MOCCA partners by a network of technicians and community extension workers. This has involved engagement with the technical assistance teams of some anchor firms and other allies. From the point of view of informants, this has been an overall challenge and there has been significant turnover in personnel. In Peru, many cacao farms are located in particularly remote and difficult to access areas, and so that is where MOCCA has had to invest in trainings the most. In Guatemala it was important to develop training materials in indigenous languages. Despite the logistical and personnel challenges, there's been important progress in relation to this activity. The goal established by MOCCA was to reach at least 20,000 farmers receiving TA, and this goal has been reached. The next step is to guarantee that all farmers continue to receive the rest of the modules that are part of the curriculum.

Most informants suggested that there's been important progress in relation to TA. The content covered is seen as up to date and the fact that it is shared in a more continuous and systematic manner is highly valued. In the Central American context, the trainings in relation to improving resilience in the face of climate change was crucial in the aftermath of the hurricanes. The material damage caused to many cacao farms also increased farmer interest in R&R techniques. Trainings in relation to cadmium management have been crucial in all countries. Farmers are especially interested in low-cost techniques that reduce cadmium levels.

Informants from all countries except El Salvador commented that R&R is highly prioritized in the technical assistance curriculum. In Honduras, the urgency of R&R for improving productivity is the most recurring comment made by interviewees. In Ecuador, several informants noted that for the technical assistance work to be even more effective, farmers need support with inputs, tools, irrigation, and financing to be able to adopt the various recommendations. There is also a need to incorporate more youth to the trainings. In El Salvador, most cacao trees are seven years old or younger, so generally there is not a huge need for renovation practices there. Many farmers are still learning basic cacao management practices that are relatively new to them, and what they need most urgently is support with irrigation systems and shade management. MOCCA trainings in El Salvador have focused especially on agroforestry and organic inputs. Even though MOCCA's TA team in El Salvador is relatively small, its collaboration with Alianza Cacao and its partners has allowed it to reach farmers in a more systematic way. The fact that many of the technical assistant providers are farmers themselves helps communicate complex technical information in a more digestible local vocabulary. On the downside, many of them feel that their compensation is too low. A few organizations expressed concern over how technical assistance would continue after MOCCA ended. There are very limited funding opportunities for cacao in El Salvador, so organizations have limited resources for technical assistance.

The countries with the strongest evidence of progress towards systemic change in relation to technical assistance work are Peru and Guatemala, but all countries have examples of actors replicating activities beyond MOCCA's target group, establishing new partnerships, and planning on continuing the TA work beyond the project end date. Numerous new partnerships have developed between anchor firms, producer organizations, research institutions, universities, and government entities. Most interviewees expressed that the technical assistance work being done is crucial, both for buyers and producers, and hence there is interest in its continuity. In some cases, the concern is whether there will continue to be enough funding to carry out the same amount of TA work as is being done under MOCCA.

**Table 59. Systemic change at the level of businesses and institutions in technical assistance**

| Details   | Ecuador  | El Salvador | Guatemala | Honduras <sup>33</sup> | Nicaragua | Peru <sup>34</sup> |
|---|----------|-------------|-----------|------------------------|-----------|--------------------|
| % of informants replicating activities beyond MOCCA target group                                | 4/8: 50% | 2/4: 50%    | 2/2: 100% | 2/4: 50%               | 4/7: 57%  | 6/6: 100%          |
| % of informants who have established new partnerships as a result of MOCCA                      | 6/8: 75% | 1/4: 25%    | 2/2: 100% | 1/4: 25%               | 2/7: 29%  | 6/6: 100%          |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 7/8: 88% | 2/4: 50%    | 2/2: 100% | 3/4: 75%               | 7/7: 100% | 5/6: 83%           |
| Level of systemic change (Systemic Change Pathway average) <sup>35</sup>                        | 1.9      | 2           | 3         | 1.5                    | 2.1       | 3                  |

<sup>33</sup> Even though Honduras only has 1 partner participating in Activity 1, we interviewed three cooperatives affiliated with the relevant partner, hence the total of 4 informants cited.

<sup>34</sup> Even though Peru has 5 partners participating in Activity 1, we interviewed a cooperative affiliated with one relevant partner, hence the total of 6 informants cited.

<sup>35</sup> 1. *Incipient*. Market system actors agree to implement approaches with MOCCA to improve farmer training  
2. *Initial*. Partners adopting improvements affecting farmer training quality, frequency, or scale  
3. *Intermediate*. Partners adopting improvements in farmer training beyond MOCCA-supported activities  
4. *Advanced*. Partners making investments to apply improved training approaches beyond MOCCA  
5. *Mature*. MOCCA partners & non-partners adopting improvements in training quality, frequency, or scalability independently of MOCCA

#### 5.2.4 Results by Activity 2: Market linkages

Market access for MOCCA as an activity in cacao is focused on improving opportunities and returns to farmers from participation in global cacao markets. The focus is on improving benefits farmers receive by increasing the volumes of cacao that are sold to these markets with price differentials related to the quality attributes of the cacao sold, and by establishing more direct commercial relationships between farmers and anchor firms, weakening the role of intermediaries, and hence improving the payments farmers receive. The work has two major components. A first component, similar to coffee, works to strengthen inclusion in the relationships between cacao farmers, their cooperatives and the exporters, importers or chocolate companies that purchase their cacao through quality price differentials, certifications, and access to supporting services through the business relationship, including technical assistance, finance, and even genetic material. MOCCA approached private sector partners interested in matching grants for co-financing activities of mutual interest that would help achieve both the firm's goals (increasing cacao volumes, quality, and farmer fidelity) and MOCCA's goals (training farmers, R&R, improving productivity, directly linking farmers and markets). Three anchor firms were engaged in this way, one each in Ecuador, Peru and Guatemala.

A second component has to do with improving transparency and shared understanding among farmers and their buyers around cacao quality – what it is, how to manage it and how it should be remunerated. Three activities contribute to this component. First, MOCCA is supporting the engagement of Latin America, together with the main cacao industry associations from North America and Europe in the development of harmonized cacao quality assessment protocols for the sector. This activity includes building capacity at origin for applying these standardized protocols to assess cacao quality so farmers and cooperatives can improve their post-harvest processes and are in a better position to negotiate quality and prices with buyers, or to meet their quality demands. A second activity is support for the organization of national cacao quality competitions to raise awareness around quality and to reward good quality management. The winners of these competitions represent the country at the biannual *Salón du Chocolat* and serve to position the origin as a whole within the fine and flavor cacao sector as this event is well attended. A third activity, the cacao flavor map, includes supporting cacao farmer organizations to develop and implement specialized post-harvest protocols to produce unique cacao flavor profiles and market those to high end specialty chocolate makers through match-making activities.

Agreements with partners seeking to improve market access for cacao farmers also include provision or facilitation of complementary services including technical assistance (a criteria for partner selection), access to finance and improved genetic material. Of 21 cacao buyers interviewed (including exporters, chocolatiers, and producer organizations), all are collaborating with MOCCA on improving technical assistance, as is expected. Additionally, 13 (62%) of buyers are also supporting farmers with improving access to higher quality genetic material, while 4 (19%) are involved in providing or facilitating improved access to farmers. This indicates progress in broadening the benefits to farmers of commercial relationships not just via price improvements but also via improvements in access to complementary services that also translate into economic benefits for farmers.

Market access activities for MOCCA began after October 2019 with the translation of the cacao quality assessment protocols as well as key information related to the *Cocoa of Excellence* competitions to ensure greater engagement and feedback from Latin America. Bioversity has been leading the work around the development of global cacao quality standards. Now that the protocols have been developed, the focus

has been to train specialists in each country who can work together to implement the standards and train others in the near future. The aspiration is that the standards will eventually provide a common language for communicating quality and flavor potential between value chain actors. By the third semester, by March 2020, 8 cacao quality assessment protocols were published for consultation. During that same semester, a Regional Cacao and Chocolate Summit was held to showcase quality cacao and cacao-based products of the region and to reward flavor quality in cacao. In the fourth semester an additional cacao quality protocol was published, and the sites and partners were selected for the development of improved cacao flavor protocols to be included in the Cacao Flavor Map. Equipment for implementing the protocols were purchased and initial samples were sent for analysis. In the fifth semester, Cocoa of Excellence competitions were held in four countries to promote quality cacao and the first cacao sales with pricing based on quality were reported for a total of 121MT. By the sixth semester, sales with significant price differentials for quality were reported as project results. Advances had been made in Ecuador and El Salvador to establish sensorial labs for cacao hosted at national research institutions and capacity building was underway. In Ecuador this has included the purchase of equipment to install a flavor laboratory at INIAP, the national research institution, and is a collaborative effort with ANECACAO (exporter association) and a specialty chocolate company. In the same semester, the ICCO (International Cocoa Organization) formally recognized the importance of the development of cacao quality protocols for the sector, in support of the efforts of the global working group MOCCA engages with.



*Table 60. Results at the level of businesses and institutions*

| Ecuador  | El Salvador   | Guatemala   | Honduras | Nicaragua   | Peru  |
|--|---|---|----------|---|---|
| <b># MOCCA partners participating in Activity</b>  |   |   |          |   |   |
| 12   | 4   | 11  | 14       | 7   | 24  |
| <b># farmers reached</b>   |   |   |          |   |   |
| 3363   | 0   | 609   | 0        | 332   | 4494  |
| <b>Major changes made in their market access services under MOCCA</b>  |   |   |          |   |   |
| Better understanding of flavor profiles; use of flavor map; better post-harvest practices; new clients                               | Introduced differential prices for different cacao qualities;                                     | Collaboration for purchasing of wet cacao   | n.d.     | Quality and productivity improvements; new sourcing routes; relationships with new buyers; support with certification processes                             | One anchor firm now purchasing more higher quality product                    |
| <b>Major achievements in market access under MOCCA</b>   |   |   |          |   |   |
| Loyalty between growers and buyers strengthened; direct purchases without intermediaries; make distinctions on the basis of quality; | Support with acquiring cacao processing equipment; closer collaboration with MAG (Ministry of Ag) | Strengthening of commercial relationships; consistency and transparency; fair prices; positioning of cacao for export markets | n.d.     | Flavor Map has opened new market opportunities; new relationships with international buyers; productivity improvements                                      | Stable and loyal client relationships; quality improvements                   |
| <b>Major challenges in market access under MOCCA</b>   |   |   |          |   |   |
| Sustainability; farmers to better understand their product; improve prices for better quality cacao; improve trust from exporters    | Exporting cacao; obtaining organic certification  | Producing enough volume; keep quality consistent  | n.d.     | Fulfilling buyers' volume requirements; maintaining certifications; transitioning to organic production to meet EU expectations; diversification of buyers; | European Union regulations on cadmium, herbicides and pollution; increase R&R |

Like in the coffee sector, MOCCA's work in relation to improving farmers' market access has been interrelated with the technical assistance work. In Ecuador, for instance, informants report that the closer relationships built between anchor firms and farmers has strengthened loyalty between the two. In Peru, a couple anchor firms stated that the volume of cacao they've been able to purchase has increased as a result of the technical assistance work they're engaged in. As hoped for by MOCCA, in Peru the technical assistance work led by anchor firms has translated into better market access for farmers. Anchor firms have found that this had led to more loyal relationships between farmers and buyers and that there have

been evident quality and productivity improvements. The Salon de Cacao y Chocolate events in Peru have helped foment a greater appreciation of cacao quality. In El Salvador, MOCCA's model of working alongside anchor firms to build closer relationships between farmers and buyers has been more difficult given that there are few medium or large sized exporters in the country to work with. Thus, the strategy that has worked in other MOCCA countries linking market access, financing and technical assistance with the private sector has been less effective in El Salvador given the sector is relatively emergent. Nonetheless, MOCCA has collaborated with a larger firm to access new markets, and supported a farmer organization with equipment for processing cacao sub-products that is now opening up new export market opportunities in El Salvador. In Honduras informants commented that the question of market access and improved quality was not prioritized, mostly because many MOCCA farmers already have a relationship with Chocolats Halba. Since 2009 Halba introduced specific quality protocols and required fair trade and organic certifications that farmers already comply with. Still, in all countries there is much pending work regarding the need to improve market access, traceability, cadmium management, and complying with zero deforestation commitments.

The work around the Cocoa Flavor Map led by Lutheran World Relief has been helpful for opening up market opportunities for fine flavor cocoa, insofar as it helps with the promotion of cacao profiles with unique flavor attributes. The Cocoa Flavor Map is a visual tool illustrating the origins and the organoleptic characteristics of cacao offered by producer organizations which have undergone a process to standardize the flavor profile of the cacao they produce. The tool allows cacao producers to better connect with buyers of fine flavor cacao, who are able to identify through the information provided in the Flavor Map, sources for the cocoa flavors, profiles and characteristics they are seeking. LWR, Zoto, and Guittard Chocolate, in collaboration with the Cacao of Excellence Program, unveiled the Cacao Flavor Map at the 2017 Salon du Chocolat, which included the flavor profiles of cacao supplied by producer organizations in El Salvador, Guatemala, and Honduras. Under MOCCA, 32 producer organizations from Guatemala, Ecuador, and Peru are receiving assistance to standardize their flavor profiles and join the Flavor Map, while producer organizations from El Salvador, Guatemala, and Honduras receive continued marketing assistance through the Map. This work is supported by Guittard Chocolate, the Fine Chocolate Industry Association (FCIA) and Zoto. To date, 4 buyers (one of them distributing to 19 different specialty chocolate makers in Europe), have purchased 36,616 kgs of cacao of 14 different flavor profiles developed with 11 different cacao producers (9 of them farmer organizations) with support from MOCCA. The map is perceived by informants as a tool that can help farmers position their cacao in specialty markets, which can then help them obtain better prices. This is not an immediate outcome, but it can potentially open new opportunities in the near future. MOCCA has contributed to the expansion of this initiative to Peru, Ecuador, Nicaragua and Guatemala. The training of tasters that is being promoted by Bioversity as part of the initiative to introduce new quality standards is also perceived as a tool that will contribute to better quality management. The hope is that this will have a positive impact in market access, especially higher prices for higher quality cacao. According to informants in Ecuador, there is generally now more interest in cacao traceability as a result.

From the point of view of informants, progress in relation to systemic change in terms of improved market access has been relatively slower than for technical assistance. Still, all informants except one commented that they plan on continuing with the innovations implemented beyond MOCCA, including directly purchasing cacao from farmers and supporting improved quality initiatives. The newly established or strengthened relationships between farmers and anchor firms have indeed facilitated better market

access and prices in some cases, as well as access to other services such as technical assistance. Nonetheless, in all countries there is more to be done to effectively build more and better market access opportunities for small-scale farmers. The implications of MOCCA's focus on supporting quality improvements will possibly lead to more visible market access improvements in the medium term.

**Table 61. Systemic change at the level of businesses and institutions in market access**

| Details   | Ecuador   | El Salvador | Guatemala | Honduras | Nicaragua | Peru      |
|---|-----------|-------------|-----------|----------|-----------|-----------|
| % of informants replicating activities beyond MOCCA target group                                | 2/5: 40%  | 0/1: 0%     | 1/1: 100% | NA       | 1/5: 20%  | 1/3: 33%  |
| % of informants who have established new partnerships as a result of MOCCA                      | 1/5: 25%  | 1/1: 100%   | 0/1: 0%   | NA       | 1/5: 20%  | 1/3: 33%  |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 5/5: 100% | 1/1: 100%   | 1/1: 100% | NA       | 3/5: 60%  | 3/3: 100% |
| Level of systemic change (Systemic Change Pathway average) <sup>36</sup>                        | 2         | 1           | 3         | 1        | 1.8       | 3         |

<sup>36</sup> 1. *Incipient*. Commercial partners agree to implement approaches with MOCCA that improve benefits to farmers in their supply chain

2. *Initial*. Commercial partners making investments in expanding approaches benefiting farmers beyond MOCCA

3. *Intermediate*. Commercial partners beginning to apply approaches beyond MOCCA-supported activities

4. *Advanced*. Commercial partners making investments in expanding approaches benefiting farmers beyond MOCCA

5. *Mature*. MOCCA partners & non-partners adopting approaches to benefit farmers in their supply chains, independently of MOCCA

## 5.2.5 Results by Activity 3: Improved Research

### 5.2.5.1 Actors, initial results, potential for systemic change

MOCCA's research agenda in cacao is focused on germplasm conservation related to the two international cacao collections at CATIE and CRC, and on cadmium mitigation. The strategy works on multiple levels – strengthening the capacity of research institutions and researchers in key regional and national research entities to improve the quality of cacao research for the region; connecting national research institutions to regional and global research institutions and networks to improve the flow of information and research best practices; improving capacities, routines and mechanisms for research dissemination from researchers down to the level of farmers; and mobilizing financial resources for cacao research.

The work on germplasm conservation is targeted towards the two international collections that form part of the global cacao germplasm conservation network, CacaoNet, coordinated in the context of global genetic resources treaties. These collections are hosted by CATIE and CRC and constitute the major international genetic resources collections and distribution centers for cacao as well as important hubs for genetic improvement for cacao. MOCCA is directly investing resources in both collections to improve their management and ensure that critical genetic diversity for cacao is not lost, but to the contrary, is made more available for research and breeding within the cacao sector. This work to date has included maintenance, infrastructural improvements, genetic fingerprinting and georeferencing of the two collections; inventories and replacements of materials that have been lost over time, including movement of materials between the two collections via the quarantine center in Reading. Bioversity International, coordinator of CacaoNet, has also worked together with consultants to develop a sustainability strategy for the collections and to mobilize long-term private sector contributions to the conservation of cacao genetic resources. The conservation strategy was endorsed early on by WCF and to date eight private sector cacao companies have committed over 600k in resources for ongoing support of these collections.

The second focus area for this activity is research and dissemination on cadmium mitigation strategies. Cadmium is a potential barrier to entry for European markets given changes in allowable cadmium levels for chocolate in recent years. Because it is a relatively new issue, information is lacking around the size of the problem, its causes and strategies to manage cacao plantations for cadmium. Research on cadmium in cacao is also new, such that alignment on research methods and how to measure cadmium in different medium is also still underway in the sector. The focus then was on disseminating existing research on the issue and mitigation strategies, as well as sharing and aligning research protocols, particularly for south America where more was known about the problem. For Central America, the work focused on mapping cadmium for different countries and cacao production areas where MOCCA works to understand the problem in the Central American context. MOCCA partnered with others in each country to share the costs of collecting large numbers of samples (almost 500) which were sent to CRC for analysis, in order to generate robust evidence about the presence of cadmium in cacao. These cadmium maps were shared with relevant stakeholders in each country to generate a dialogue about next steps. Research results in cadmium were disseminated to over 300 individuals through a newsletter produced by CRC. Highly visual content on cadmium for farmers was also developed following adult education principles and incorporated into the Cacao Móvil suite. MOCCA has also engaged with other initiatives focused on cadmium in MOCCA countries including a FONTAGRO project in Ecuador, Colombia and Peru and ClimaLoCa, an EU funded project focused on cadmium research and mitigation in Peru and Ecuador.

Cacao research in the region in general is limited, and even more so for cacao research with specific relevance for small and medium sized cacao farms, and as a result dissemination of research results to small farmers is even more limited. In response, MOCCA has sought to engage a range of actors conducting or with capacity to engage in cacao research and dissemination, including national universities as well as public agricultural research institutions where possible. MOCCA has partnered not just on research and dissemination but also on building the capacities of research institutions for cacao research and engagement with farmers. MOCCA has just three research partners in Honduras and Nicaragua, and two in each of the remaining four countries. The project has also engaged important regional and global research partners to support both the research agenda and capacity building at the national level, as well as building networks and connections between cacao researchers in different countries through scientific events, forums, and research activities. Institutions from beyond the six MOCCA priority countries have engaged as participants in events and contributors and users of MOCCA generated research and information products, evidencing on the one hand the unmet demand for research exchange on these topics in the region and on the other hand, the relevance that MOCCA supported research and dissemination efforts have for countries beyond MOCCA. Regional research partners include CRC, CATIE, Bioversity and a FONTAGRO-funded project led by ESPOL.

**Table 62. Results at the level of businesses and institutions**

| Ecuador  | El Salvador   | Guatemala                        | Honduras                             | Nicaragua   | Peru   |
|--|---|----------------------------------|--------------------------------------|---|--|
| # MOCCA partners participating in Activity   |   |                                  |                                      |   |  |
| 2  | 2   | 2                                | 3                                    | 3   | 2  |
| # of technologies  |   |                                  |                                      |   |  |
| 2  | 0   | 1                                | 2                                    | 9   | 2  |
| Major changes made in their research services under MOCCA  |   |                                  |                                      |   |  |
| Growers have more access to research findings; findings on more themes are disseminated  | New cadmium research; development of new research protocols   | New cadmium research             | Inclusion of cadmium research topics | They began to engage in cacao research for the first time.  | More focus on cadmium, quality control, post-harvest practices and biological pest control   |
| Major achievements in research under MOCCA   |   |                                  |                                      |   |  |
| Better knowledge on cadmium; better ability to describe the profiles of different cacaos;  | Development of cadmium map country; agronomic plans to propagate cacao plants; obtained state funds to further research | Cadmium maps, sampling protocols | Cadmium maps                         | Better understanding of cadmium management; support for college students carrying out research on cacao production related themes | More information on biological pest control; germplasm bank; genetic material exchange; understanding of Trichoderma microorganism |
| Major challenges in research under MOCCA   |   |                                  |                                      |   |  |
| Most information still held by institutions; having resources for carrying out research; transfer more knowledge through in-person trainings; wider variety on research topics | No mechanisms to share findings with farmers; narrow projects, need to widen agenda                                     | Insufficient resources           | Insufficient resources               | In some areas with great potential for cacao farmers are hesitant to grow the crop  | Incorporating new methodologies  |

Informants from all MOCCA countries have found the cadmium research related work that MOCCA has collaborated with especially useful. The collaboration with the Cocoa Research Center on this theme has been key for the creation of cadmium maps in Central American countries that help farmers better understand where and how the issue affects them. Interviewees in both Honduras and El Salvador expressed that the national cadmium maps developed as part of the project have been very useful to make the reality of cadmium in these countries more visible and comprehensible. There is also a bimonthly research bulletin addressing cadmium related issues and findings that is shared with roughly 300 cacao researchers in the region. Given the generally underdeveloped situation of cacao research in the region, MOCCA's materials have received much attention and they are in great demand even in countries that are not part of the project. The Cacao Móvil app, cadmium bulletins, infographics, and adult learning methodologies have been shared in forums with actors from Mexico, the Dominican Republic, Colombia, Brazil and Mexico.

Another research related outcome frequently cited by informants has been the research around the cacao varieties that exist in different countries. Oftentimes farmers are not aware of the varieties they have; and this information is key both for R&R practices and for marketing purposes. Informants from Honduras commented that there is still much pending research to do in relation to better understanding the genetic material available in the country, but the work with MOCCA has been an important start. MOCCA has also collaborated with and funded the germplasm banks maintained by CATIE and the CRC. In El Salvador, collaboration with MOCCA has also facilitated the strengthening of a germplasm bank and a plant breeding program that is now supported by CENTA. In Ecuador there is the perception that the relationships built with research institutions will continue and will be more fluid moving forward, as the contacts have been established. Informants also commented that MOCCA farmers generally have better access to research results as part of their collaboration with MOCCA.

Progress towards systemic change is most evident in Peru, Nicaragua and Ecuador. Important new relationships with research centers, development organizations, government entities, and universities have been established as a result of MOCCA's work. These new ties are part of the reason that much of this work will likely continue after MOCCA.

**Table 63. Systemic change at the level of businesses and institutions in research**

| Details   | Ecuador   | El Salvador | Guatemala | Honduras | Nicaragua | Peru      |
|---|-----------|-------------|-----------|----------|-----------|-----------|
| % of informants replicating activities beyond MOCCA target group                                | 2/4: 50%  | 0/2: 0%     | n.d.      | n.d.     | 1/1: 100% | 1/1: 100% |
| % of informants who have established new partnerships as a result of MOCCA                      | 4/4: 100% | 1/2: 50%    | n.d.      | n.d.     | 1/1: 100% | 1/1: 100% |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 4/4: 100% | 1/2: 50%    | n.d.      | n.d.     | 1/1: 100% | 1/1: 100% |
| Level of systemic change (Systemic Change Pathway average) <sup>37</sup>                        | 2.5       | 2           | 1         | 1        | 3         | 3         |

#### 5.2.5.2 Farmers' access to products of research

Almost 40% of farmers reported receiving information about cacao research, representing directly a positive change from de baseline where this percentage was 22.7%. It is El Salvador (63.5%) and Nicaragua (62.7%) were we observed highest percentage and Peru the lowest (16.9%). Similar to the baseline, the main source of information about cacao research products was through non-governmental organizations NGOs (44.8%) or the government (23.2%). However, this varied significantly by country—while using the internet to obtain information about cacao was the most common source in Ecuador (34.4%), the government or an extensionist was the most common source in Peru (72,2%), and neighbor or relative was the most common source in Honduras (63.6%). Most farmers (92.6%) said they used the information to make farming decisions and the ones who were not able to use the information, said they did consider difficult to understand.

When farmers need technical advice on their cacao, they consult with an NGO technician (31.7%), followed by relatives (7.8%). Only a few producers do not consult anybody (9.5%). The baseline's

<sup>37</sup> 1 Incipient: Research partners agree on approaches to improve research and dissemination with MOCCA

2 Initial: Research partners adopting improvements in research (quality and scope) and dissemination of research results to farmers.

3 Intermediate: Research partners adopting improvements to research and dissemination beyond MOCCA supported activities

4 Advanced: Research partners making investments to expand research and dissemination independently of MOCCA

5 Matured: MOCCA Research partners and non-partners improving research and dissemination relevant to farmers, independently of MOCCA



respective percentages were 40.8%, 18%, and 11.6%. When contacting a technician for advice, farmers usually do it over a cell phone (45.6%) or wait for their visit (41.8%).

Practically all farmers have access to market and price information, and among them, 53% use different sources and 31.6 % NGO technicians. In El Salvador, this percentage is significantly high (75%) compared to Honduras, where nobody reported that source and 96.4 % mentioned others.

65.4% of farmers reported MOCCA trainings have been very useful, standing out Ecuador (70.1%) and El Salvador (78.9%). The lowest perception of utility is in Nicaragua (45.3%), although 50.7% of the farmer in this country considered the training useful (Table 64).

**Table 64. Cacao: Access to products of cacao research at midline**

| Details   | Ecuador | El Salvador | Guatemala | Honduras | Nicaragua | Peru  | All countries |
|---|---------|-------------|-----------|----------|-----------|-------|---------------|
| Farmers (%) who reported ever receiving information about cacao research products | 57.0    | 63.5        | 32.6      | 19.6     | 62.7      | 16.9  | 37.0          |
| Source of this information (%):   |         |             |           |          |           |       |               |
| Internet  | 34.4    | n.a.        | n.a.      | n.a.     | 8.5       | 5.6   | 13.3          |
| Neighbor or relative  | 16.4    | n.a.        | n.a.      | 63.6     | 17.0      | 11.1  | 14.3          |
| NGO   | 16.4    | 90.9        | 93.3      | 9.1      | 68.1      | 11.1  | 44.8          |
| Government or extensionist  | 26.2    | 9.1         | n.a.      | 9.1      | 6.4       | 72.2  | 23.2          |
| Other   | 6.6     | n.a.        | 6.7       | 18.2     | n.a.      | n.a.  | 4.4           |
| Farmers (%) reporting this information cost them                                  | 9.8     | 12.1        | 6.7       | 100.0    | 10.9      | 36.1  | 14.4          |
| Farmers (%) using this information to make farming decisions                      | 78.7    | 100.0       | 100.0     | 100.0    | 100.0     | 97.8  | 92.6          |
| Among farmers not using this information, reason for this (%):                    |         |             |           |          |           |       |               |
| Was not useful  | 7.1     | n.a.        | n.a.      | n.a.     | 100.0     | n.a.  | 6.3           |
| Difficult to understand   | 35.7    | n.a.        | n.a.      | n.a.     | n.a.      | 100.0 | 37.5          |
| Could not implement the recommendations   | 35.7    | n.a.        | n.a.      | n.a.     | n.a.      | n.a.  | 31.3          |
| None of the recommendations were needed in my farm                                | 21.4    | n.a.        | n.a.      | n.a.     | n.a.      | n.a.  | 25.0          |
| Other reason  | n.a.    | n.a.        | n.a.      | n.a.     | n.a.      | n.a.  | n.a.          |
| When in need of technical advice for cacao, farmers (%) contacting...:            |         |             |           |          |           |       |               |
| No one  | 12.2    | 1.9         | 8.7       | 3.6      | 16.0      | 9.4   | 9.5           |
| A relative  | 13.1    | 0           | 4.4       | 12.5     | 13.3      | 4.7   | 7.8           |
| A neighbor with a cacao farm  | 10.3    | 0           | 0.0       | 12.5     | 6.7       | 0.9   | 4.6           |
| NGO technician  | 2.8     | 75.0        | 41.3      | 0.0      | 40.0      | 39.0  | 31.7          |
| Government technician   | 8.4     | 0           | 0         | 0        | 2.7       | 14.1  | 7.5           |
| Promoter, facilitator, or organization technician                                 | 2.8     | 5.8         | 0         | 0        | 0         | 0     | 1.1           |
| Other   |         |             |           |          |           |       |               |
| For farmers contacting a technician, most common way to contact them (%):         |         |             |           |          |           |       |               |
| Visit to their office   | 10.0    | 2.5         | 52.6      | 0        | 6.5       | 11.3  | 12.6          |
| Call over cellular  | 60.0    | 70.0        | 31.6      | 0        | 58.1      | 34.0  | 45.6          |
| E-mail  | 0       | 0           | 0         | 0        | 0.0       | 0.0   | 0.0           |
| Wait for them to visit me   | 30.0    | 27.5        | 15.8      | 0        | 35.5      | 54.7  | 41.8          |
| Other   | 0       | 0           | 0         | 0        | 0         | 0     | 0             |

Table 64. Continued

| Details  | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| For farmers contacting no one to seek technical advice, % who...:                              |            |             |           |           |           |            |               |
| Never clarify their doubts   | 15.4       | 0           | 50.0      | 33.3      | 58.3      | 50.0       | 41.8          |
| Ask a relative/neighbor/friend for advice  | 15.4       | 100.0       | 50.0      | 0         | 16.7      | 9.1        | 12.7          |
| Go to agro-dealer  | 7.7        | 0           | 0         | 0         | 0.0       | 9.1        | 5.5           |
| Thru farmer organization   | 61.5       | 0           | 0         | 66.7      | 25.0      | 22.7       | 36.4          |
| Clarify doubts using other means   | 0.0        | 0           | 0         | 0         | 0         | 9.1        | 3.6           |
| Farmers (%) accessing market and price information, and among them, % reporting these sources: | 100.0      | 100.0       | 100.0     | 100.0     | 100.0     | 98.7       | 99.5          |
| Farmer organization I belong to  | 10.3       | 0           | 0         | 12.5      | 6.8       | 0.94       | 4.6           |
| NGO technician   | 2.8        | 75.0        | 41.3      | 0.0       | 40.5      | 38.7       | 31.6          |
| Government   | 8.4        | 0           | 0         | 0         | 2.7       | 14.2       | 7.5           |
| Relative or friend   | 2.8        | 5.8         | 0         | 0         | 0         | 0          | 1.1           |
| Other sources  | 66.4       | 36.5        | 60.9      | 96.4      | 29.7      | 45.3       | 53.0          |
| Farmers (%) reporting MOCCA trainings have been:   |            |             |           |           |           |            |               |
| Very useful  | 70.1       | 78.9        | 56.5      | 64.3      | 45.3      | 69.0       | 65.4          |
| Useful   | 24.3       | 17.3        | 43.5      | 35.7      | 50.7      | 29.1       | 31.9          |
| Little useful  | 5.6        | 3.9         | 0         | 0.0       | 4.0       | 1.4        | 2.6           |
| Not useful   | 0          | 0           | 0         | 0         | 0         | 0.5        | 0.2           |
| <b>Number of households</b>  | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

### 5.2.6 Results by Activity 4: Strengthening Suppliers of Planting Material

The major actions to date to support the development of suppliers of high-quality genetic material for cacao include an assessment of the capacity of clonal gardens and nurseries in each country, the development of a curriculum for cacao nursery operators, and training of cacao nurseries. The initial assessment was carried out to understand in greater detail the baseline situation of the genetic material system for cacao in each country including materials present, their conservation status, and the capacity of clonal gardens and nurseries to offer high quality traceable cacao genetic materials, as well as the state of the regulatory framework in support of cacao genetic material certification and traceability. This baseline was completed by March 2021 and the results were shared with country stakeholders as well as published in an open-source peer reviewed journal. Findings generally point to poor certification, verification and traceability mechanisms in all MOCCA countries. The vast majority of gene banks and nurseries do not carefully characterize the materials in their possession. The data collected on nurseries and clonal gardens has been integrated into a virtual platform to facilitate identification of nurseries for proximity to production areas and kinds of materials that are offered. The findings were used to prioritize efforts in each country to strengthen the genetic material system. These efforts have included

investments in infrastructure, inputs and technical assistance visits to key clonal gardens and nurseries, many managed by farmer organizations, to improve their capacity to produce a greater diversity of healthy cacao plants or budwood with known genetics. To date MOCCA has directly supported infrastructure and capacity of 58 nurseries, who in turn have produced just over one million plants benefitting over 7300 farmers, and 26 clonal gardens across all MOCCA countries. While managed under activity 3 (research), the work to strengthen the international cacao germplasm collections at CATIE and CRC in the context of CacaoNet, and the active exchange between them and with countries is a fundamental part of the health of a global genetic resources system that in turn support countries with capacity to conserve, disseminate and use their own materials as well as to access to international materials for the development of the sector. This work could benefit from stronger integration in the future with national gene banks and clonal gardens and genetic material actors to realize synergies.

The second major activity was development and delivery of a curriculum for nurseries titled *Viverista Estrella*. This curriculum was developed in late 2020 with options for in person or remote delivery. The curriculum incorporates content from experts across the region. By March 2022, 230 cacao nursery operators had been trained across MOCCA countries. This has included the incorporation of the curriculum for nurseries and clonal gardens into Cacao Móvil tools and messaging to support farmers at a distance. Some have been supported to register formally with the regulating authority, and others to create a catalogue of their genetic materials for marketing purposes. In this context, farmer organizations have been supported to produce and disseminate high quality cacao plants, particularly in Ecuador, in support of renovation of cacao plantations.

MOCCA has worked with a large number of partners in Ecuador, particularly around production and dissemination of plants. In the other MOCCA countries, the project has worked with one or two partners max, with a focus on production and dissemination of plants in the case of El Salvador and Peru, while the work in Honduras has focused on compliance with existing regulations for certified genetic material providers in cacao. In Nicaragua, partner NicaFrance, supported delivery of the training for nursery managers.

**Table 65. Results at the level of businesses and institutions**

| Ecuador   | El Salvador   | Guatemala | Honduras  | Nicaragua   | Peru   |
|---|---|-----------|---|---|--|
| <b># MOCCA partners participating in Activity</b>   |   |           |   |   |  |
| 9   | 1   | 0         | 4   | 8   | 3  |
| <b># nurseries reached <sup>38</sup></b>  |   |           |   |   |  |
| 29  | 6   | 18        | 33  | 70  | 64   |
| <b># seedlings/budwood acquired at improved nurseries/clonal gardens</b>  |   |           |   |   |  |
| 280,000   | 82,000  | 19,000    | 91,500  | 135,000   | 390,000  |
| <b>Major changes made in their genetic material services under MOCCA</b>  |   |           |   |   |  |
| Some actors working on this issue for the first time; better knowledge about varieties; more availability of high-quality plants; more farmers understand the importance of genetic profiles; | Development of new nursery with varieties to be shared with farmers                                   | NA        | Establishment of nurseries; information diffusion about the importance of quality genetic material; training for “ <i>Viveristas Estrella</i> ” | Support with the establishment and maintenance of clonal gardens; use of new genetic materials;   | Maintenance of a clonal garden, a nursery, and demonstrative plots for R&R training; focus on identifying types of trees |
| <b>Major achievements in genetic material under MOCCA</b>   |   |           |   |   |  |
| More quality standardization; better understanding of varieties best suited for different contexts; increased productivity; market access guaranteed; assurance that genetic quality is high  | Progress in the establishment of nursery; training of 16 farmers as part of <i>Viverista Estrella</i> | NA        | Friendly payment mechanisms   | Better understanding of clones and genetic characteristics; better materials available; distribution of plants for R&R; better management of nurseries; women trained in grafting techniques; | More focus on R&R; increase productivity and incomes; strengthening of research and propagation practices                |
| <b>Major challenges in genetic material under MOCCA</b>   |   |           |   |   |  |
| Continue guaranteeing high quality genetic material; renovate old and deficient farms; lack of certified nurseries  | Registering germplasm so that the 3 clones can be shared with farmers                                 | NA        | Raise productivity; raise more awareness on why to plant good quality genetic material  | Need more space for grafting; introduce new materials to the clonal garden; overcome farmer reticence to R&R  | Maintaining the genetic profiles of local trees without mixing with foreign materials; continuity of work                |

<sup>38</sup> From FAIS indicators through March 2022.

Informants in Honduras stated that the assessment of nurseries and clonal gardens in the country was very informative for better understanding the genetic material options that exist in the country. However, even if the high-quality genetic material is there, there is support lacking for farmers so that they can actually purchase or obtain better genetic material. In El Salvador a new nursery was established that is multiplying three different varieties from the germplasm bank to be shared with farmers. The varieties still need to be registered, but once that is done, they plan on sharing with growers. In Ecuador informants commented that there is now better availability of high-quality genetic material as a result of the establishment of nurseries and the infrastructure built as part of MOCCA.

In Peru there have been important advances in relation to the identification of fine flavor ecotypes and the maintenance of clonal gardens, nurseries, and demonstration plots for R&R. Cooperatives in particular were supported to rehabilitate clonal gardens, converting them from conservation sites into resources for the active multiplication and distribution of material to farmers, incorporating this as a new or expanded service to farmers. In some cases this work was linked with the work to improve understanding of flavor profiles such that multiplication and distribution of materials was guided by an understanding of market/flavor potential. Cooperatives in particular shared a new vision of the importance of their involvement in provision of genetic material to ensure future volumes and quality for expanded markets for differentiated cacao. To date however, these actions have been heavily supported by MOCCA and we did not find much evidence of autonomous action by partners yet.

Indicators of systemic change in relation to the improvement of genetic materials are variable across countries. Still, there is generally more interest in and knowledge of the genetic profile of the plants used in all countries. There is also now more attention to traceability, certification and verification procedures that may help guarantee genetic purity and quality.

**Table 66. Systemic change at the level of businesses and institutions in genetic material**

| Details   | Ecuador   | El Salvador | Guatemala | Honduras | Nicaragua | Peru      |
|---|-----------|-------------|-----------|----------|-----------|-----------|
| % of informants replicating activities beyond MOCCA target group                                | 4/5: 80%  | 0/1         | NA        | n.d.     | 0/6: 0%   | 1/1: 100% |
| % of informants who have established new partnerships as a result of MOCCA                      | 1/5: 20%  | 0/1         | NA        | n.d.     | 0/6: 0%   | 0/1: 0%   |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 5/5: 100% | 0/1         | NA        | n.d.     | 5/6: 83%  | 1/1: 100% |
| Level of systemic change (MDF pathway average) <sup>39</sup>                                    | 2.6       | 1           | 1         |          | 1.8       | 2         |

<sup>39</sup> 1. Incipient. Market system actors (seed lots, nursery operators, clonal gardens, government policymakers, NCIs, public or private sector auditors and certifiers) agree to collaborate with MOCCA to improve quality of planting material available to farmers.

## 5.2.7 Results by Activity 5: Facilitating Access to Finance

### 5.2.7.1 Actors, initial results, potential for systemic change

MOCCA's budget does not include money for co-financing loans. Instead, the attempt to improve financial services for small-scale farmers has focused on trying to establish alliances with organizations that may be willing to finance the roughly 48,000 farmers MOCCA is working with in the region. The work is therefore more about raising awareness and sharing information about the needs of this group of farmers to access credit. MOCCA staff have found that commercial banks, in general, are not interested in working with the type of farmers MOCCA targets. Commercial banks are, unsurprisingly, interested in lending to larger scale operations, not small-scale farmers. MOCCA's major allies for this activity include credit unions, finance companies, anchor firms, and state banks. Progress with state banks has been slow, but there is still the hope that working with them could open new financial opportunities for small-scale farmers commonly excluded from the banking system. Except for Ecuador, and just recently Peru, it has been extremely challenging to obtain financing for small cacao farmers. Existing credit options entail high interest rates, and/or high transaction costs (in the case of state banks) and there are no long term financial products. This has much to do with the fact that in most MOCCA countries the cacao sector is relatively small and financial products for cacao farmers were largely non-existent at project start. Yet to date, roughly USD \$2 million have been disbursed in loans to over 500 cacao farmers.

While MOCCA has formalized agreements to offer financial services for cacao farmers with 8 financial institutions, six in Ecuador and two in Peru where cacao sectors are larger, historically so. Of these eight, seven have improved the conditions for access to finance for cacao farmers, yet to date only two in Ecuador have actually provided any finance to farmers or farmer organizations. Several financial institutions have developed products for cacao farmers or added cacao to their portfolio but have not yet been able to place a loan. In Ecuador and Peru, state banks offer lower interest rates and so despite slow processing times, farmers are less interested in credit offered by financial institutions which cannot compete in terms of interest rates. Work is ongoing with these partners to assess potential demand, develop cacao specific financial products, and to connect and motivate farmers around accessing finance. Work is also ongoing with several other financial institutions that have been engaged successfully in coffee to expand the collaboration to cacao, including a few in Central America. For Central American countries, MOCCA has only been able to engage one or two partners in designing financial services for cacao and they have yet to formalize concrete offerings for the sector. It is interesting to note, in contrast to coffee, that there is only one cacao exporter engaged as a potential partner in access to finance. It would seem that providing finance to cacao farmers is less common practice than it is for coffee among buyers. Some cacao buyers pay cooperatives in advance of the harvest as a way to finance buying. Producer organizations and government banks are also important partners that MOCCA is engaging with

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2. Initial. Market system actors adopting approaches to improve quality of planting material available to farmers

3. Intermediate. Market system actors applying approaches to improve the quality of planting material beyond MOCCA supported activities

4. Advanced. Market system actors making long term investments in approaches that improve the quality of planting material available to farmers beyond MOCCA

5. Mature. MOCCA partner and non-partner market system actors adopting improved approaches to expand access to quality planting material independently of MOCCA

to promote access to finance in Ecuador and Peru. If successful, this work will benefit farmers far beyond MOCCA beneficiaries.

Access to finance activities started in MOCCA's second and third semesters of implementation (by March 2020) with the identification of 25 lenders with a potential lending portfolio of USD \$100million for farmers. By March 2021, agreements had been signed with 18 financial institutions and many included cacao as well as coffee in their expected lending targets. In that same semester, USD \$467,700 in finance was disbursed to 153 cacao farmers in Ecuador. In the following period, ending September 2021, the same financial institution in Ecuador doubled its lending amount to just over USD \$1 million to an additional 91 farmers. MOCCA has motivated and accompanied cacao anchor firms, especially in Guatemala, Peru and Ecuador, to widen the financial services they provide to MOCCA farmers. In some cases, these refer to financial services offered by firms themselves, while in other cases it entails linking farmers to other financial institutions. So far, MOCCA's allies have distributed USD \$1,891,630 to 507 cacao farmers. While increasing over the past few semesters, these numbers are notably lower than what has been achieved in the coffee sector in terms of funding amount and numbers of farmers that have benefited from new financial services as part of MOCCA, likely a reflection of the initial differences between the two sectors in this regard.



*Table 67. Results at the level of businesses and institutions*

| Ecuador  | El Salvador | Guatemala | Honduras | Nicaragua | Peru  |
|--|-------------|-----------|----------|-----------|---|
| <b># MOCCA partners participating in Activity</b>  |             |           |          |           |   |
| 8  | 0           | 0         | 0        | 0         | 5   |
| <b># farmers reached<br/>USD loaned</b>  |             |           |          |           |   |
| 245<br>USD1,084,300  | 0           | 0         | 0        | 0         | 0   |
| <b>Major changes made in their financial services under MOCCA</b>  |             |           |          |           |   |
| Despite efforts to improve financial services for farmers, not much has been achieved  | n.d.        | n.d.      | n.d.     | n.d.      | New funds available for cocoa farmers and cooperatives  |
| <b>Major achievements in financial services under MOCCA</b>  |             |           |          |           |   |
| Better understanding on what is needed for creating credit and saving accounts; beginning to build relationships between farmers and financial institutions  | n.d.        | n.d.      | n.d.     | n.d.      | Better understanding on what is needed for creating credit and saving accounts; beginning to build relationships between farmers and financial institutions               |
| <b>Major challenges in financial services under MOCCA</b>  |             |           |          |           |   |
| Design public policies that help farmers; create more opportunities for creating bank accounts and accessing loans; reaching farmers in remote places; farmers are often perceived as bad candidates for credit; high interest rates translate into low farmer interest in financing | n.d.        | n.d.      | n.d.     | n.d.      | Difficult to obtain credit due to low credit scores related to land tenure issues; farmers not interested in applying for financing given the slow attention they receive |

Challenges remain in relation to facilitating access to bank accounts for cacao farmers. From the point of view of MOCCA staff, the attempt to open up new financing opportunities for cacao farmers has been generally less successful than for coffee farmers. On one level it is a demand problem, as cacao farmers are generally less interested in seeking financial services. Ecuador and Peru offer more options than do Central American countries, where the cacao sector is comparatively younger and undeveloped. In

Ecuador, anchor firms usually offer payments in advance, and farmers generally rely on those arrangements as opposed to approaching banks. Similarly, an anchor firm in Peru reported that farmers now have better access to financial services offered by the anchor firm itself as a result of the collaboration with MOCCA. Moreover, the state run Fondo Agroperu has committed to lending US \$1 million to cocoa farmers and cooperatives to implement R&R. Like in other countries, however, cacao farmers in Peru face enormous challenges in their attempt to obtain credit and open bank accounts. Issues around land tenure are an important obstacle in this regard.

Despite the challenges, an important MOCCA achievement is that AgroPeru/Midagri has now included funds for financing R&R in the cocoa sector as part of its financial products portfolio for the first time in its history. In 2022, MOCCA, TNS and LWR made consultations with cocoa cooperatives to gauge their interest in these funds. They found that 8 farmer organizations that are part of Appcacao are interested in requesting credit, which could potentially reach 2,200 farmers. MOCCA will continue to support these organizations with a financial advisor (*promotor financiero*) so that they can be supported throughout the process.

In Central America there are practically no attractive financial services for cacao farmers. Informants in Guatemala repeatedly stated that from the point of view of farmers credit opportunities are inadequate and insufficient. In El Salvador no interviewees reported offering financial services for cacao farmers. This is in part related to the low levels of income small farmers receive from cacao. It may be that new opportunities emerge for farmers in Honduras in 2022, as the National Agricultural Development Bank announced in May 2022 that coffee and cacao farmers will be credit candidates with the incoming administration. MOCCA has made comparatively more progress in relation to financial services in Ecuador and Peru. MOCCA's work in Ecuador has focused on strengthening BanEcuador and helping it become more efficient in its administrative processes including introducing digital and automated procedures to accelerate approval of credit. Generally speaking, public banks have friendlier interest rates, but they need to drastically improve the efficiency of their administrative procedures. In Ecuador a couple informants commented that they are in the process of creating funds for green credits with the support of the IADB, a model that may be better aligned with the needs of cacao farmers in the near future.

As is evident in the table below, it has been challenging to engage partner financial institutions to develop products for the cacao sector in most countries, particularly where cacao is a much smaller and newer sector to financial institutions (as compared to coffee). This is evidenced by the fact that progress has happened in Ecuador and Peru where the cacao sectors are much larger and more established. Eight partners have been engaged in Peru and Ecuador. All but one has made improvements in the terms of their financial services or in the procedures for access, yet to date just two financial institutions have actually provided funds to farmers. In Central America, conversations are ongoing with several financial institutions that may result in changes in the second half of MOCA, building on the successes of the engagement in coffee. We anticipate that the results of the efforts to improve financial services and procedures will result in increased finance flows to small farmers, but this will also depend on farmer needs and preferences for accessing financial services.

**Table 68. Progress with financial institutions in access to finance in cacao**

|   | Ecuador | El Salvador | Guatemala | Honduras | Nicaragua | Peru |
|---|---------|-------------|-----------|----------|-----------|------|
| Partners  | 6       | 0           | 0         | 0        | 0         | 2    |
| # that have modified financial services to better serve farmers | 5       |             |           |          |           | 2    |
| # that have provided finance to farmers                         | 2       |             |           |          |           | 0    |

Progress on systemic change with regard to improving access to financial services has been limited. While MOCCA has established collaboration with financial institutions in Ecuador and Peru which have improved the offer of credit for the cacao sector, there are still challenges from the demand side in organizing and motivating farmers to access credit. Structural barriers include lack of credit histories among cacao farmers and low presence of financial institutions in cacao producing areas. The challenges are immense. Changing perceptions of both financial institutions and farmers with regards to credit is a slow process. Still, a few success stories exist. Perhaps the most relevant improvements have occurred in anchor firms offering financial support arrangements to the farmers they buy from, and in the Peruvian case, through the collaboration with government institutions.

**Table 69. Systemic change at the level of businesses and institutions in financial services**

| Details   | Ecuador   | El Salvador | Guatemala | Honduras | Nicaragua | Peru |
|---|-----------|-------------|-----------|----------|-----------|------|
| % of informants replicating activities beyond MOCCA target group                                | 0/3: 0%   | NA.         | NA.       | NA.      | NA.       | n.d. |
| % of informants who have established new partnerships as a result of MOCCA                      | 2/3: 67%  | NA.         | NA.       | NA.      | NA.       | n.d. |
| % of informants who claim it is likely that they will continue with these activities post MOCCA | 3/3: 100% | NA.         | NA.       | NA.      | NA.       | n.d. |
| Level of systemic change (Systemic Change Pathway average) <sup>40</sup>                        | 1         | 1           | 1         | 1        | 1         | 1    |

<sup>40</sup> 1. Incipient. Market system actors agree to implement approaches to facilitate farmer access to finance (A2F) with MOCCA

2. Initial. Market system actors partnering with MOCCA implement approaches that facilitate greater access to finance for farmers (amounts, reach, terms, cost, and scale).

3. Intermediate. MOCCA access to finance partners adopt improvements affecting farmer access beyond MOCCA supported activities

#### 5.2.7.2 Farmers' access to financing

During the 2020-2021 agricultural year, only 13.5% of farmers requested a loan, representing a slight decrease from the baseline (18.2%). El Salvador has the lowest percentage (1.9%) of farmers requesting credit. Those who requested a loan had a very low (less than 2%) rejection rate. The midline findings pointed out that producers requesting a loan stated the formal system as banks (4.6%), rural banks (1.6%), micro-financing (1.8%) as the most common sources of credit, consistent with baseline results. No farmer requested loans from the informal sector. (Table 70).

**Table 70. Cacao: Access to and source of financing**

| Financing details                                     | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Farmers (%):  |            |             |           |           |           |            |               |
| Not requesting a loan                                 | 89.7       | 98.1        | 91.3      | 92.9      | 90.7      | 77.9       | 86.5          |
| Requesting a loan but was denied                      | 0.9        | 0           | 0         | 0         | 1.3       | 0          | 0.4           |
| Requesting a loan and was granted                     | 9.3        | 1.9         | 8.7       | 7.1       | 8.0       | 21.6       | 12.9          |
| For farmers obtaining a loan, source of the loan (%): |            |             |           |           |           |            |               |
| Bank  | 4.7        | 0.0         | 2.2       | 1.8       | 1.3       | 8.0        | 4.6           |
| Rural bank  | 0          | 0           | 0         | 0         | 0         | 4.2        | 1.6           |
| Micro-financing                                       | 0          | 0           | 2.2       | 0         | 4.0       | 2.8        | 1.8           |
| Cooperative   | 4.7        | 1.9         | 4.3       | 3.6       | 0.0       | 3.3        | 3.1           |
| MOCCA anchor firm                                     | 0          | 0           | 0         | 0         | 2.7       | 2.8        | 1.5           |
| Informal source ("prestamista")                       | 0          | 0           | 0         | 0         | 0         | 0          | 0             |
| Any other source                                      | 0          | 0           | 0         | 1.8       | 0         | 0.5        | 0.4           |
| <b>Number of households</b>                           | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

#### 5.2.8 Results by Activity 6: Supporting Trade Association Service Provision

Given that there are no consolidated National Commodity Institutes in the cacao sector in MOCCA countries, the project took a relatively flexible definition including national-level farmer organizations, national level working groups, exporter associations, and public institutions. Under this activity MOCCA has also implemented organizational strengthening activities with partners where considered important. For example, MOCCA carried out a gap analysis with six research institutions across the region to guide investments in building their institutional capacity to coordinate cacao research and dissemination (also

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4. Advanced. MOCCA access to finance partners make investments in long term application of improvements that support greater access to short-, medium-, and long-term financing for farmers beyond MOCCA

5. Matured. MOCCA partners and non-partners adopt approaches to facilitate access to finance for farmers, independently of MOCCA.

mentioned in activity 3). Thus, MOCCA has worked with research centers, multistakeholder working groups, associations, public institutions and national farmer associations and federations.

Work to strengthen national level platforms in the cacao sector began in MOCCA's fourth semester of implementation (by September 2020) with the signing of collaboration agreements with FENAPROCACAO in Honduras and APPCACAO in Peru. In both cases MOCCA will support them to strengthen capacity to deliver scalable training for farmers at a national scale. During that same semester, organizational gap analyses were carried out with APPCACAO and ANECACAO in Peru. By the following semester gap analyses had been completed in Ecuador, Peru, Honduras and Guatemala and were used to develop organizational strengthening plans to strengthen their capacities to provide services that support R&R, related largely with MOCCA activities 1 through 5. In Honduras, El Salvador, Guatemala and Peru MOCCA has collaborated with public sector entities to strengthen sector coordination by participating in and supporting national cacao coordination groups that bring together actors from across the sector. MOCCA also supported gap analyses and strengthening plans with six national research organizations in every country except Nicaragua. This assessment served to inform activities aimed at strengthening their capacity for research and dissemination in cacao.

In El Salvador CENTA has taken the lead in relation to the cacao sector. A "Mesa Nacional de Cacao" was created, the closest thing there is to an NCI, but it is an incipient initiative with insufficient support from the government. In Ecuador, ANECACAO has been strengthened. Their technical assistance work has much improved as a part of MOCCA, which is seen as a direct benefit by private companies. According to informants in Ecuador that there is a need for the creation of a cacao institute dedicated to supporting the sector. In Peru MOCCA collaborated with a consultancy seeking to identify the organizational strengthening needs of APPCACAO, a national cacao farmers association. The hope is that this initial assessment will help APPCACAO improve its logistical, administrative and organizational capacities. Moreover, MOCCA collaborated with MIDAGRI on the elaboration of a National Cocoa Plan to support the strengthening and growth of the cacao sector and has participated in and supported the multistakeholder working group coordinated by the Ministry of Agriculture, grouping both private and public actors. In Both Ecuador and Peru it has been difficult to support sector coordination led by public institutions because there's been significant turnover in personnel and important institutional changes that have accompanied broader political changes. MOCCA doesn't have an office in Ecuador and the work has been channeled through their ally Rikolto. It hasn't been possible to collaborate in Nicaragua in this regard given the political environment.

MOCCA's approach has centered on strengthening the organizational capacity of key sector actors, and in particular strengthening their capacity to provide or play a facilitative role in the provision of technical assistance, market access, research, genetic material and finance for small cacao farmers. Thus, the engagements with NCIs in the cacao sector go beyond actions under this activity to include engagement under activities 1-5. Below you can see the diversity of roles in which MOCCA has engaged or is strengthening capacity of NCIs across the six countries. It is interesting to note that in the cases of Peru and Ecuador, the more developed cacao economies, existing national platforms are able to engage in provision of facilitation of technical assistance, market access, genetic material provision, financial services as well as coordination within the sector at the national level. Neither are engaged in research. It is also interesting to note that in the case of Peru, it is a producer organization who plays this role, while in Ecuador it is an exporter association. In the case of El Salvador, an emergent cacao sector with strong support from donors and government, it is the national research institute that is playing a coordinating

role in the sector, and also engaging in technical assistance, research, and genetic material provision. In Honduras the coordination function is carried out by the ministry of agriculture that coordinates a multi-stakeholder platform of actors and a national cacao producer federation plays a key role in coordinating among farmer organizations as well as directly supporting technical assistance and market access. In Nicaragua and Guatemala, the coordination function is less clear and other functions even less so on the part of any sectoral entity or working group. Nicaragua attempted to do this with NicaFrance, but the institution has insufficient coverage in cocoa producing areas. In Guatemala the Ministry of Agriculture together with IICA coordinate cacao multi-stakeholder working groups and MOCCA has contributed to this space to strengthen coordination function and coordinate efforts. For none of the countries do NCIs play a representational role in regional cacao platforms in any formal way, in part because regional platforms in cacao are also emergent.

**Table 71. NCI functions supported by MOCCA in each country**

|                         | <b>Ecuador</b> | <b>El Salvador</b>     | <b>Guatemala</b>                  | <b>Honduras</b>                                 | <b>Nicaragua</b> | <b>Peru</b>               |
|-------------------------|----------------|------------------------|-----------------------------------|---|------------------|---------------------------|
| NCIs                    | ANECACAO       | CENTA<br>Mesa Nacional | MAGA/<br>CONADEA<br>Mesa Nacional | Comité Nacional<br>de la Cadena<br>FENAPROCACHO | N/A              | APPCACAO<br>Mesa Nacional |
| Technical Assistance    | X              | X                      |                                   | X   |                  | X                         |
| Inclusive Market Access | X              |                        |                                   | X   |                  | X                         |
| Research                |                | X                      |                                   |   |                  |                           |
| Genetic Material        | X              | X                      |                                   |   |                  | X                         |
| Financial Services      | X              |                        |                                   |   |                  | X                         |
| National Platforms      | X              | X                      | X                                 | X   |                  | X                         |

**Table 72. Results at the level of businesses and institutions**

| Ecuador   | El Salvador   | Guatemala | Honduras   | Nicaragua | Peru   |
|---|---|-----------|--|-----------|--|
| Major achievements of work with NCIs cited by MOCCA partners  |   |           |  |           |  |
| Agreement with the Agriculture Ministry to support MOCCA's agenda; gap analysis aiding organizational strengthening plan; support with establishment of a flavor lab at INIAP | Creation of Mesa Nacional de Cacao; strengthening of TA | n.d.      | Strengthening of TA; collaboration with universities, gap analysis | NA        | Consultancy for organizational strengthening of APPCACAO; contribution to the elaboration of a National Cacao Plan |
| Major challenges of work with NCIs cited by MOCCA partners  |   |           |  |           |  |
| Need to create an NCI; Various actors have tried to strengthen ANECACAO, but it hasn't been sustainable; dependence on foreign aid  | Insufficient government support                         | n.d.      | Dependency on international aid                                    | NA        | n.d.   |

### 5.2.9 Results by Activity 7: Bolster Platforms

In the cacao sector, there is not a single recognized regional cacao platform in Latin America, like PROMECAFE for coffee. There are, however, a number of initiatives that function as regional platforms, bringing multiple countries in the region together around different issues, including MOCCA itself. In South America, a FONTAGRO-funded research project led by Ecuador with participation of Peru and Colombia serves to facilitate collaboration in research related to cadmium between those three countries. In Peru there's been some relevant work linking government institutions to the Asociación Latinoamericana de Organizaciones de Pequeños Productores de Cacao – ALCACAO, which brings together cacao farmer organizations across four countries, three MOCCA countries. In Central America, SICACAO has emerged as a multi-stakeholder platform for coordination within the cacao sector among SICA member countries (Central America and the DR) around climate smart agriculture and other topics.

MOCCA's work to strengthen regional cacao platforms began in the third semester of implementation, by March 2020, with their engagement with the FONTAGRO-funded project on cadmium research led by ESPOL, together with Peru and Colombia. This project aims to strengthen collaboration between research institutions in the three countries including standardizing research methodologies for analyzing cadmium including sample analysis to improve comparability of results and support best practices in cadmium

research in the region. In the following semesters, MOCCA supported several events that bring together actors from across the region, including a Cacao and Chocolate Summit (online), the Salon de Cacao y Chocolate event in Peru which brings together an increasingly regional audience (online), virtual forums in cacao on a range of topics grouping MOCCA allies in various countries, and carried out an analysis of the impact of COVID on the sector. Cacao scientific and technical events and forums organized by MOCCA, along with other actors, have brought together up to 300 individuals across the region, constituting in itself a regional platform for technical and scientific exchange. In the sixth semester, by September 2021, MOCCA supported regional research institutions to engage across multiple countries in R&R research in cacao. MOCCA partner LWR has been supporting the strengthening of ALCACAO. ALCACAO seeks to make Latin American cacao more visible in global markets, emphasizing its distinct quality and diversity and the fact that it's generally sustainably produced. In Guatemala, for example, a producer organization that is a MOCCA partner has participated in activities organized by ALCACAO. As a result of this collaboration, they will now participate in a Latin American cacao flavor contest, which may strengthen their market access opportunities.

Generally speaking, most informants did not readily identify these regional platforms as such or had little knowledge about their reach and relevance. In El Salvador, for example, there is awareness of SICACAO's existence but there is no evidence of recent activities in collaboration with them yet. In Guatemala informants identified as positive the closer relationship between producer organizations and ALCACAO while in Peru informants were excited to be organizing the first Latin American Cacao de Oro competition with ALCACAO. In Honduras informants cited increased access to information as a benefit of SICACAO, but also highlighted as a challenge the fact that regional platforms often compete with other organizations for attention and visibility. MOCCA can continue to make important contributions in raising awareness of these regional platforms and bringing together buyers, researchers and farmers around these initiatives so that they can be more dynamic and cohesive.



## 5.2.10 Adoption of farm level practices

### 5.2.10.1 Cacao shade management

Similar to the baseline, midline figures show an important percentage of plots without shade or with little shade for the average of all countries; plots without trees and plots with less than 5% shade taken together represent 35.9%, while plots above 40% shade were 15%, which is slightly greater than baseline average (10.6%). Around 30% of the plots have 5%-24% shade.

At the country level, cacao plantations in Peru and Ecuador reported lower shade cover than Central American countries, especially in Salvador, Guatemala, and Honduras, with between 65 and 75% of farmers reporting >25% shade cover in cacao plantations (sum of 25-39% and >40%). Farmers planted new shade trees were around 19.1% of all cacao plots, with the highest being Peru having 28.4 % of plots with shade trees planted in the past two years, followed by Ecuador (11.8%). Farmers in El Salvador, Guatemala, and Honduras reported pruning the trees more than 50% of cacao plots during 2021-2022, while farmers in Ecuador had pruned only a very low proportion of plots (27.1%). In general, compared to the baseline, there is a tendency for a rate increment in these practices. Additional information reported was the percentage of households that pruned shade crops after harvest; on average, 65.9% implemented the practice. The highest portion is in Peru (88.8%) and the lowest in El Salvador (21.6%), possibly explained because the trees are younger. Another complementary indicator was the percentage of farmers considering the farm location and/or temperature when pruning shade crops; 43.9% are considering those variables, especially in El Salvador (71.2%) compared to Guatemala (8.7%) (Table 73).

**Table 73. Shade management in cacao plots**

| Shade management in cacao plots                      | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Cacao plots (%) with:                                |            |             |           |           |           |            |               |
| No shade   | 11.8       | 1.9         | 0.0       | 8.6       | 4.9       | 24.4       | 13.3          |
| <5% shade  | 22.9       | 5.6         | 5.9       | 1.2       | 13.6      | 40.2       | 22.6          |
| 5%-24% shade   | 34.7       | 18.5        | 27.9      | 14.8      | 46.9      | 29.5       | 29.9          |
| 25%-39% shade  | 24.3       | 48.2        | 36.8      | 22.2      | 19.8      | 3.9        | 19.1          |
| 40% or more shade                                    | 6.3        | 25.9        | 29.4      | 53.1      | 14.8      | 2.0        | 15.1          |
| Cacao plots (%) where:                               |            |             |           |           |           |            |               |
| New shade trees were planted within the last 2 years | 11.8       | 7.4         | 5.9       | 16.1      | 24.7      | 28.4       | 19.1          |
| Shade trees were pruned in the 2021-2022 ag. year    | 27.1       | 66.7        | 52.9      | 50.6      | 38.3      | 39.4       | 41.5          |
| <b>Number of cacao plots</b>                         | <b>144</b> | <b>54</b>   | <b>68</b> | <b>81</b> | <b>81</b> | <b>254</b> | <b>682</b>    |

### 5.2.10.2 Cacao varieties grown and management

Like the baseline, 80.3% of farmers surveyed grow only 1 variety of cacao, 12% two varieties, and 4.2 % more than three. At the country level, 17.9 % of Honduras producers have two varieties, and the same percentage in this country has more than three varieties. Table 74 describes the name of the most planted varieties per country: Nacional in Ecuador is the variety with the highest percentage, 67.5%, followed by CCN 51 (26.8%). Criollo is the most used variety in El Salvador (77.8%) and Peru (52.6). The ‘Híbridos’ are in Guatemala (53.3%) and Honduras (34.9%), the most planted materials, and ‘Forastero’ is in Nicaragua (38.6%), followed by ‘Híbridos’ (22%). The main varieties changed considering the results of the baseline, except for Ecuador, where ‘Nacional’ continues to be the most planted variety.

**Table 74. Cacao: Varieties most commonly grown at midline**

| Details of cacao varieties                                      | Ecuador             | El Salvador        | Guatemala          | Honduras               | Nicaragua            | Peru               | All countries       |
|---|---------------------|--------------------|--------------------|------------------------|----------------------|--------------------|---------------------|
| Farmers (%) growing:  |                     |                    |                    |                        |                      |                    |                     |
| Only 1 variety  | 81.3                | 82.7               | 93.5               | 62.5                   | 88.0                 | 78.4               | 80.3                |
| 2 varieties   | 14.0                | 13.5               | 6.5                | 17.9                   | 6.7                  | 12.2               | 12.0                |
| 3 varieties   | 2.8                 | 0.0                | 0.0                | 1.8                    | 4.0                  | 5.6                | 3.5                 |
| More than 3 varieties   | 1.9                 | 3.9                | 0.0                | 17.9                   | 1.3                  | 3.8                | 4.2                 |
| Name (and % cacao area) of the most commonly planted varieties: |                     |                    |                    |                        |                      |                    |                     |
| Variety 1   | Nacional<br>(67.45) | Criollo<br>(77.75) | Hibrido<br>(53.26) | Hibrido<br>(34.89)     | Forastero<br>(38.55) | Criollo<br>(52.55) | Nacional<br>(67.45) |
| Variety 2   | CCN-51<br>(26.81)   | ICS-95<br>(20.03)  | UF-676<br>(43.05)  | Trinitarios<br>(31.15) | Hibrido<br>(21.97)   | CCN-51<br>(40.40)  | Hibrido<br>(34.19)  |
| Variety 3   | Criollo<br>(1.88)   | TSH-565<br>(0.90)  | Criollo<br>(2.17)  | Forastero<br>(10.58)   | Criollo<br>(20.37)   | VRAE99<br>(3.08)   | Criollo<br>(31.20)  |
| Other varieties   | 3.8                 | 1.3                | 1.5                | 22.9                   | 19.1                 | 4.0                |                     |
| <b>Number of households</b>                                     | <b>107</b>          | <b>52</b>          | <b>46</b>          | <b>56</b>              | <b>75</b>            | <b>213</b>         | <b>549</b>          |

As the Table 75 describes, the number of trees planted ranged from 978 in Guatemala to 2,767 in Ecuador. The planting rate in the evaluated countries was higher in Guatemala (1,517 trees/ha) and lowest in Honduras (769 trees/ha). The highest percentage of productive trees is 91.8% in Ecuador and the lowest is in Honduras (64.5%) and El Salvador (64.9%). The average minimum age of the trees is 10.4 years for all countries combined; and this age was highest in Ecuador (15.1 years) and lowest in El Salvador 5.8 years. In contrast, the average maximum age of the cacao trees ranged from 28.2 years to 6.6 years in the same countries.

**Table 75. Cacao: Characteristics of the cacao crop at midline**

| Details of cacao varieties              | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| # of trees planted                      | 2,767      | 701         | 978       | 1,259     | 1,368     | 2,410      | 1,938         |
| # of trees planted/ha                   | 816        | 907         | 1,517     | 769       | 877       | 1,120      | 1,004         |
| % of productive trees                   | 91.8       | 64.9        | 88.0      | 64.5      | 73.9      | 81.7       | 82.3          |
| Average minimum age (yr) of cacao trees | 15.1       | 5.8         | 9.8       | 14.7      | 9.5       | 8.4        | 10.4          |
| Average maximum age (yr) of cacao trees | 28.2       | 6.6         | 15.7      | 22.1      | 12.9      | 11.9       | 16.2          |
| <b>Number of households</b>             | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

#### 5.2.10.3 Cacao renovation & rehabilitation, and evaluation of plants in main cacao plot

We evaluated the state of cacao trees in the farmer's main plot. The results showed an average plot size of 2.3 ha in the baseline was 1.9 ha. Currently, El Salvador has the biggest area, with an average of 2.8 ha and 729 trees per plot, previously was Ecuador (2.8 ha). Guatemala has a smaller area, with an average plot size of 0.9 ha and 703 trees per plot. Ecuador has the highest quantity of trees on its main plot (2030). Cacao production is relatively new in El Salvador, which explains why this country has a low percentage of productive trees (59.6%) in El Salvador compared to the average across countries of 80.6%, but an important increase compared to the baseline (30.4%). A quarter of trees (30%) require pruning, mainly in Nicaragua (39.4%) and Honduras (43.1%). The percentage of trees that need renovation is lower (11.2%), and the percentage of trees that need to be removed is even lower (2.3%), the same as the percentage (< 5%) of trees recently grafted and Trees recently renovated. These percentages are quite similar to the baseline results (Table 76).

**Table 76. Cacao: Technician's evaluation of the main cacao plot, at midline**

| Evaluation details                     | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Area (ha) of the main cacao plot       | 2.3        | 2.8         | 0.9       | 1.5       | 2.5       | 2.5        | 2.3           |
| # cacao trees (median) in this plot    | 1,000      | 463         | 444       | 850       | 800       | 1,500      | 1,000         |
| # cacao trees (mean) in this plot      | 2,030      | 729         | 703       | 1,020     | 1,099     | 2,120      | 1,599         |
| Percent of:                            |            |             |           |           |           |            |               |
| Productive trees                       | 81.5       | 59.6        | 90.3      | 75.7      | 72.8      | 87.2       | 80.6          |
| Trees in need of pruning               | 29.7       | 33.7        | 33.9      | 43.1      | 39.4      | 23.1       | 30.6          |
| Trees in need of renovation (grafting) | 7.5        | 9.4         | 17.3      | 13.4      | 22.6      | 7.5        | 11.2          |
| Trees that need to be removed          | 2.2        | 0.9         | 4.0       | 1.5       | 4.0       | 1.9        | 2.3           |
| Trees recently grafted                 | 1.3        | 1.8         | 3.0       | 0.1       | 3.3       | 4.3        | 2.8           |
| Trees recently renovated               | 4.2        | 1.1         | 2.8       | 0.0       | 2.2       | 0.7        | 1.7           |
| Physical failures (missing trees)      | 11.5       | 20.2        | 3.2       | 12.4      | 10.6      | 3.8        | 8.6           |
| <b>Number of households</b>            | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

During the 2021/2022 agricultural year, we found on average that 18% of farmers renovated cacao trees renovated cacao anytime since the baseline, and Peru (32.4%) and Nicaragua (17.3%) have the highest rates and El Salvador the lowest (1.9%). Almost 84% of these producers consider their knowledge level of renovation is medium to high, except for Ecuador (only 40%). However, the percentage of farmers who use the diagnostic to decide whether to renovate is really low, 11.1% of the 18% of farmers who renovated.

During the 2021-22 agricultural year, we found, on average, that just 16.9 % of farmers renovated cacao trees during the year like the baseline. Honduras and Ecuador have the highest rates (23.2% and 19.6%), and El Salvador has the lowest (5.8%). A change is that a significant percentage of farmers renovate cacao trees based on an assessment of the plantation (from 4.38% in the baseline to 84.7%). 10.8% of farmers renovating cacao buying plants from a certified nursery and 58.1% from their own farm. The main reason farmers think cacao renovation is important is yield increase (50.7%). On average, 338 trees need to be renovated, mainly in Ecuador (679); an expected result is due to the age of the trees in this country. Around 70% of the farmers considered important the renovation practices. This percentage is lower in Honduras (53.9%) than in other countries, which is higher than 65% (Table 77).

**Table 77. Cacao: Adoption of renovation practices at midline**

| Renovation practices  | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Farmers (%) who renovated cacao anytime since the baseline                                    | 9.4        | 1.9         | 8.7       | 3.6       | 17.3      | 32.4       | 18.0          |
| Of these farmers, % considering their knowledge level of renovation is medium to high         | 40.0       | 0           | 100.0     | 100.0     | 61.5      | 94.2       | 83.8          |
| Of these farmers, % who usually use a farm diagnosis to decide whether to renovate            | 10.0       | 0           | 0         | 0         | 0         | 14.5       | 11.1          |
| Farmers (%) who renovated (replanted/compacted) cacao plants in the 2021-2022 ag. year        | 19.6       | 5.8         | 10.9      | 23.2      | 18.7      | 17.4       | 16.9          |
| Of farmers renovating cacao in 2021-2022 ag. year:  |            |             |           |           |           |            |               |
| % renovating based on production diagnostic tool  | 82.3       | 76.9        | 0.0       | 36.8      | 87.2      | 94.7       | 84.7          |
| % buying plants from a certified nursery  | 14.3       | 0.0         | 0.0       | 23.1      | 21.4      | 2.7        | 10.8          |
| % obtaining plants from their own farm  | 61.9       | 100.0       | 80.0      | 23.1      | 57.1      | 62.2       | 58.1          |
| Of farmers selecting plants from own farm, % selecting plants with 4-6 pairs of mature leaves | 7.7        | 0           | 0         | 0         | 0         | 0          | 1.9           |
| % renovating cacao because of low yields  | 22.7       | 0           | 66.7      | 7.1       | 52.6      | 67.6       | 50.7          |
| Cacao trees renovated either by seed or grafting  | 93.6       | 17.0        | 29.4      | 166.1     | 398.9     | 158.9      | 169.2         |
| % grafting mature cacao trees   | 4.8        | 0           | 20.0      | 7.7       | 28.6      | 35.1       | 21.5          |
| % of renovated trees renovated by grafting mature trees and/or bud                            | 50.0       | n.a.        | n.a.      | 100.0     | 100.0     | 47.4       | 58.2          |
| Cacao trees in the farm that need to be renovated   | 678.7      | 153.3       | 160.9     | 224.9     | 468.3     | 268.0      | 338.1         |
| % of cacao trees that need to be renovated  | 9.7        | 9.1         | 11.0      | 12.8      | 15.9      | 5.4        | 9.2           |
| Farmers (%) who consider it is important to renovate cacao                                    | 70.1       | 65.4        | 73.9      | 53.6      | 88.0      | 75.6       | 72.9          |
| <b>Number of households</b>   | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

More than 90% of the farmers rehabilitated their trees in the 2021-22 agriculture year, more farmers compared to the baseline (81.8%). All farmers in Honduras implemented this practice vs. 75.7% of the Ecuadorian farmers. Of farmers pruning cacao, 86% used the bud's method, followed by lateral branches (67.3%) and dead branches (52.2%). There is a high variation per country, described in the table below. Around 68.7% of the farmers are implementing 3 or more pruning methods based on a production assessment; Peru has the highest rate of implementation, 81.4% vs. 50% in El Salvador. Of farmers who pruned cacao, 26.7 % pruned <25% of cacao trees, 16.4% from 25%-50%, 18.2% pruned 50%-75% and 16.4% > 75% of the trees. Honduras has the highest percentage, with more than 60% of its producer pruning more than 50% of trees. 73.4% of farmers considered it important to rehabilitate cacao, going from 51.8% in Honduras to 84% in Nicaragua (Table 78).

**Table 78. Cacao: Adoption of rehabilitation practices at midline**

| Rehabilitation practices   | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Farmers (%) who rehabilitated (pruned) cacao trees in the 2021-2022 ag. year | 75.7       | 96.2        | 93.5      | 100.0     | 86.7      | 98.6       | 92.0          |
| Of farmers pruning cacao, % using these pruning methods:                     |            |             |           |           |           |            |               |
| Of buds ( <i>chupones</i> )  | 86.4       | 89.8        | 100.0     | 100.0     | 92.3      | 77.6       | 86.5          |
| Of fake stems ( <i>tallos falsos</i> )                                       | 37.0       | 14.3        | 41.9      | 33.9      | 21.5      | 65.7       | 44.8          |
| Of lateral branches ( <i>ramas laterales</i> )                               | 55.6       | 55.1        | 34.9      | 80.4      | 50.8      | 82.9       | 67.3          |
| Of dead branches ( <i>ramas muertas</i> )                                    | 59.3       | 42.9        | 27.9      | 32.1      | 38.5      | 66.2       | 52.2          |
| Of misplaced branches ( <i>ramas mal colocadas</i> )                         | 65.4       | 18.4        | 30.2      | 35.7      | 46.2      | 57.6       | 48.8          |
| Rehabilitation   | 14.8       | 6.1         | 4.7       | 26.8      | 9.2       | 21.0       | 16.3          |
| Of height ( <i>de altura</i> )   | 54.3       | 51.0        | 18.6      | 28.6      | 36.9      | 50.0       | 44.0          |
| Of farmers pruning cacao, %:   |            |             |           |           |           |            |               |
| Rehabilitating based on production assessment                                | 1.2        | 8.0         | 0         | 0         | 0         | 3.8        | 2.6           |
| Implementing a single pruning method   | 7.4        | 16.0        | 4.7       | 1.8       | 10.8      | 11.4       | 9.5           |
| Implementing 3 or more pruning methods based on a production assessment      | 66.7       | 50.0        | 55.8      | 60.7      | 60.0      | 81.4       | 68.7          |
| Of farmers who pruned cacao, % pruning:                                      |            |             |           |           |           |            |               |
| <25% of cacao trees  | 34.6       | 34.0        | 18.6      | 17.9      | 26.2      | 26.2       | 26.7          |
| 25%-50% of cacao trees   | 9.9        | 16.0        | 18.6      | 30.4      | 15.4      | 15.2       | 16.4          |
| 51%-75% of cacao trees   | 19.8       | 20.0        | 32.6      | 32.1      | 21.5      | 9.5        | 18.2          |
| >75% of cacao trees  | 9.9        | 16.0        | 18.6      | 30.4      | 15.4      | 15.2       | 16.4          |
| Farmers (%) who consider it is important to rehabilitate cacao               | 79.4       | 63.5        | 67.4      | 51.8      | 84.0      | 76.1       | 73.4          |
| <b>Number of households</b>  | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

We prepared a panel dataset to analyze better the changes between baseline and midline adoption rates for renovation and rehabilitation practices. First, we examined the differences in these two indicators using the two rounds of information. The differences in the adoption rates of renovation practices were statistically significant only in Peru and for all countries combined. We noticed a decrease in farmers' share doing renovation at the midline. Although could be many reasons behind it, a plausible explanation for this observed trend is farmers who had already renovated cacao since baseline may not need to renovate more cacao (or fewer farmers need to renovate) at the midline. Similar to renovation, in most countries, the differences in the rate of adoption of rehabilitation practices were not statistically significant except for Peru, where we observed an increase in this rate (at midline) (Table 79). However, when we disaggregate rehabilitation rates by type of pruning, we observe differences across countries and types of pruning. In Ecuador, we observe an increase in the share of farmers implementing all types of pruning except rehabilitation pruning at midline (compared to baseline). In contrast, in El Salvador, we observed an increase in the share of farmers doing pruning of height, but a decrease in the ones pruning misplaced branches. In Guatemala, we observe an increase in farmers pruning buds, and a decrease in the share of farmers doing pruning of height. In Honduras, we observe an increase in the share of farmers pruning buds, but a decrease in the share of farmers pruning dead branches, misplaced branches and doing pruning of height. In Nicaragua we observe a decrease in the share of farmers pruning lateral branches and pruning misplaced branches at midline. Finally, in Peru, we found that, at midline, a higher share of farmers did four of the seven types of pruning methods evaluated.



**Table 79. Panel data analysis: Cacao renovation and rehabilitation**

| Variable   | Ecuador    |            |          | El Salvador |           |          | Guatemala |           |          |
|--|------------|------------|----------|-------------|-----------|----------|-----------|-----------|----------|
|  | LB         | LI         | p-value  | LB          | LI        | p-value  | LB        | LI        | p-value  |
| Farmers (%) who renovated (replanted/compacted) cacao trees                | 13.7       | 16.7       | 0.5607   | 9.6         | 5.8       | 0.4666   | 13.0      | 10.9      | 0.7512   |
| Farmers (%) who rehabilitated (pruned) cacao trees, and of these, % doing: | 69.6       | 74.5       | 0.4378   | 88.5        | 96.2      | 0.1438   | 93.5      | 93.5      | 1        |
| Of buds ( <i>chupones</i> )  | 69.6       | 83.9       | 0.055*   | 92.3        | 89.8      | 0.688    | 93.0      | 100.0     | 0.079*   |
| Of fake stems ( <i>tallos falsos</i> )                                     | 17.4       | 37.1       | 0.011**  | 7.7         | 14.3      | 0.3386   | 46.5      | 41.9      | 0.6685   |
| Of lateral branches ( <i>ramas laterales</i> )                             | 33.3       | 56.5       | 0.008**  | 61.5        | 55.1      | 0.5488   | 32.6      | 34.9      | 0.8221   |
| Of dead branches ( <i>ramas muertas</i> )                                  | 33.3       | 58.1       | 0.004**  | 53.8        | 42.9      | 0.3108   | 37.2      | 27.9      | 0.3632   |
| Of misplaced branches ( <i>ramas mal colocadas</i> )                       | 33.3       | 62.9       | 0.000*** | 43.6        | 18.4      | 0.001*** | 37.2      | 30.2      | 0.4996   |
| Rehabilitation   | 14.5       | 17.7       | 0.616    | 10.3        | 6.1       | 0.4822   | 7.0       | 4.7       | 0.6496   |
| Of height ( <i>de altura</i> )   | 29.0       | 51.6       | 0.008**  | 15.4        | 51.0      | 0.000*** | 58.1      | 18.6      | 0.000*** |
| <b>Number of households</b>  | <b>102</b> | <b>102</b> |          | <b>52</b>   | <b>52</b> |          | <b>46</b> | <b>46</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

Table 79. Continued

| Variable   | Honduras  |           |           | Nicaragua |           |         | Peru       |            |           | All countries |            |           |
|--|-----------|-----------|-----------|-----------|-----------|---------|------------|------------|-----------|---------------|------------|-----------|
|  | LB        | LI        | p-value   | LB        | LI        | p-value | LB         | LI         | p-value   | LB            | LI         | p-value   |
| Farmers (%) who renovated (replanted/compacted) cacao trees                | 25.0      | 23.2      | 0.8271    | 18.7      | 18.7      | 1       | 26.8       | 17.4       | 0.0194**  | 20.2          | 16.4       | 0.0998*   |
| Farmers (%) who rehabilitated (pruned) cacao trees, and of these, % doing: | 96.4      | 100       | 0.1563    | 88.0      | 86.7      | 0.8076  | 85.9       | 98.6       | 0.0000*** | 85.1          | 91.9       | 0.0004*** |
| Of buds (chupones)   | 93        | 100       | 0.038**   | 87.9      | 92.3      | 0.4005  | 72.9       | 77.6       | 0.2837    | 78.9          | 86.2       | 0.004**   |
| Of fake stems (tallos falsos)  | 35        | 34        | 0.891     | 22.7      | 21.5      | 0.8711  | 37.0       | 65.7       | 0.000***  | 29.4          | 45.2       | 0.000***  |
| Of lateral branches (ramas laterales)                                      | 81        | 80        | 0.882     | 74.2      | 50.8      | 0.005** | 61.3       | 82.9       | 0.000***  | 55.5          | 67.8       | 0.000***  |
| Of dead branches (ramas muertas)   | 48        | 32        | 0.088*    | 48.5      | 38.5      | 0.2506  | 50.8       | 66.2       | 0.002**   | 46.2          | 51.8       | 0.1027    |
| Of misplaced branches (ramas mal colocadas)                                | 52        | 36        | 0.090*    | 63.6      | 46.2      | 0.045** | 40.3       | 57.6       | 0.000***  | 43.0          | 47.8       | 0.1486    |
| Rehabilitation   | 24        | 27        | 0.747     | 10.6      | 9.2       | 0.7943  | 27.6       | 21.0       | 0.1243    | 18.6          | 16.7       | 0.4627    |
| Of height (de altura)  | 63        | 29        | 0.0002*** | 36.4      | 36.9      | 0.9475  | 55.2       | 50.0       | 0.3013    | 44.0          | 43.3       | 0.8417    |
| <b>Number of households</b>  | <b>56</b> | <b>56</b> |           | <b>75</b> | <b>75</b> |         | <b>213</b> | <b>213</b> |           | <b>544</b>    | <b>544</b> |           |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

#### 5.2.10.4 Nursery management and grafting

Compared to baseline, the number of farmers with nurseries and grafted seedlings increased from 10.8% to 19.9% in the 2021-2022 agricultural year. Peru has the highest percentage (24.9%). The average number of seedlings produced also increased from 62.5 in El Salvador to 980 in Peru. Like the baseline, farmers produce most of their seedlings (57.8%). All the producers of the sample in El Salvador have their production; this is an important change compared to the baseline most of the seedlings are obtained for free same in Nicaragua. 41.7% and 38.9% of farmers buy their seedlings in Honduras and Ecuador. For farmers buying cacao seedlings, the sources they buy include neighbors (9.5%), certified nurseries (52.4%), non-certified nurseries (33.3%), and other sources (4.8%). The percentages across the different sources vary among countries. In Honduras and Nicaragua, 100% of farmers buy certified seeds, different from Peru, where this percentage is zero. The number of seedlings purchased goes from 474 in Honduras to 152 in Ecuador, with an average of 269 across countries. The price paid per seedling ranges from US\$0.02 in El Salvador to US\$3.3 in Peru. Similar to the baseline (87.7%), most of the farmers (86.1%), on average, stated that the quality of the seedlings was good or excellent. This indicator is constant in the countries, from 83.3% in Nicaragua and Honduras to 100% in El Salvador and Guatemala.

Preparation of substrates mix for cacao nurseries medium level of adoption (52.3%), with high variation amount countries, from zero in Guatemala and Honduras to 100% in El Salvador. Of these farmers, 38.4% did not disinfect the substrate mix, 24.2% disinfected the substrate with solarization, and only 7% used chemicals. (Table 80).

**Table 80. Cacao: Management of cacao nurseries at midline**

| Practices implemented in the 2021-2022 ag. year   | Ecuador       | El Salvador | Guatemala   | Honduras     | Nicaragua     | Peru          | All countries |
|---|---------------|-------------|-------------|--------------|---------------|---------------|---------------|
| Farmers (%) managing a cacao nursery in their farms, and...:<br># seedlings (plants)                      | 16.8<br>217.5 | 7.7<br>62.5 | 8.7<br>n.a. | 21.4<br>n.a. | 24.0<br>680.0 | 24.9<br>980.7 | 19.9<br>764.8 |
| For farmers with nurseries or acquiring cacao seedlings, % reporting:                                     |               |             |             |              |               |               |               |
| Seedlings coming from own seedbeds  | 44.4          | 100.0       | 75.0        | 0            | 66.7          | 67.9          | 57.8          |
| Buying the seedlings  | 38.9          | 0           | 0           | 41.7         | 11.1          | 13.2          | 19.3          |
| Obtaining seedlings for free (NGO, relatives, friends, etc.)  | 16.7          | 0           | 25.0        | 58.3         | 22.2          | 13.2          | 20.2          |
| Obtaining seedlings from other sources  | 11.1          | 0           | 0           | 0            | 0             | 11.3          | 7.3           |
| For farmers buying cacao seedlings, % reporting this source:  |               |             |             |              |               |               |               |
| Neighbor  | 0             | n.a.        | n.a.        | 0            | 0             | 28.6          | 9.5           |
| Certified nursery   | 57.1          | n.a.        | n.a.        | 100.0        | 100.0         | 0.0           | 52.4          |
| Non-certified nursery   | 42.9          | n.a.        | n.a.        | 0            | 0             | 57.1          | 33.3          |
| Other source  | 0             | n.a.        | n.a.        | 0            | 0             | 14.3          | 4.8           |
| For farmers buying cacao seedlings:   |               |             |             |              |               |               |               |
| Amount (#) of seedlings purchased   | 152.1         | n.a.        | n.a.        | 274.0        | 150.0         | 474.0         | 268.7         |
| Price paid per unit   | 0.5           | n.a.        | n.a.        | 1.2          | 0.2           | 3.3           | 1.4           |
| % stating the seedlings quality was good or excellent   | 89.5          | 100.0       | 100.0       | 83.3         | 83.3          | 84.3          | 86.1          |
| Farmers (%) preparing substrate mix, and of these farmers, %:   | 27.8          | 100.0       | 0           | 0            | 66.7          | 67.9          | 52.3          |
| That includes one part of organic matter (compost or bokashi) in the mix                                  | 0             | 25.0        | n.a.        | n.a.         | 8.3           | 31.7          | 24.2          |
| That uses MOCCA-recommended mix (80% soil, 10% org. matter, 10% sand)                                     | 0             | 0           | n.a.        | n.a.         | 0             | 0             | 0             |
| Not disinfecting the substrate mix  | 28.6          | 0           | n.a.        | n.a.         | 75.0          | 33.3          | 38.4          |
| Disinfecting substrate with solarization  | 0             | 25.0        | n.a.        | n.a.         | 8.3           | 31.7          | 24.2          |
| Disinfecting substrate with boiling water   | 20.0          | 75.0        | n.a.        | n.a.         | 0             | 2.8           | 8.8           |
| Disinfecting substrate with chemicals   | 0             | 0           | n.a.        | n.a.         | 16.7          | 5.6           | 7.0           |
| Disinfecting substrate with other method  | 66.7          | 0           | n.a.        | n.a.         | 0             | 19.4          | 19.0          |
| For farmers not buying from certified nurseries, % who know where to acquire certified or verified plants | 5.82          | 1.92        | 0.00        | 9.80         | 9.58          | 11.26         | 7.99          |
| <b>Number of households</b>   | <b>107</b>    | <b>52</b>   | <b>46</b>   | <b>56</b>    | <b>75</b>     | <b>213</b>    | <b>549</b>    |

Like the baseline, a relatively small proportion (12.8%) of farmers carry out grafting. However, at the country level, there are some variations; while Peru maintains its percentage (24.9%), in El Salvador and Honduras the number is zero. We identify the most common variety/clone grafted in each country; for Ecuador, the variety/clone EET-800 is the most common (unlike baseline, CCN-51); UF is the most common in Guatemala; ICS-95 in Nicaragua and CCN-51 in Peru. The total average number of plants grafted varies from 77.6 in Nicaragua to 395.4 in Peru. Of farmers grafting in their cacao plantations, 25.7% paid to get this service on their farms. Disaggregating by country, this percentage is higher in Guatemala with 37.5%, followed by Peru with 26.4% and Ecuador with 25%.

For farmers grafting during the agricultural year 2021-2022, 28.6% considered the topic important (below the value reported in the baseline of 40.4%). However, 70% considered the topic very important in the midline, well above the percentage reported in the baseline (58.3%). More than half of farmers (55.7%) considered their knowledge about grafting at an intermediate level similar to baseline. In comparison, almost 32.9% considered their knowledge of grafting high, while in the baseline, the percentage was 24.5% (Table 81).

**Table 81. Cacao Grafting practices at midline**

| Practices implemented in the 2021-2022 ag. year                | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Farmers (%) doing grafting in their cacao plantations, and...: | 3.7        | 0           | 17.4      | 0         | 6.7       | 24.9       | 12.8          |
| % farmers grafting only in nursery                             | 0          | n.a.        | 0.0       | n.a.      | 0.0       | 17.0       | 12.9          |
| % farmers grafting only trees in the field                     | 75.0       | n.a.        | 75.0      | n.a.      | 100.0     | 81.1       | 81.4          |
| % farmers grafting in nursery & trees in the field             | 25.0       | n.a.        | 25.0      | n.a.      | 0         | 1.9        | 5.7           |
| Most common variety/clone grafted (and % farmers)              | EET-800    | n.a.        | UF        | n.a.      | ICS-95    | CCN-51     | CCN-51        |
| Total plants grafted (#)                                       | 113.5      | n.a.        | 298.6     | n.a.      | 77.6      | 395.4      | 345.3         |
| % farmers paying to get this service in their farms            | 25.0       | n.a.        | 37.5      | n.a.      | 0.0       | 26.4       | 25.7          |
| Of farmers grafting, % considering this is:                    |            |             |           |           |           |            |               |
| Very important   | 75.0       | n.a.        | 37.5      | n.a.      | 80.0      | 73.6       | 70.0          |
| Important  | 0          | n.a.        | 62.5      | n.a.      | 20.0      | 26.4       | 28.6          |
| Neutral  | 25.0       | n.a.        | 0         | n.a.      | 0         | 0          | 1.4           |
| Less important   | 0          | n.a.        | 0         | n.a.      | 0         | 0          | 0             |
| Not important  | 0          | n.a.        | 0         | n.a.      | 0         | 0          | 0             |
| Farmers (%) grafting in nursery, and of those, % doing:        | 0          | n.a.        | 0         | n.a.      | 0         | 17.0       | 12.9          |
| Parche graft   | n.a.       | n.a.        | n.a.      | n.a.      | n.a.      | n.a.       | n.a.          |
| Pua lateral graft  | n.a.       | n.a.        | n.a.      | n.a.      | n.a.      | n.a.       | n.a.          |
| Yema lateral graft   | n.a.       | n.a.        | n.a.      | n.a.      | n.a.      | 0          | 0             |
| Micro-graft  | n.a.       | n.a.        | n.a.      | n.a.      | n.a.      | 11.1       | 11.1          |
| Other type of graft  | n.a.       | n.a.        | n.a.      | n.a.      | n.a.      | 88.9       | 88.9          |
| Farmers (%) considering their knowledge about grafting is:     |            |             |           |           |           |            |               |
| High   | 0          | n.a.        | 12.5      | n.a.      | 20.0      | 39.6       | 32.9          |
| Medium   | 50.0       | n.a.        | 50.0      | n.a.      | 80.0      | 54.7       | 55.7          |
| Low  | 50.0       | n.a.        | 25.0      | n.a.      | 0         | 5.7        | 10.0          |
| Non-existent   | 0          | n.a.        | 12.5      | n.a.      | 0         | 0          | 1.4           |
| <b>Number of households</b>                                    | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

#### 5.2.10.5 Cacao nutrition

Related to weeding practices were considered two: carried out at least one weeding practice and did selective weeding according to a calendar of activities. Regarding soil cover or mulch (dead or alive), the practices considered were implementing at least one soil cover crop (legumes, other crops) and using at least one soil cover crop and one soil and water conservation practice. We considered two-floor management practices (live or dead barriers, cover crops, herbicides). The farmer implemented at least one practice to manage the floor of the plantation, and if they Implemented two or more practices to manage the plantation floor.

Table 82 describes the levels of adoption of those farmers implementing FM practices. For the weeding management practices, an essential increase in the implementation rate, from 28.8% in the baseline to 61.2% in the midline, especially in Peru (89.7%). On average, more than 90% of those farmers implement at least one weeding practice, and 36,6% do selective weeding according to calendar activities. Another significant increase is the percentage of farmers implementing dead or alive soil cover practices, which went from 19.98% to 76.3%. Most of the countries have a rate of over 80% of implementation, except for Ecuador (45.8%) and Nicaragua (70.7%). Finally, farmers implementing floor management methods are lower than baseline (82.7% vs. 58.7%). Of these farmers, 91.3% implemented at least one method to manage cacao floor, and 48.1 two or more methods.

**Table 82. Cacao: Adoption of floor management practices**

| Floor management MOCCA-promoted practices   | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| <b>Farmers (%) doing weeding management practices, and % farmers...:</b>              | 59.8       | 46.2        | 13.0      | 25.0      | 49.3      | 89.7       | 61.2          |
| Doing at least 1 weeding practice   | 100.0      | 54.2        | 66.7      | 57.1      | 91.9      | 98.4       | 92.6          |
| Doing selective weeding according to calendar activities                              | 17.2       | 79.2        | 66.7      | 42.9      | 37.8      | 36.1       | 36.6          |
| <b>Farmers (%) implementing dead or alive soil cover practices, and % farmers...:</b> | 45.8       | 94.2        | 89.1      | 100.0     | 70.7      | 80.3       | 76.3          |
| Implementing at least 1 soil cover crop   | 16.3       | 14.3        | 34.1      | 0         | 11.3      | 33.9       | 22.2          |
| Implementing 1 soil cover crop and 1 soil and water conservation method               | 12.2       | 0           | 19.5      | 0         | 9.4       | 32.2       | 17.7          |
| <b>Farmers (%) implementing floor management methods, and % farmers...:</b>           | 46.7       | 46.2        | 52.2      | 69.6      | 44.0      | 71.4       | 58.7          |
| Implementing at least 1 method to manage cacao floor                                  | 98.0       | 37.5        | 100.0     | 97.4      | 87.9      | 95.3       | 91.3          |
| Implementing 2 or more methods to manage cacao floor                                  | 44.0       | 4.2         | 87.5      | 53.8      | 27.3      | 53.3       | 48.1          |
| <b>Number of households</b>   | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

Related to plant nutrition practices described in the MOCCA curriculum and additional indicators, results have shown that the percentage of farmers applying fertilizers in the 2021-2022 agricultural year was 20.6% in Ecuador, 76.9% in El Salvador, 39.1% in Guatemala, 19.6% in Honduras, 33.3% in Nicaragua, 32.4% in Peru, with an average of 33.7% across all countries like the baseline (33.8%). Of farmers fertilizing, 25.4% do so based on nutritional deficiencies, 40.4% use visual symptoms, and 61.7% do soil analysis. Of farmers fertilizing, many are making two or more applications, and 50.3% use the full amount. In Nicaragua (68%), Ecuador (95.5%), Peru (55.1%), and El Salvador (92.5%), most farmers apply only chemical fertilizers, while in Honduras, organic fertilizer is the option most used (100%). The most used fertilizer in Ecuador is *Ferticacao* in the baseline was *Completo*, with 18.1% of farmers using it. In El Salvador is 15-15-15, used by 72.5 % of farmers, while 100% is used in Guatemala *Humifertil*. In Nicaragua, the most used was *Ferticacao* (33.3%), and in Peru was *Guano de Isla* (46.4%), different from the baseline that was NPK (48.97%). On average, fertilizer was applied 1.7 times during the agricultural year.

Only 15.5 of farmers implemented soil acidity corrections, and of those, 8.2% applied lime based on soil analysis recommendations, and nobody applied lime to correct the pH based on the soil map. (Table 83).



**Table 83. Cacao: Adoption of crop nutrition practices at midline**

| Crop nutrition practices adopted   | Ecuador | El Salvador | Guatemala | Honduras | Nicaragua | Peru | All countries |
|--|---------|-------------|-----------|----------|-----------|------|---------------|
| <b>Farmers (%) applying fertilizer in the 2021-2022 ag. year</b>                                     | 20.6    | 76.9        | 39.1      | 19.6     | 33.3      | 32.4 | 33.7          |
| <b>Of farmers fertilizing, % that do so based on nutritional deficiencies</b>                        | 36.4    | 35.0        | 5.6       | 0        | 12.0      | 30.4 | 25.4          |
| Of farmers who apply fertilizer based on nutritional deficiencies, % who do so using visual symptoms | 12.5    | 42.9        | 100.0     | n.a.     | 100.0     | 38.1 | 40.4          |
| Of farmers who apply fertilizer based on nutritional deficiencies, % who do so using soil analyses   | 87.5    | 64.3        | 0         | n.a.     | 0         | 61.9 | 61.7          |
| <b>Of farmers fertilizing, %:</b>  |         |             |           |          |           |      |               |
| Doing at least 2 fertilizer applications (one every 6 months)  | 4.5     | 2.5         | 5.6       | 0.0      | 0.0       | 2.9  | 2.7           |
| Doing at least 4 fertilizer applications (one every 3 months)  | 4.3     | 12.5        | 5.6       | 0.0      | 0.0       | 0.0  | 3.8           |
| <b>Of farmers fertilizing, % fertilizing the:</b>  |         |             |           |          |           |      |               |
| Partial amount required  | 0       | 7.5         | 0         | 0        | 12.0      | 2.9  | 4.3           |
| Full amount required   | 72.7    | 82.5        | 0         | 0        | 48.0      | 46.4 | 50.3          |
| <b>Of farmers applying fertilizer, %:</b>  |         |             |           |          |           |      |               |
| Applying only chemical fertilizers   | 95.5    | 92.5        | 0         | 0        | 68.0      | 55.1 | 61.1          |
| Applying only organic fertilizers  | 4.5     | 12.5        | 0         | 100.0    | 8.0       | 58.0 | 31.9          |
| Applying chemical and organic fertilizers  | 0       | 5.0         | 0         | 0        | 0         | 13.0 | 5.9           |
| Applying microorganisms  | 0       | 25.0        | 0         | 0        | 20.0      | 1.4  | 8.6           |

Table 83. Continued.

| Crop nutrition practices adopted  | Ecuador    | El Salvador | Guatemala  | Honduras | Nicaragua  | Peru          | All countries |
|---|------------|-------------|------------|----------|------------|---------------|---------------|
| Of farmers applying organic fertilizer, % using farm residues to prepare them | 100.0      | 100.0       | n.a.       | 100.0    | 0          | 65.0          | 72.1          |
| Most commonly used fertilizer according to the amount applied, and...:        | Ferticacao | 15-15-15    | Humifertil | Organico | Ferticacao | Guano de isla | 15-15-15      |
| % farmers applying this fertilizer  | 18.18      | 72.50       | 100.00     | 100.00   | 33.33      | 46.38         | 17.58         |
| # times it was applied during the 2021-2022 agricultural year                 | 2.00       | 1.68        | 1.35       | 1.20     | 1.25       | 1.56          | 1.71          |
| Farmers (%) implementing soil acidity corrections, and of those, %:           | 7.5        | 7.7         | 17.4       | 33.9     | 22.7       | 13.6          | 15.5          |
| Applying lime to correct the pH based on soil map                             | 0          | 0           | 0          | 0        | 0          | 0             | 0             |
| Applying lime based on soil analysis recommendations                          | 37.5       | 0           | 0          | 5.3      | 5.9        | 6.9           | 8.2           |
| Number of households  | 20.6       | 76.9        | 39.1       | 19.6     | 33.3       | 32.4          | 33.7          |

#### 5.2.10.6 Control of pests and diseases in cacao

The percentage of farmers implementing pest monitoring systems, in general, is low (22%), especially in Ecuador (0.9%) and Guatemala (0%) but is almost double the baseline. The same occurs with the farmers reporting insect pests affecting their crop, only 11.7% of the total sample, Peru has a slight rate (21.6%). Of farmers reporting pests affecting their crop, 98.4% control them; of these, 70.3% use one pest identified method. And only 10.9% more than two.

89.1% of the farmers reported diseases that affect their crop, an important variation compared to the baseline (55%). Of farming reporting diseases, only 10% utilize control methods, and of them, only 1.4% use more than two (Table 84).

**Table 84. Cacao: Adoption of integrated pest management practices at midline**

| <b>Integrated Pest Management (IPM) MOCCA-promoted practices</b>                           | <b>Ecuador</b> | <b>El Salvador</b> | <b>Guatemala</b> | <b>Honduras</b> | <b>Nicaragua</b> | <b>Peru</b> | <b>All countries</b> |
|--|----------------|--------------------|------------------|-----------------|------------------|-------------|----------------------|
| <b>Farmers (%) monitoring pest &amp; disease monitoring using:</b>                         |                |                    |                  |                 |                  |             |                      |
| A standardized sampling protocol   | 1.9            | 15.4               | 8.7              | 0               | 12.0             | 11.3        | 8.6                  |
| A monitoring system  | 0.9            | 11.5               | 0                | 25.0            | 22.7             | 39.0        | 22.0                 |
| <b>Farmers (%) reporting insect pests affected their crop</b>                              | 3.7            | 21.2               | 0                | 0               | 4.0              | 21.6        | 11.7                 |
| Of farmers reporting pests affecting their crop, % utilizing methods to control them       | 100.0          | 90.9               | n.a.             | n.a.            | 100.0            | 100.0       | 98.4                 |
| Of farmers using control methods, % using 1 method for each pest identified                | 100.0          | 63.6               | n.a.             | n.a.            | 33.3             | 71.7        | 70.3                 |
| Of farmers using control methods, % using more than one method for each pest identified    | 0              | 9.1                | n.a.             | n.a.            | 0                | 13.0        | 10.9                 |
| <b>Farmers (%) reporting diseases affected their crop</b>                                  | 100.0          | 42.3               | 100.0            | 83.9            | 90.7             | 93.4        | 89.1                 |
| Of farmers reporting diseases affecting their crop, % utilizing methods to control them    | 3.7            | 27.3               | 0                | 0               | 1.5              | 19.1        | 10.0                 |
| Of farmers using control methods, % using 1 method for each disease identified             | 3.7            | 27.3               | 0                | 0               | 1.5              | 16.1        | 8.6                  |
| Of farmers using control methods, % using more than one method for each disease identified | 0              | 4.5                | 0                | 0               | 0                | 3.0         | 1.4                  |
| <b>Number of households</b>  | <b>107</b>     | <b>52</b>          | <b>46</b>        | <b>56</b>       | <b>75</b>        | <b>213</b>  | <b>549</b>           |

Among farmers reporting insect pests or diseases (91.8%), only 4.2% applied pesticides; 25.8% use products authorized by the Phytosanitary Service. The main insect pests or diseases affecting the cacao crop were Monilia (81.5%) except for El Salvador (7.4%) and Black pods (54.6%). The highest rate is in Honduras (87.1%) (Table 85).

**Table 85. Cacao: Use of pesticides and main pests affecting cacao in the 2021-2022 ag. year**

| Characteristics  | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| <b>Farmers (%) reporting insect pests or diseases affected their cacao crop</b>          | 100.0      | 51.9        | 100.0     | 83.9      | 93.3      | 97.2       | 91.8          |
| Among these farmers, % applying pesticides (for insects or diseases)                     | 10.3       | 33.3        | 0         | 0         | 0         | 0.5        | 4.2           |
| Among these farmers, % using products authorized by the Phytosanitary Service            | 25.2       | 51.9        | 0         | 0         | 24.3      | 34.8       | 25.8          |
| Among these farmers, main insect pests or diseases affecting the cacao crop (% farmers): |            |             |           |           |           |            |               |
| Monilia (Monilia roleri E)   | 87.9       | 7.4         | 91.3      | 83.0      | 85.7      | 84.1       | 81.5          |
| Black pods (Phytophthora)  | 37.4       | 63.0        | 97.8      | 93.6      | 87.1      | 32.9       | 54.6          |
| Witches broom (Crinipellis perniciososa)   | 52.3       | 22.2        | 0         | 0         | 0         | 23.7       | 22.0          |
| Pod worm (mazorquero)  | 3.7        | 11.1        | 0         | 0         | 0         | 10.1       | 5.6           |
| Other  | 0.9        | 57.7        | 0         | 16.1      | 9.3       | 4.7        | 10.4          |
| <b>Number of households</b>  | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

### 5.2.10.7 Cacao harvest

Table 86 gives an overview of harvest practices (harvesting cacao, selective cacao harvesting, and removing the cacao beans within three days after harvest) on the farm. Harvesting cacao and selective cacao harvesting are implemented by more than 90% of farmers, 20 percentage points more than in the baseline. Of farmers doing selective harvest, around 14% were doing it according to color and size, or taking into account color, shape and size, and eliminated sick, damaged, over-ripe, or green pods. Only 11.8% remove the cacao beans from pods within 3 days after harvest, and the highest the rates were in Peru (17.4%), El Salvador (15.4%) and Ecuador (14%). In Honduras, no farmer reported doing the latter, and this was almost the case in Guatemala and Nicaragua. The amount of wet cacao harvested on average was 2,079 kg, and in Peru and Ecuador farmers harvested the largest amounts (3,021 and 2,342 kg, respectively), because they planted the largest areas. The average dry cacao harvested was 790 kg.

**Table 86. Cacao: Harvest practices and amount harvested at midline**

| Details   | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| <b>% farmers harvesting cacao in the 2021-2022 ag. year</b>   | 93.5       | 86.5        | 95.7      | 87.5      | 94.7      | 98.6       | 94.5          |
| <b>Of farmers harvesting, % doing so selectively</b>  | 93.5       | 86.5        | 95.7      | 87.5      | 94.6      | 99.1       | 94.7          |
| Of farmers doing selective harvest, % doing it according to color and size (ripening)   | 10.0       | 24.4        | 6.8       | 0         | 7.1       | 21.5       | 14.3          |
| Of farmers doing selective harvest, % doing it according to color, shape and size, and eliminated sick, damaged, over-ripe, or green pods | 10.0       | 24.4        | 6.8       | 0         | 5.7       | 19.6       | 13.3          |
| <b>Farmers (%) removing cacao beans from pods within 3 days after harvest</b>   | 14.0       | 15.4        | 4.3       | 0.0       | 4.0       | 17.4       | 11.8          |
| <b>Cacao area (ha)*</b>   | 3.32       | 0.96        | 1.02      | 1.62      | 1.65      | 2.14       | 2.04          |
| <b>Total amount of wet cacao harvested (kg)</b>   | 2,342      | 788         | 968       | 990       | 1,155     | 3,021      | 2,079         |
| <b>Total amount of dry cacao (equivalent) harvested (kg)</b>  | 890        | 300         | 368       | 376       | 439       | 1,148      | 790           |
| <b>Number of households</b>   | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

#### 5.2.10.8 Post-harvest cacao activities

Table 87 includes details about the adoption of post-harvest (fermenting and drying) practices. Only 19.8% of farmers fermented cacao on their farms, mainly in Peru (31.3%) and currently in El Salvador (28.3%), while on-farm fermentation was rare in other countries in Central America. Farmers fermenting cacao started this process within 3 hours after beans were removed from pods, mainly using other fermentation methods (76.7%), and a lower percentage use methods such as boxes/trays (8.7%) or crates in stair-like arrangement (14.6%). The farmers ferment cacao for between 1.8 and 7.8 days. Most farmers (76.9%) cover the beans during this process and turn them between 1.8 in Nicaragua and 7.1 times in El Salvador. However, most farmers (67%) do not monitor temperature during this process. 93.1% of cacao farmers dry cacao beans using the sun, Ecuador has the lowest percentage with 86.7%, 6.7% of the farmers in this country use the oven to dry the cacao beans, and 13.3% use other techniques. Among this group, 76.5% verify the moisture of the cacao; most farmers do so by testing if the beans break (84.8%) and/or by visual assessment (27.8%); using equipment for this was rare (8.9%), except in El Salvador. The results, in general, are like the baseline.

**Table 87. Cacao: Adoption of post-harvest (fermenting and drying) practices at midline**

| Details  | Ecuador | El Salvador | Guatemala | Honduras | Nicaragua | Peru  | All countries |
|--|---------|-------------|-----------|----------|-----------|-------|---------------|
| <b>Farmers (%) processing cacao in the farm</b>  | 16.0    | 28.3        | 6.8       | 0        | 7.0       | 31.3  | 19.8          |
| <b>For farmers not processing cacao:</b>   |         |             |           |          |           |       |               |
| Average time (hrs) between bean removal from pods and delivery to collecting centers           | 7.1     | 15.4        | 5.5       | 3.9      | 8.5       | 38.2  | 18.3          |
| Farmers (%) transporting beans to collecting centers within 6 hours of removal from pods       | 78.1    | 63.9        | 91.7      | 100.0    | 87.2      | 42.6  | 70.1          |
| <b>For farmers processing cacao in the farm:</b>   |         |             |           |          |           |       |               |
| Time (hrs) between bean removal from pods and the start of fermentation                        | 40.9    | 21.5        | 11.0      | n.a.     | 21.6      | 131.6 | 96.1          |
| Farmers (%) using:   |         |             |           |          |           |       |               |
| Boxes or trays to ferment  | 6.3     | 15.4        | 0         | n.a.     | 0         | 9.1   | 8.7           |
| Crates in stair-like arrangement   | 25.0    | 15.4        | 33.3      | n.a.     | 0         | 12.1  | 14.6          |
| Other fermentation methods   | 68.8    | 69.2        | 66.7      | n.a.     | 100.0     | 78.8  | 76.7          |
| # of days the cacao is fermented for   | 4.2     | 3.8         | 4.7       | n.a.     | 1.8       | 7.8   | 6.3           |
| Farmers (%) who cover cacao (plantain leaves or jute/burlap sacks) to improve the fermentation | 62.5    | 53.9        | 33.3      | n.a.     | 16.7      | 92.4  | 76.9          |
| # of times the cacao is turned during fermentation   | 4.6     | 7.1         | 2.7       | n.a.     | 1.2       | 3.3   | 3.9           |
| Farmers (%) who during fermentation:   |         |             |           |          |           |       |               |
| Control the temperature daily  | 25.0    | 61.5        | 0         | n.a.     | 0         | 19.7  | 24.3          |
| Control the temperature less frequent  | 12.5    | 15.4        | 0         | n.a.     | 0         | 7.6   | 8.7           |
| Do not control the temperature   | 62.5    | 23.1        | 100.0     | n.a.     | 100.0     | 72.7  | 67.0          |

Table 87. Continued

| Details  | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| <b>Farmers (%):</b>  |            |             |           |           |           |            |               |
| Drying cacao beans using the sun   | 86.7       | 100.0       | 100.0     | n.a.      | 100.0     | 92.4       | 93.1          |
| Drying cacao beans using oven  | 6.7        | 0           | 0         | n.a.      | 0         | 0          | 1.0           |
| Not drying cacao beans   | 0          | 0           | 0         | n.a.      | 0         | 0          | 0             |
| Using other method for drying cacao                                      | 13.3       | 0           | 0         | n.a.      | 0         | 10.6       | 8.9           |
| <b>Of farmers drying cacao beans, % verifying cacao moisture, and %:</b> |            |             |           |           |           |            |               |
| Doing tests with special equipment                                       | 60.0       | 84.6        | 33.3      | n.a.      | 0         | 86.4       | 76.5          |
| By visual evaluation of the color of the beans                           | 11.1       | 45.5        | 0         | n.a.      | n.a.      | 1.7        | 8.9           |
| Testing if the beans break   | 44.4       | 27.3        | 100.0     | n.a.      | n.a.      | 24.1       | 27.8          |
| Using other method   | 66.7       | 45.5        | 0         | n.a.      | n.a.      | 96.6       | 84.8          |
|  | 0          | 0           | 0         | n.a.      | n.a.      | 0          | 0             |
| <b>Number of households</b>  | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

#### 5.2.10.9 Cacao quality and certifications

Compared to the baseline, there is a tendency to increase the percentages related to cacao quality and certification. For example, 77.4% of the farmers can identify physical characteristics that affect cacao quality vs. 57.2% in the last round of data collection; this knowledge is broader in Honduras (82.1%) and the lowest in Guatemala (41.3%).

Among the farmers with certification (63%) previously was 45.6%, Organic certification is the most popular cacao certification across the countries except in El Salvador. 100% of the certified farmers are organic in Guatemala and Honduras, followed by Peru (75.2%) and Ecuador (88.2%). Other important certifications are Fair Trade (31.4%) and FLO (14.1%), especially in Ecuador and Honduras. In Nicaragua, UTZ certification continues to be relevant (63.8). Currently, El Salvador does not report certified production. Around half of the farmers use any tool to record production costs and income, especially in Peru (64.8%), Ecuador (68.2%), and Nicaragua (57.3%) (Table 88)



**Table 88. Cacao: Quality and farm certifications at midline**

| Quality and certifications   | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|--|------------|-------------|-----------|-----------|-----------|------------|---------------|
| <b>Farmers (%) who can identify physical characteristics that affect cacao quality, and:</b> |            |             |           |           |           |            |               |
| Of these, % who know three or more of these characteristics                                  | 86.9       | 63.5        | 41.3      | 82.1      | 68.0      | 85.9       | 77.4          |
|  | 72.9       | 86.5        | 71.7      | 48.2      | 80.0      | 38.5       | 59.2          |
| <b>Farmers (%) with farm certifications, and of these, % with:</b>                           |            |             |           |           |           |            |               |
| Organic certification  | 86.9       | 0           | 82.6      | 83.9      | 64.0      | 56.3       | 63.0          |
| Fair trade certification   | 88.2       | n.a.        | 100.0     | 100.0     | 27.7      | 75.2       | 78.4          |
| FLO certification  | 67.7       | n.a.        | 0         | 30.4      | 4.3       | 24.8       | 31.4          |
| FLO-organic certification  | 21.5       | n.a.        | 0         | 28.3      | 12.8      | 8.3        | 14.1          |
| UTZ certification  | 3.2        | n.a.        | 0         | 6.5       | 0.0       | 21.5       | 9.2           |
| CLAC certification   | 8.6        | n.a.        | 0         | 0         | 63.8      | 0.8        | 11.2          |
| Other certifications   | 0          | n.a.        | 0         | 0         | 0         | 0          | 0             |
|  | 8.6        | n.a.        | 0         | 0         | 10.6      | 0.8        | 4.0           |
| <b>Farmers (%) using any tool to record production costs and income</b>                      |            |             |           |           |           |            |               |
|  | 68.2       | 17.3        | 8.7       | 16.1      | 57.3      | 64.8       | 50.3          |
| <b>Number of households</b>  | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

#### 5.2.10.10 Cacao yields and sales

Most of the farmers sold cacao in the 2021-2022 ag. year. In Peru farmers sold 1,137 kg of dry cacao, followed by Ecuador (867 kg of dry cacao). In CA, the quantity sold varies from 241 kg of dry cacao in El Salvador to 415 kg of dry cacao in Nicaragua. Yields averaged 434 kg dry cacao/ha, and the highest yields were observed in Guatemala and Peru. In Ecuador, we reported a larger amount sold/ha vs harvested because of missing data in the amount harvested. Approximately 55% of the volume was sold to MOCCA anchor firms, although selling to this buyer was only reported in Ecuador and Nicaragua, and in all other countries, most of the volume was sold to other buyers (Table 89). We discuss changes between baseline and midline for these indicators in section 5.2.11.1.

**Table 89. Cacao: Yields, sales and buyers at midline**

| Details   | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| <b>Cacao area (ha)*</b>                                     | 3.32       | 0.96        | 1.02      | 1.62      | 1.65      | 2.14       | 2.04          |
| <b>Farmers (%) who sold cacao in the 2021-2022 ag. year</b> | 91.6       | 82.7        | 95.7      | 87.5      | 94.7      | 99.1       | 94.0          |
| <b>Amount of dry cacao sold (kg)</b>                        | 867        | 241         | 337       | 308       | 415       | 1,137      | 749           |
| <b>Cacao yields (dry):</b>                                  |            |             |           |           |           |            |               |
| Kg harvested/ha   | 287        | 340         | 625       | 407       | 270       | 547        | 434           |
| Kg sold/ha  | 303        | 278         | 553       | 334       | 255       | 542        | 411           |
| <b>Income from cacao sales:</b>                             |            |             |           |           |           |            |               |
| US\$  | 2,273      | 471         | 688       | 364       | 775       | 2,447      | 1,642         |
| US\$/ha   | 573        | 505         | 1,031     | 242       | 494       | 1,159      | 789           |
| <b>Share (%) of cacao sold to:</b>                          |            |             |           |           |           |            |               |
| MOCCA anchor firm   | 92.9       | 0           | 0         | 0         | 23.4      | 0          | 55.4          |
| Intermediary  | 1.5        | 49.6        | 48.6      | 2.3       | 31.3      | 38.6       | 15.3          |
| Local market  | 0          | 41.6        | 0         | 0         | 3.7       | 0          | 1.2           |
| Cooperative or farmer organization                          | 0.6        | 8.4         | 98.9      | 100       | 69.5      | 46.7       | 23.7          |
| Other buyers  | 0          | 0.5         | 0         | 0         | 0         | 0          | 0.01          |
| <b>Number of plots</b>                                      | <b>144</b> | <b>54</b>   | <b>68</b> | <b>81</b> | <b>81</b> | <b>254</b> | <b>682</b>    |

\*1 ha (hectare) = 10,000 square meters

#### 5.2.10.11 Panel data analysis of the adoption of key cacao indicators

Similar to what we did for renovation and rehabilitation, we constructed a panel data using the midline and baseline samples, to better analyze the adoption of key variables (Table 90). As we see, of the 18 indicators evaluated using a panel dataset, the adoption rates at midline were statistically significantly higher than at baseline for six of the indicators, were significantly lower for four of the indicators, and remained unchanged for eight of the indicators. The indicators where we observe an increase at midline relate to the adoption of soil management practices, fertilizing based on nutritional deficiencies and doing it using soil analysis, implementing pests and disease monitoring systems, the incidence of diseases (though this does not relate to adoption), and certifications. In contrast, we observed a decrease in indicators that relate to the use of herbicides, fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it using visual symptoms (perhaps a positive effect of the project as more farmers are doing this using soil analysis), and applying both chemical and organic fertilizers. We observed differences across countries.

*Table 90. Panel data analysis of the adoption of key cacao indicators*

| Farmers (%)  | Ecuador    |            |           | El Salvador |           |           | Guatemala |           |           | Honduras  |           |           |
|--|------------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|  | LB         | LI         | p-value   | LB          | LI        | p-value   | LB        | LI        | p-value   | LB        | LI        | p-value   |
| Implementing dead cover in their cacao plots                                     | 32.4       | 32.4       | 1.0000    | 55.8        | 92.3      | 0.0000*** | 41.3      | 73.9      | 0.0013*** | 71.4      | 94.6      | 0.0009*** |
| Implementing live/green cover in their cacao plots                               | 8.8        | 10.8       | 0.6397    | 7.7         | 21.2      | 0.0514*   | 13.0      | 93.5      | 0.0000*** | 42.9      | 51.8      | 0.3485    |
| Covering space between cacao rows with residues from weeding                     | 70.6       | 57.8       | 0.058*    | 61.5        | 92.3      | 0.0001*** | 82.6      | 80.4      | 0.7910    | 78.6      | 73.2      | 0.5119    |
| Using herbicides   | 14.7       | 6.9        | 0.0716    | 5.8         | 1.9       | 0.3125    | 0.0       | 0.0       | n.a       | 0.0       | 0.0       | n.a       |
| Applying fertilizer  | 23.5       | 23.5       | 0.7391    | 86.5        | 76.9      | 0.2083    | 26.1      | 39.1      | 0.1860    | 16.1      | 19.6      | 0.6254    |
| Fertilizing based on nutritional deficiencies                                    | 20.6       | 7.8        | 0.0090*** | 23.1        | 26.9      | 0.6544    | 13.0      | 2.2       | 0.0500*   | 7.1       | 0.0       | 0.0421**  |
| Fertilizing based on nutritional deficiencies and doing it using visual symptoms | 17.6       | 1.0        | 0.000***  | 23.1        | 11.5      | 0.1222    | 2.2       | 2.2       | 1.0000    | 3.6       | 0.0       | 0.1563    |
| Fertilizing based on nutritional deficiencies and doing it using soil analyses   | 3.9        | 6.9        | 0.3549    | 1.9         | 17.3      | 0.0075*** | 10.9      | 0.0       | 0.0214**  | 3.6       | 0.0       | 0.1563    |
| Fertilizing the full amount required   | 14.7       | 15.7       | 0.8463    | 69.2        | 63.5      | 0.5382    | 0.0       | 0.0       | n.a       | 3.6       | 0.0       | 0.1563    |
| Applying only chemical fertilizers   | 14.7       | 20.6       | 0.2727    | 50.0        | 71.2      | 0.0273**  | 0.0       | 0.0       | n.a       | 3.6       | 0.0       | 0.1563    |
| Applying only organic fertilizers  | 1.0        | 1.0        | 1.0000    | 9.6         | 9.6       | 0.7304    | 26.1      | 0.0       | 0.0001*** | 10.7      | 19.6      | 0.1912    |
| Applying chemical and organic fertilizers  | 7.8        | 0.0        | 0.0038*** | 28.8        | 3.8       | 0.0004*** | 0.0       | 0.0       | n.a       | 1.8       | 0.0       | 0.3195    |
| Implementing any pest & disease monitoring system                                | 12.7       | 2.0        | 0.0056*** | 13.5        | 23.1      | 0.3454    | 21.7      | 0.0       | 0.0006*** | 26.8      | 50.0      | 0.0795*   |
| Reporting insect pests affected their crop                                       | 2.0        | 3.9        | 0.4097    | 21.2        | 21.2      | 1.0000    | 13.0      | 0.0       | 0.0110    | 0.0       | 0.0       | n.a       |
| Using 1 method for each pest identified  | 1.0        | 3.9        | 0.1760    | 3.8         | 13.5      | 0.0826*   | 2.2       | 0.0       | 0.3200    | 0.0       | 0.0       | n.a       |
| Reporting diseases affected the crop   | 96.1       | 100.0      | 0.0436**  | 36.5        | 42.3      | 0.5517    | 84.8      | 100.0     | 0.0055*** | 76.8      | 83.9      | 0.3459    |
| Using 1 method for each disease identified                                       | 1.0        | 3.9        | 0.1760    | 3.8         | 9.6       | 0.2445    | 2.2       | 0.0       | 0.3200    | 0.0       | 0.0       | n.a       |
| With farm certifications   | 82.4       | 86.3       | 0.4437    | 0.0         | 0.0       | n.a       | 82.6      | 82.6      | 1.0000    | 60.7      | 83.9      | 0.0057*** |
| <b>Number of households</b>  | <b>102</b> | <b>102</b> |           | <b>52</b>   | <b>52</b> |           | <b>46</b> | <b>46</b> |           | <b>56</b> | <b>56</b> |           |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*); LB=baseline; LI=midline

Table 90. Continued

| Farmers (%)  | Nicaragua |           |           | Peru       |            |           | All countries |            |           |
|--|-----------|-----------|-----------|------------|------------|-----------|---------------|------------|-----------|
|  | LB        | LI        | p-value   | LB         | LI         | p-value   | LB            | LI         | p-value   |
| Implementing dead cover in their cacao plots                                     | 24.0      | 56.0      | 0.0000*** | 76.1       | 69.5       | 0.1282    | 55.3          | 65.8       | 0.0004*** |
| Implementing live/green cover in their cacao plots                               | 22.7      | 20.0      | 0.6926    | 35.7       | 36.2       | 0.9198    | 25.0          | 34.2       | 0.0009*** |
| Covering space between cacao rows with residues from weeding                     | 30.7      | 62.7      | 0.0001*** | 61.0       | 52.6       | 0.0786*   | 62.3          | 63.2       | 0.7541    |
| Using herbicides   | 6.7       | 4.0       | 0.4707    | 11.7       | 8.5        | 0.2613    | 8.8           | 5.3        | 0.0247**  |
| Applying fertilizer  | 20.0      | 33.3      | 0.0656*   | 43.7       | 32.4       | 0.0166**  | 36.4          | 34.0       | 0.4097    |
| Fertilizing based on nutritional deficiencies                                    | 4.0       | 4.0       | 1.0000    | 11.3       | 9.9        | 0.6372    | 12.9          | 8.6        | 0.0244**  |
| Fertilizing based on nutritional deficiencies and doing it using visual symptoms | 4.0       | 4.0       | 1.0000    | 9.4        | 3.8        | 0.0189**  | 10.3          | 3.5        | 0.0000*** |
| Fertilizing based on nutritional deficiencies and doing it using soil analyses   | 0.0       | 0.0       | n.a       | 1.9        | 6.1        | 0.0259**  | 2.9           | 5.3        | 0.0478**  |
| Fertilizing the full amount required   | 5.3       | 16.0      | 0.0345**  | 22.5       | 15.0       | 0.0473**  | 19.3          | 17.1       | 0.3462    |
| Applying only chemical fertilizers   | 18.7      | 22.7      | 0.5483    | 19.7       | 17.8       | 0.6207    | 18.2          | 20.8       | 0.2843    |
| Applying only organic fertilizers  | 1.3       | 2.7       | 0.5628    | 18.8       | 18.8       | 1.0000    | 11.8          | 10.8       | 0.6325    |
| Applying chemical and organic fertilizers  | 0.0       | 0.0       | n.a       | 5.2        | 4.2        | 0.6478    | 6.4           | 2.0        | 0.0003*** |
| Implementing any pest & disease monitoring system                                | 41.3      | 45.3      | 0.7237    | 41.3       | 77.9       | 0.0000*** | 30.1          | 44.5       | 0.0005*** |
| Reporting insect pests affected their crop                                       | 13.3      | 4.0       | 0.0425**  | 23.9       | 21.6       | 0.5645    | 14.7          | 11.8       | 0.1526    |
| Using 1 method for each pest identified  | 6.7       | 1.3       | 0.0968*   | 17.8       | 15.5       | 0.5168    | 8.6           | 8.3        | 0.8277    |
| Reporting diseases affected their crop   | 90.7      | 90.7      | 1.0000    | 92.5       | 93.4       | 0.7057    | 85.3          | 89.0       | 0.0703*   |
| Using 1 method for each disease identified                                       | 5.3       | 1.3       | 0.1747    | 17.4       | 15.0       | 0.5120    | 8.3           | 7.7        | 0.7377    |
| With farm certifications   | 62.7      | 64.0      | 0.8666    | 35.2       | 56.3       | 0.0000*** | 51.1          | 62.7       | 0.0001*** |
| <b>Number of households</b>  | <b>75</b> | <b>75</b> |           | <b>213</b> | <b>213</b> |           | <b>544</b>    | <b>544</b> |           |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

While in Peru, we observed statistically significant differences for seven indicators (3 increased at midline), we observed the same effect for six in Ecuador (1 increased), seven indicators in El Salvador (6 increased), seven in each of Guatemala (3 increased) four in Honduras (3 increased), and six in Nicaragua (4 increased). While in Peru we observed a decrease in the rates of indicators that relate to covering space between cacao rows with residues from weeding, applying fertilizers, fertilizing based on nutritional deficiencies and doing it using visual symptoms, and fertilizing the full amount required, we observed an increase in the rates of indicators that relate to fertilizing based on nutritional deficiencies and doing it using soil analyses, implementing pests and diseases monitoring systems, and farm certifications.

In Ecuador, adoption rates decreased for indicators that relate to covering space between cacao rows with residues from weeding, fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it using visual symptoms, the use of both chemical and organic fertilizers and the implementation of pests and disease monitoring systems; and increased for the incidence of diseases (that has nothing to do with adoption rates directly, but that do affect the use of control methods). In El Salvador we observed a decrease in the rate of farmers applying both chemical and organic fertilizers, and an increase in the rates of indicators that relate to the implementation of three soil management practices, fertilizing based on nutritional deficiencies and doing it using soil analyses, the use of chemical fertilizers only, and the control of pests.

In Guatemala, the decrease at midline related to indicators about fertilizing based on nutritional deficiencies, fertilizing based on nutritional deficiencies and doing it using soil analyses, the use of organic fertilizers only, and the implementation of pests and disease monitoring systems, while the increase related to indicators about two soil management practices, and the incidence of diseases (though the latter has no direct relation to adoption rates). In Honduras, at midline (compared to baseline), fewer farmers were fertilizing based on nutritional deficiencies, and more farmers were implementing dead cover in their cacao plots, were implementing pests and disease monitoring systems, and had farm certifications. In Nicaragua the decrease related to the incidence and control of insect pests, and the increase related to the implementation of dead cover in their cacao plots, covering the space between cacao rows with residues from weeding, applying fertilizers, and fertilizing the full amount required.

#### 5.2.10.12 Determinants of adoption of renovation & rehabilitation practices at midline

In the two regressions (renovation and rehabilitation and yields), we considered variables that would affect the adoption of R&R practices that were conceptually appropriate and with high-quality data and that were exogenous. Given that the processes that determine the adoption of R&R practices are similar, we used the same variables in these two regressions.

The variables included in the R&R regression are not the same as the baseline because we used a shorter instrument, which excluded some of the explanatory variables used in the baseline regressions. For the midline, we included sex of the household head, cacao area, number of cacao varieties, number of cacao trees, the trees age, whether the cacao had a shade crop, owns land, remittances, if anyone in the household had access to credit, whether farmers obtained information of cacao research products from NGOs or the Government and if some household member migrated within last six months.

In the two regressions, the combined analysis (for all countries) included variables to control country-specific effects (i.e., dummy variables for countries/region). Further, we estimated standard errors considering municipality fixed effects in all regressions. In Annex Table 8 and Annex Table 9 we provide the descriptive statistics for the variables included in the renovation and rehabilitation regressions, respectively. Next, we discuss the regression results.

## Renovation

The factors affecting the likelihood of implementing renovation practices by cacao farmers vary by region and country. Table 91 presents the Probit regression results for each region/country separately, and for all countries together.

In Central America<sup>41</sup>, only one factor had a statistically significant influence on the probability of implementing renovation practices: access to credit (positive effect at an increasing rate). More available resources through credit access are consistent with the increment in the probability of adopting renovation practices.

Only one variable significantly explains the probability of implementing renovation practices in Ecuador. Producers who reported obtaining information of cacao research products from the government, universities, or extension agents were less likely to do renovation. This effect was unexpected (although we observed the same at baseline) and maybe could be related to the complexity of (or how easy is for farmers to understand) this information, which may still not translate into a positive effect. This suggests that more attention may need to be paid to how this information is transmitted to farmers.

In Peru, the number of cacao varieties explained the rate of adoption positively, possibly because farmers who combine a high number of varieties in their plantation may be more likely to invest in productivity through renovation practices (Table 91).

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<sup>41</sup> Because of the small number of observations per country, Guatemala, Honduras and El Salvador were analyzed as a region.

**Table 91. Renovation Regressions results. Marginal Effects**

| <b>Variables</b>   | <b>Central America</b> | <b>Ecuador</b>      | <b>Peru</b>         | <b>All Countries</b> |
|--|------------------------|---------------------|---------------------|----------------------|
| Sex of HH head (1=male)  | 0.032<br>(0.066)       | -0.025<br>(0.117)   | -0.002<br>(0.061)   | 0.006<br>(0.044)     |
| Number of MOCCA trainings  | 0.030<br>(0.036)       | -0.051<br>(0.080)   | 0.026<br>(0.045)    | 0.023<br>(0.027)     |
| Number of MOCCA trainings squared  | -0.001<br>(0.004)      | 0.006<br>(0.008)    | -0.001<br>(0.004)   | -0.001<br>(0.003)    |
| Cacao area (Ha)  | -0.008<br>(0.078)      | 0.001<br>(0.162)    | 0.097<br>(0.145)    | -0.026<br>(0.044)    |
| Cacao area squared   | -0.004<br>(0.009)      | -0.005<br>(0.012)   | -0.024<br>(0.023)   | 0.001<br>(0.003)     |
| Number of cacao varieties  | 0.008<br>(0.032)       | -0.020<br>(0.092)   | 0.095***<br>(0.036) | 0.021<br>(0.019)     |
| Number of cacao trees  | 0.000<br>(0.000)       | 0.000<br>(0.000)    | 0.000<br>(0.000)    | 0.000<br>(0.000)     |
| Number of cacao trees squared  | 0.000<br>(0.000)       | 0.000<br>(0.000)    | -0.000<br>(0.000)   | -0.000<br>(0.000)    |
| Cacao age  | -0.009<br>(0.009)      | 0.021<br>(0.022)    | -0.002<br>(0.011)   | -0.001<br>(0.007)    |
| Cacao age squared  | 0.000<br>(0.000)       | -0.001<br>(0.001)   | 0.000<br>(0.000)    | -0.000<br>(0.000)    |
| Altitude   | 0.001<br>(0.001)       | -0.000<br>(0.001)   | -0.000<br>(0.000)   | 0.000<br>(0.000)     |
| Altitude squared   | -0.000<br>(0.000)      | 0.000<br>(0.000)    | 0.000<br>(0.000)    | -0.000<br>(0.000)    |
| Owns land (1=yes)  | -0.105<br>(0.097)      |                     | -0.011<br>(0.059)   | -0.022<br>(0.055)    |
| Remittances (1=yes)  | 0.066<br>(0.073)       |                     | -0.084<br>(0.115)   | -0.025<br>(0.064)    |
| Access to credit (1=yes)   | 0.239***<br>(0.075)    | 0.009<br>(0.137)    | 0.065<br>(0.062)    | 0.144***<br>(0.046)  |
| Received technical information about coffee thru NGO or government (1=yes) | -0.031<br>(0.064)      | -0.470**<br>(0.206) | 0.036<br>(0.063)    | -0.028<br>(0.043)    |
| HH member migrated within last 6 months (1=yes)                            | -0.129<br>(0.107)      | 0.084<br>(0.119)    | 0.027<br>(0.079)    | -0.002<br>(0.059)    |
| Has shade crop with cacao  |                        | 0.033<br>(0.143)    | 0.164*<br>(0.085)   | 0.139*<br>(0.078)    |
| <i>Control country</i>   | Yes                    | No                  | No                  | Yes                  |
| Observations   | <b>161</b>             | <b>95</b>           | <b>164</b>          | <b>422</b>           |

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Rehabilitation

In Central America, if farmers have shade crops with their cacao, this increases the probability of doing rehabilitation. This was the only variable with statistical significance in the regression. In Ecuador, the age of cacao trees negatively affected the probability of adoption of rehabilitation practices, possibly because after certain age, it becomes too costly to rehabilitate the coffee, and renovation may make more sense (even though this variable was not statistically significant in the renovation regression, it had the correct sign). Further, the number of cacao varieties positively affected the probability of doing rehabilitation, perhaps because farmers who have more varieties know more how to better manage each of them, which may be reflected in the rehabilitation practices they implement. In the case of Peru, due to the small number of observations and variability, it was not possible to find any statistically significant effect (Table 92). As we see in the regressions, except for Ecuador, the lack of statistical significance of the variables, particularly in Peru, is because most farmers reported doing at least one type of renovation, and there is little variability in the data. Because of this, for the final evaluation, we plan to analyze the types of pruning separately, for key types, or determine together with project implementers an alternative way to measure this indicator.



**Table 92. Rehabilitation Regressions results. Marginal Effects**

| Variables  | Central America   | Ecuador             | Peru              | All Countries     |
|--|-------------------|---------------------|-------------------|-------------------|
| Sex of HH head (1=male)  | -0.077<br>(0.072) | -0.232<br>(0.159)   | -0.000<br>(0.000) | -0.055<br>(0.041) |
| Number of MOCCA trainings  | 0.002<br>(0.045)  | 0.135<br>(0.110)    | 0.000<br>(0.000)  | -0.002<br>(0.024) |
| Number of MOCCA trainings squared  | 0.001<br>(0.006)  | -0.014<br>(0.011)   | 0.000<br>(0.000)  | 0.001<br>(0.002)  |
| Cacao area (Ha)  | 0.186<br>(0.142)  | -0.056<br>(0.134)   | 0.000<br>(0.000)  | -0.030<br>(0.033) |
| Cacao area squared   | -0.058<br>(0.036) | 0.008<br>(0.008)    | -0.000<br>(0.000) | 0.001<br>(0.002)  |
| Number of cacao varieties  | -                 | 0.204*<br>(0.115)   | -                 | 0.047<br>(0.037)  |
| Number of cacao trees  | -0.000<br>(0.000) | 0.000<br>(0.000)    | 0.000<br>(0.000)  | 0.000<br>(0.000)  |
| Number of cacao trees squared  | 0.000<br>(0.000)  | -0.000<br>(0.000)   | -0.000<br>(0.000) | -0.000<br>(0.000) |
| Cacao age  | -0.014<br>(0.018) | -0.016**<br>(0.007) | -0.000<br>(0.000) | -0.004<br>(0.003) |
| Cacao age squared  | 0.001<br>(0.001)  | 0.000*<br>(0.000)   | 0.000<br>(0.000)  | 0.000<br>(0.000)  |
| Altitude   | 0.000<br>(0.000)  | -0.000<br>(0.001)   | 0.000<br>(0.000)  | -0.000<br>(0.000) |
| Altitude squared   | -0.000<br>(0.000) | 0.000<br>(0.000)    | -0.000<br>(0.000) | 0.000<br>(0.000)  |
| Owns land (1=yes)  | -                 | -                   | 0.000<br>(0.000)  | -0.047<br>(0.067) |
| Remittances (1=yes)  | -0.014<br>(0.086) |                     |                   | 0.028<br>(0.079)  |
| Access to credit (1=yes)   | -0.057<br>(0.089) |                     | -0.000<br>(0.000) | 0.000<br>(0.058)  |
| Received technical information about coffee thru NGO or government (1=yes) | -0.030<br>(0.056) | -0.315<br>(0.297)   |                   | 0.010<br>(0.037)  |
| HH member migrated within last 6 months (1=yes)                            | -0.073<br>(0.093) | -0.067<br>(0.161)   | 0.000<br>(0.000)  | -0.046<br>(0.048) |
| Has shade crop with cacao  | 0.185*<br>(0.108) | -0.206<br>(0.224)   |                   | -0.019<br>(0.058) |
| Control country  | Yes               | No                  | No                | Yes               |
| Observations   | 127               | 69                  | 39                | 355               |

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### 5.2.10.13 Exploratory econometric analysis of the effect of training model and number of training sessions on the number of practices adopted and yields: Cacao in Peru

After the submission of this report, CIAT conducted an exploratory analysis of the effect of the training model used to train farmers and the number of training sessions received by farmers, on two outcome variables: the number of practices adopted and yields. We did this only for Peru. While three of these variables are self-explanatory, the training model refers to the MOCCA-promoted training model, which in cacao includes providing a training on the use of Cacao Movil to trainers, using the curricula from Cacao Movil in the trainings with farmers, and doing mostly individual technical visits to farmers (and seldom doing group training sessions). Just recently (2022), in this country, project implementers started using demonstrative plots and to do group trainings, but since we use data from the recently completed season, this change would have no effect on this analysis. From now on, we refer to this as the MOCCA model. In this variable, we compare the MOCCA model with other models used by anchor firms to train farmers. We expect that the MOCCA model will have a positive significant effect on outcome variables as it allows for higher interaction between project implementers and beneficiary farmers.

For this analysis, we used panel data for 213 farmers from Peru, who were interviewed both at baseline (2020) and midline (2022). Descriptive statistics show that farmers trained with the MOCCA model (48% of farmers) received a higher number of trainings. Further, we see no variation (between baseline and mid line) in the number of practices adopted regardless of the training model (New Annex Table 5). Given that a smaller share of farmers trained with the MOCCA model reported a decrease in yields, compared to farmers trained with other methods, a more detailed analysis (beyond the current one) becomes necessary.

Regression analysis showed that the differences (in descriptive statistics) we observed were statistically significant for the number of practices adopted (New Annex Table 7) but not for yields (New Annex Table 8): farmers trained with the MOCCA model adopted (roughly 1.5) more practices. Other variables that positively affected the number of practices adopted were having access to credit, receiving information from research products from NGOs/Government, making joint decisions on the use of cacao income, distance to closest town, elevation, tree density the number of varieties grown and having shade with cacao.

Finally, as the results show (New Annex Table 7 and New Annex Table 8), the number of trainings received by farmers has no statistically significant effect on the number of practices adopted or yields. Descriptive statistics of the regression variables are in New Annex Table 6.

#### 5.2.11 Key farm level MOCCA indicators

In this section, we present key MOCCA indicators for each country, and then disaggregate these indicators by sex of household head and size of the cacao area. The USDA requested key indicators are disaggregated by these variables using the following groups: (1) sex of household head: male vs. female headed households; (2) size of cacao area: <5 ha vs. >5 ha. In the Annex Table 10 thru Annex Table 15 we present similar results, disaggregated by anchor firm for each country. However, we provide the latter information as a reference only, since the evaluation of the MOCCA project was designed the country and project level, and the sample is (hence the results are) not representative at the anchor firm level.

### 5.2.11.1 By country

In Guatemala, at midline, farmers harvested 625 kg dry cacao/ha, followed by Peru (547 kg dry cacao/ha), Honduras (407 kg dry cacao/ha), El Salvador (340 kg dry cacao/ha), Ecuador (287 kg dry cacao/ha) and Nicaragua (270 kg dry cacao/ha). In Ecuador, the crop situation is different. The country continues to have the largest production area per producer (3.23 ha), generating annual cacao sales of US\$2,273 per farmer. In Central America, annual sales were US\$775 in Nicaragua, US\$688 in Guatemala, US\$471 in El Salvador, and US\$364 in Honduras (Table 93).

**Table 93. Cacao: MOCCA key indicators for USDA by country, at midline**

| Key USDA indicators   | Ecuador    | El Salvador | Guatemala | Honduras  | Nicaragua | Peru       | All countries |
|---|------------|-------------|-----------|-----------|-----------|------------|---------------|
| Yield (kg dry/ha) *   | 287        | 340         | 625       | 407       | 270       | 547        | 434           |
| Area cacao (ha)   | 3.32       | 0.96        | 1.02      | 1.62      | 1.65      | 2.14       | 2.04          |
| Value of annual cacao sales (US\$) - includes only producers who sold | 2,460      | 571         | 719       | 417       | 818       | 2,470      | 1,743         |
| Value of annual cacao sales (US\$)                                    | 2,273      | 471         | 688       | 364       | 775       | 2,447      | 1,642         |
| Annual amount of cacao sold (kg dry)                                  | 867.4      | 240.7       | 337.4     | 308.0     | 415.1     | 1,136.5    | 749.2         |
| <b>Number of households</b>   | <b>107</b> | <b>52</b>   | <b>46</b> | <b>56</b> | <b>75</b> | <b>213</b> | <b>549</b>    |

\*1 ha (hectare) = 10,000 square meters

When we compare midline to baseline results (Table 94), for the combined (all countries) analysis, we observed a statistically significant increase in cacao yields, and the effects were different depending on the country. For example, in Ecuador, the only significant difference was in the value of annual cacao sales, which decreased at midline. In El Salvador, yields, the amount sold, and the value of sales all increased significantly at midline. In Guatemala, the value of annual cacao sales significantly doubled at midline. In Honduras, production, yields and the amount of cacao sold per hectare all decreased at midline. In Nicaragua, the area with cacao decreased, and the value of sales increased at midline. The latter was surprising, as the amount sold was statistically the same, suggesting that at midline, farmers reported a higher per unit price. Finally in Peru, production, yields and the amount sold increased at midline.<sup>42</sup>

<sup>42</sup> Midline values in the panel analysis are not equal to midline values in Table 93 because the number of observations used is different.

*Table 94. Cacao: Panel analysis results of yields and sales, by country*

| Farmers (%)                             | Ecuador   |           |           | El Salvador |           |           | Guatemala |           |           | Honduras  |           |          |
|---|-----------|-----------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|
|   | LB        | LI        | p-value   | LB          | LI        | p-value   | LB        | LI        | p-value   | LB        | LI        | p-value  |
| Cacao area (ha)                         | 3.03      | 3.36      | 0.5447    | 1.27        | 0.96      | 0.2780    | 1.06      | 1.02      | 0.8772    | 1.53      | 1.62      | 0.6924   |
| Cacao production (kg dry)               | 1,092     | 887       | 0.3686    | 120         | 122       | 0.9745    | 433       | 351       | 0.4665    | 308       | 213       | 0.0734*  |
| Cacao yields (kg dry/ha)                | 337       | 298       | 0.5229    | 64          | 128       | 0.0753*   | 420       | 511       | 0.3089    | 201       | 150       | 0.0897*  |
| Annual amount of cacao sold (kg dry/ha) | 346       | 349       | 0.9731    | 27          | 110       | 0.0057*** | 454       | 463       | 0.9242    | 229       | 141       | 0.005*** |
| Value of annual cacao sales (US\$/ha)   | 838       | 580       | 0.0021*** | 60          | 505       | 0.000***  | 506       | 1,031     | 0.0059*** | 243       | 242       | 0.9958   |
| <b>Number of households</b>             | <b>99</b> | <b>99</b> |           | <b>51</b>   | <b>51</b> |           | <b>44</b> | <b>44</b> |           | <b>46</b> | <b>46</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

Table 94. Continued

| Farmers (%)                             | Nicaragua |           |          | Peru       |            |           | All countries |            |           |
|---|-----------|-----------|----------|------------|------------|-----------|---------------|------------|-----------|
|   | LB        | LI        | p-value  | LB         | LI         | p-value   | LB            | LI         | p-value   |
| Cacao area (ha)                         | 2.57      | 1.65      | 0.0289** | 2.40       | 2.14       | 0.5893    | 2.23          | 2.03       | 0.3954    |
| Cacao production (kg dry)               | 803       | 436       | 0.1318   | 799        | 1,214      | 0.0014*** | 756           | 821        | 0.4379    |
| Cacao yields (kg dry/ha)                | 338       | 267       | 0.5253   | 352        | 565        | 0.000***  | 329           | 409        | 0.0059*** |
| Annual amount of cacao sold (kg dry/ha) | 354       | 277       | 0.5229   | 440        | 565        | 0.0062*** | 375           | 417        | 0.2199    |
| Value of annual cacao sales (US\$/ha)   | 364       | 500       | 0.0225** | 993        | 1,160      | 0.3658    | 673           | 795        | 0.1261    |
| <b>Number of households</b>             | <b>75</b> | <b>75</b> |          | <b>213</b> | <b>213</b> |           | <b>528</b>    | <b>528</b> |           |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

LB=baseline; LI=midline

#### 5.2.11.2 By sex

Since we did not statistically test differences between baseline and midline in the remaining sections, we only interpret midline results. When analyzed by sex of the household head, none of the differences (all countries combined) were statistically significant. However, we did observe differences in some of these indicators in Honduras and Nicaragua. In Honduras, male heads reported growing a larger area with cacao, the only indicator for which differences were statistically significant in this country. In Nicaragua, male headed households reported a larger cacao area and a higher value of sales (Table 95).

*Table 95. Cacao: MOCCA indicators for USDA by sex of household head, at midline*

| Key USDA indicators   | Ecuador   |           |         | El Salvador |           |         | Guatemala |           |         | Honduras  |           |          |
|---|-----------|-----------|---------|-------------|-----------|---------|-----------|-----------|---------|-----------|-----------|----------|
|   | Female    | Male      | p-value | Female      | Male      | p-value | Female    | Male      | p-value | Female    | Male      | p-value  |
| Yield (kg dry/ha)*  | 263.9     | 247.3     | 0.8873  | 112.1       | 396.5     | 0.4952  | 685.5     | 596.2     | 0.7811  | 953.1     | 133.7     | 0.1671   |
| Area cacao (ha)   | 3.32      | 3.32      | 0.9990  | 1.01        | 0.94      | 0.9032  | 0.60      | 1.22      | 0.1134  | 1.20      | 1.84      | 0.0392** |
| Value of annual cacao sales (US\$) - includes only producers who sold | 2,242     | 2,519     | 0.8162  | 436         | 602       | 0.7463  | 524       | 820       | 0.2296  | 333       | 458       | 0.3163   |
| Value of annual cacao sales (US\$)                                    | 2,047     | 2,334     | 0.7942  | 317         | 514       | 0.6303  | 524       | 767       | 0.3177  | 281       | 407       | 0.2695   |
| <b>Number of households</b>   | <b>23</b> | <b>84</b> |         | <b>11</b>   | <b>41</b> |         | <b>15</b> | <b>31</b> |         | <b>19</b> | <b>37</b> |          |

Table 95. Continued.

| Key USDA indicators   | Nicaragua |           |          | Peru      |            |         | All countries |            |         |
|---|-----------|-----------|----------|-----------|------------|---------|---------------|------------|---------|
|   | Female    | Male      | p-value  | Female    | Male       | p-value | Female        | Male       | p-value |
| Yield (kg dry/ha)*  | 215.8     | 282.1     | 0.1650   | 545.3     | 542.5      | 0.9635  | 506.4         | 401.8      | 0.2104  |
| Area cacao (ha)   | 0.83      | 1.83      | 0.0365** | 2.28      | 2.10       | 0.6786  | 1.84          | 2.11       | 0.2615  |
| Value of annual cacao sales (US\$) - includes only producers who sold | 341       | 926       | 0.0951*  | 2,472     | 2,469      | 0.9940  | 1,559         | 1,801      | 0.4333  |
| Value of annual cacao sales (US\$)                                    | 316       | 880       | 0.091*   | 2,472     | 2,439      | 0.9415  | 1,453         | 1,702      | 0.3933  |
| <b>Number of households</b>   | <b>14</b> | <b>61</b> |          | <b>50</b> | <b>163</b> |         | <b>132</b>    | <b>417</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

#### 5.2.11.3 By size of cacao area

In general, in terms of yield, there are no significant differences in farm size among countries and in three countries we could not statistically compare results because larger farms were not represented in the sample. In the remaining countries for the remaining indicators shown, we did observe statistically significant differences because these indicators were directly related to the size of the farm (larger farmers obtained higher values for these indicators). We discuss the values as a reference, as the reason for the differences were given by the farm size. Small farmers had, on average, 1.6 ha vs. 10 ha of the larger farmers. Farmers with smaller farms (<5 ha) obtained on average US\$1,543 from annual cacao sales, compared to the US\$7,237 obtained by larger producers (> 5 ha). We do not discuss the differences for each country, as the trend (as one would expect), is the same (Table 96).

*Table 96. Cacao: MOCCA indicators for USDA by cacao area, at midline*

| Key USDA indicators   | Ecuador   |           |          | El Salvador |          |         | Guatemala |          |         | Honduras  |          |         |
|---|-----------|-----------|----------|-------------|----------|---------|-----------|----------|---------|-----------|----------|---------|
|   | ≤5 ha     | >5 ha     | p-value  | ≤5 ha       | >5 ha    | p-value | ≤5 ha     | >5 ha    | p-value | ≤5 ha     | >5 ha    | p-value |
| Yield (kg dry/ha)*  | 252.9     | 239.0     | 0.917    | 345.1       | 99.4     | n.a.    | 638.7     | 61.6     | n.a.    | 406.9     | n.a.     | n.a.    |
| Area cacao (ha)   | 1.89      | 11.45     | 0.000*** | 0.77        | 10.50    | n.a.    | 0.89      | 7.00     | n.a.    | 1.61      | n.a.     | n.a.    |
| Value of annual cacao sales (US\$) - includes only producers who sold | 1,202     | 8,905     | 0.000*** | 1,913       | 8,280    | n.a.    | 712       | 1,036    | n.a.    | 1,416     | n.a.     | n.a.    |
| Value of annual cacao sales (US\$)                                    | 1,107     | 8,905     | 0.000*** | 1,577       | 8,280    | n.a.    | 680       | 1,036    | n.a.    | 1,239     | n.a.     | n.a.    |
| <b>Number of households</b>   | <b>92</b> | <b>16</b> |          | <b>51</b>   | <b>1</b> |         | <b>45</b> | <b>1</b> |         | <b>56</b> | <b>0</b> |         |

Table 96. Continued.

| Key USDA indicators   | Nicaragua |          |          | Peru       |          |          | All countries |           |          |
|---|-----------|----------|----------|------------|----------|----------|---------------|-----------|----------|
|   | ≤5 ha     | >5 ha    | p-value  | ≤5 ha      | >5 ha    | p-value  | ≤5 ha         | >5 ha     | p-value  |
| Yield (kg dry/ha)*  | 270.5     | 249.1    | 0.848    | 550.7      | 351.8    | 0.146    | 435.2         | 261.4     | 0.273    |
| Area cacao (ha)   | 1.44      | 9.18     | 0.000*** | 1.88       | 7.94     | 0.000*** | 1.60          | 10.02     | 0.000*** |
| Value of annual cacao sales (US\$) - includes only producers who sold | 707       | 4,681    | 0.000*** | 2,327      | 6,092    | 0.000*** | 1,639         | 7,496     | 0.000*** |
| Value of annual cacao sales (US\$)                                    | 668       | 4,681    | 0.000*** | 2,316      | 5,415    | 0.000*** | 1,543         | 7,237     | 0.000*** |
| <b>Number of households</b>   | <b>73</b> | <b>2</b> |          | <b>204</b> | <b>9</b> |          | <b>520</b>    | <b>28</b> |          |



## 6 Conclusions and recommendations

### 6.1 Coffee

We next summarize main conclusions and recommendations from the market system and farmer level midline evaluation, for coffee.

#### Gender equity

A key aspect of MOCCA's work has been to foster gender equity in all the different activities it is engaged in. Farmers are now more conscious about gender equity issues, and in all countries, informants reported that there have been advances in this regard. In Honduras, informants commented that as a result of MOCCA, gender equity is receiving much more needed attention. One firm, for example, has a project through which women commercialize coffee directly. The incorporation of the family unit and more women in TA sessions is generally seen as a strength by informants. Many women have participated in TA activities, even if there is potential for many more to join. In Peru, several anchor firms reported achievements in relation to gender equity, including: increased financing opportunities for women, the creation of women's groups, the purchasing of coffee "*produced by women*", more influence of women in decision-making, and the hiring of women as technical assistance providers. At the same time, various interviewees recognize that machismo continues to exist, and that women's participation levels are still lower than men's.

Several interviewees noted that, despite progress, it is necessary to incorporate more women. An interviewee in Nicaragua noted that roughly 16% of the credit that is granted is for women, and men still lead most of the TA. In El Salvador there has been minimal gender equity related work as part of MOCCA beyond promoting women's participation in the various activities through the strengthening of the Women's Coffee Alliance. Generally, inclusion logics have not transcended the participation quotas measure. In the case of a financial institution MOCCA is collaborating with, merely 7% of the loans the institution offers are granted to women, so there is still a lot to do in terms of making women viable candidates for financial services. In Honduras, another critique is that even though women have participated in the trainings, some perceive the MOCCA's gender goals to be too high, considering the role that women usually play in coffee households. There are of course different opinions in this regard, with variation across those who want to prioritize changing gender patterns in the coffee sector and those who see it as a secondary issue. Gender norms and long-standing perceptions about gendered divisions of labor persist and achieving cultural shifts around gender will inevitably be gradual. Still, most interviewees acknowledge that the issue is receiving systematic attention and that some improvements have been achieved.

#### Recommendations for MOCCA from informants

Some of the recurring proposals for MOCCA shared by informants are the following:

1. To extend the duration of MOCCA's work to continue consolidating the various activities they are engaged in.
2. It'd be valuable for different MOCCA partners to be able to share their experiences with each other and learn from the various initiatives different actors are engaged with.

3. Establish mechanisms to make it more viable for farmers to access high quality genetic material. In many places, even though there is an offer of quality plants and seeds, they are too expensive from the point of view of farmers. Several interviewees commented that it'd be helpful if MOCCA could promote and financially support the access to better genetic material because it is expensive for farmers to do it themselves.
4. Research findings need to be disseminated with farmers more widely. They are frequently shared amongst MOCCA partners but rarely with farmers.
5. Much remains to be done in terms of improving farmers' market access, both conventional and niche market opportunities. There is also the need to promote organic production more.
6. In all countries, demonstration plots are particularly valued, and so having more of them and having some larger ones would be beneficial for farmers. Farmers could be more motivated to implement R&R if they had the opportunity to exchange information with other growers, be it at the local, national or regional level. Observing successful experiences first-hand is likely more effective than simply being told that these changes to their production systems are beneficial.
7. It would be helpful if people providing technical assistance were also trained on topics related to commercialization, market access, and quality so that they could address farmers' questions in a more comprehensive manner.
8. In all countries, informants consider progress with regards to improving financial services to fall short of needs in the sector. Most informants agree that there is a need to do more in this regard to address challenges to financing for small farmers. This could include additional efforts to support engagement and capacity building with financial institutions and engagement with other projects and initiatives to join efforts in driving changes within the market system vis a vis finance for small farmers. MOCCA might consider engaging development banks and impact investors targeting private sector actors such as MFIs and exporters including IFC, INVEST and FMO for example.

Regarding the results from the **farmer level evaluation**, we now discuss the main conclusions in terms of changes in key indicators observed, in seven groups of indicators.

#### ***Household characteristics***

- Among coffee farmers, the household head is the primary decision-maker about using the income from coffee sales, which is primarily a man (>50% of the households). Generally, this decision is consulted with other household members, except in El Salvador, and to a lesser degree, Honduras. The latter is a change (increase) from baseline, where in most households, this decision was not consulted with anyone.
- Migration was practically the same as for the baseline, and low. However, at midline, migration was slightly higher in Honduras than in any other MOCCA country.
- Regarding additional sources of income, we found that the rate of households that reported receiving subsidies (21%) or remittances (7.9%) is practically the same as for the baseline.

#### ***Farm characteristics***

- Farmers dedicated 2.06 ha for coffee cultivation, which is slightly lower than for the baseline (2.4 ha) when comparing the panel analysis results, possibly influenced by the fact that the midline

data comes from a sub-sample of baseline farmers, or because farmers may have lost some coffee area during the 2019 storms that affected the Central American region, or because of abandonment of land.

- The number of plots per household remains similar to those reported at baseline, with 63% of farmers having only one coffee plot.
- Few farmers established new coffee plots since the baseline (only 7.8% reported this).
- In general, the share of farmers doing a diagnosis of their coffee farms increased from 24.4% at baseline to 31.1%; except in Guatemala, where this percentage is lower than at baseline.
- Covering the space between coffee rows with residues from weeding (76.3%) and having dead cover in their coffee plots (62.7%) are the most frequent soil conservation practices, and the adoption of the former significantly increased from baseline (panel analysis results).
- Scheduling weeding activities is the most typical cost-saving practice to control weeds (47.5%), followed by using a weed-wacker (23.1%). While the share of farmers reporting the former has increased from the baseline value of 34.5%, the latter has decreased from the 39% who reported this.
- The coffee plantations had an average minimum age of 5.3 years and an average maximum age of 7.6 years, and the average unweighted age was 6.45 years (up from 6.39 years at baseline).

### ***Access to financing***

- Few farmers requested and obtained a loan (only 23.3% did this vs. roughly 27% at baseline), except in Nicaragua, where the percentage was higher than in all other countries (54.2%), but lower than the baseline value (of 67%). Since this is a decision that farmers make by themselves, it becomes difficult for MOCCA to have a direct effect on this indicator, except indirectly thru improving the conditions under which loans may be offered (which makes these offers more attractive to them).
- Among farmers obtaining a loan at midline, only 14.3% (equivalent to 3.3% of all farmers in the sample<sup>43</sup>) reported a MOCCA anchor firm as the source of this loan. This source remains practically the same as in the baseline (when of the 27% who obtained a loan, only 14.9% stated a MOCCA anchor firm was the source of this loan, equivalent to 4% of all sampled farmers). These results are mostly driven by farmers in Nicaragua, as none or close to no farmer reported this source in any other country (both at baseline and midline). Given that MOCCA has provided funding thru anchor firms, which in turn provide funding to farmer organizations for harvest pooling and processing, to guarantee the fulfillment of contracts, it is likely that farmers may be receiving loans but do not know these come from MOCCA, which would explain this finding.
- Of farmers willing to provide additional information, we found that 87.5% (equivalent to 15% of all farmers) used the loan in the coffee crop (up from the 80.5% willing to provide the same information at baseline, which is equivalent to 10.2% of all farmers). The most common use of the loan at midline was to purchase inputs for coffee (58.7%), followed by coffee renovation (23.4%) and rehabilitation (19%).

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<sup>43</sup> To estimate this value, we multiplied the share of farmers obtaining a loan times the share of farmers reporting a MOCCA anchor firm as the source of this loan. We did this for both the midline and baseline results, to be able to compare the change over time. This is the same process followed for other indicators where we need to compare unconditional results (or sample-level results), but for which we have provided conditional values in this report.

### ***Farmers' access to products of research***

- Receiving information about coffee research increased since the baseline (from 16.4% to 35.4%), and the most significant change happened in Peru and Guatemala.
- Among those who received information, the primary source was non-governmental organizations, a sharp increase from baseline (from 47% to 61% of farmers receiving information, which is equivalent to an increase from 7.7% to 21.7% of all farmers in the sample).
- Most farmers (91.6% of the ones who received this information, equivalent to 32.4% of all sampled farmers) said they were able to use the information to make farming decisions, a considerable increase from baseline (88.1% of the ones who received this information, equivalent to 14.5% of all farmers). Those who could not use the information said they could not implement the recommendations, a change from baseline, when most did not consider the information helpful.
- Regarding farmers' perception of the training, most reported these were very useful (53.7%) or useful (42.8%). This ranking was consistent among Central American countries, except in Peru, where most farmers reported that training was useful. The latter suggests that, in general, farmers are benefiting from the MOCCA training.

### ***Adoption of farm-level practices***

- 85% of farmers reported their coffee plots had shade trees<sup>44</sup> (up from 64% at baseline), and 53.8% of them (equivalent to 45.7% of all sampled farmers) said they managed the shade crop, also an increase from baseline (of 36.5% of all sampled farmers).
- The share of farmers doing coffee renovation in the agricultural year of reference was 21.3%, a statistically significant (albeit small) decrease from the 24.4% who did this at baseline (panel analysis results), and this decrease was driven by a reduction in renovation in Nicaragua and (mostly) Peru. As discussed in the results section, this could be justified because farmers who had already renovated coffee at baseline may not need to renovate more coffee, and thus a smaller share reported this at midline. Further, the share of farmers renovating based on a production diagnostic tool decreased from 59.8% of farmers renovating coffee at baseline to 26.3% of farmers doing this at midline (equivalent to 14.4% and 6.6% of sampled farmers, respectively).
- Implementing rehabilitation practices (63%) was more common than renovation practices in the midline year of reference, and this proportion remains unchanged compared to baseline results (of 62.9%), using panel analysis. Only in El Salvador we observed a statistically significant increase in the share of farmers doing rehabilitation at midline, but there were differences across countries depending on the type of rehabilitation done. While doing normal pruning and stumping was statistically significantly more common at midline, doing rejuvenation and stress formation remained unchanged, and practically inexistent, suggesting more needs to be done to promote the use of the latter two practices (perhaps teach farmers the benefits of these techniques, and how to properly do them). The share of farmers doing normal pruning increased at midline in all countries except El Salvador, suggesting this practice needs to be promoted more intensively in this country. In contrast, the share of farmers doing stumping increased at midline only in

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<sup>44</sup> At baseline, we estimated “no shade” as plots with “<5% of shade.” Although we collected disaggregated data for this indicator at midline (“no shade” separated from plots with “1%-<5% shade”), to compare both values, we re-estimated midline values in the same way as for the baseline.

Honduras and Nicaragua, suggesting there is room for improvement in the adoption of this practice in the remaining countries, particularly Peru. Further, the share of farmers rehabilitating coffee based on a production assessment drastically decreased from roughly 35% at baseline to 6% at midline.

- 21.6% of farmers reported managing seedbeds in their farms at midline, a reduction from the 35.9% reporting this at baseline. At midline, managing seedbeds was more common in Nicaragua and practically non-existent in El Salvador. Further, 28.9% of farmers managed nurseries in their farms at midline, a considerable increment compared to the baseline (of 19.4%). In most countries, buying seedlings from certified nurseries was not common (as wasn't at baseline).
- Most farmers (88.3%) reported applying fertilizer in the midline year of reference, and while this share increased in Nicaragua (vs. baseline), it decreased in El Salvador (panel analysis results). However, fertilizing based on nutritional deficiencies was not common, especially in Guatemala and El Salvador. When farmers fertilized based on nutritional deficiencies, it was more common to do this based on visual characteristics of the plant instead of results from soil analysis. Applying the full dosage was significantly higher at midline vs. baseline, though the magnitude of this increase was small, and driven by a statistically significant increase in El Salvador and Honduras only. Although using only chemical fertilizers at midline is still quite common (and statistically more common than at baseline), the use of only organic fertilizers significantly increased at midline. The use of only chemical or only organic fertilizers was statistically significantly higher at midline in all countries except El Salvador. Overall, the share of farmers using only chemical fertilizers was much higher in Central America than in Peru, and the opposite is true for the use of only organic fertilizers (higher in Peru than Central America).
- 26.1% of farmers implemented a pest & disease monitoring system, a statistically significant decrease from the 31% who reported this at baseline, mostly driven by a decrease in the share of farmers who did this at midline in Guatemala and Honduras (despite observing an increase at midline in Nicaragua). Compared to baseline, the incidence of pests was lower at midline, but the incidence of diseases was higher. However, for the latter, a much higher share of farmers implemented at least one method to control diseases at midline (55%) compared to baseline (47%).

### ***Coffee quality***

- Among farmers harvesting coffee, 78.3% (equivalent to 76% of sampled farmers) classified coffee cherries after the harvest, an increase from the 57.7% (equivalent to 56% of sampled farmers) doing this at baseline. Doing this was less common in Nicaragua and Guatemala.
- Roughly 61% of farmers could name at least three physical factors affecting coffee quality, especially in Nicaragua, a sharp increase from the 49% who reported this at baseline.
- Only 24.3% of farmers knew their coffee cup grade (a slight increase from 21.7% at baseline). In Peru and Honduras, a higher share of farmers knew this compared to all other countries. Among farmers harvesting, only 7.4% reported receiving a premium due to their cup grade, an increase from the 2.5% who reported this at baseline.
- 41% of farmers reported having at least one certification, a minor improvement from baseline (38%). El Salvador and Guatemala are still the countries where this is less common (especially the former).

### ***Yields, and sales***

- Panel analysis results show that farmers harvested 930 kg of green coffee/ha (oscillating from 555 kg/ha in El Salvador to 1,133 kg/ha in Nicaragua). These yields suggest a statistically significant increase from the yields observed at baseline in all countries except Honduras.
- Further, panel analysis results show that farmers sold an average of 869 kg of green coffee/ha (a significant increase from the 731 kg/ha reported at baseline), representing a gross annual income of US\$4,709/ha (vs. US\$1,993/ha at baseline), an increase most likely due to the higher yields and possibly better prices at midline.
- At midline, although 42.6% of farmers sold coffee to a MOCCA anchor firm, the volume sold was quite small (accounted for roughly 6% of the total volume). Although we did not estimate the latter at baseline (because we did not collect the information), the share of farmers selling to MOCCA anchor firms increased (from 30% at baseline).

### **Recommendations for MOCCA from farmer-level results**

Although we observe a positive trend in the adoption rates for many of the MOCCA-promoted practices, we recommend the following to project implementers, to increase the benefits coffee farmers realize:

1. Farm diagnosis: although we observed a positive trend in the number of farmers doing a diagnosis of their coffee farm, more efforts are necessary to improve this, especially in Guatemala. Correctly implementing this will help farmers make better informed decisions, which may have a positive effect on yields. Further, we recommend MOCCA to continue (and even more aggressively promote) the use of farm diagnosis to make farming decisions, as we observed a decrease in the use of this tool at midline to make renovation and rehabilitation decisions.
2. Soil management practices: although the adoption of two of these practices (covering the space between coffee rows with residues from weeding and having dead cover in their coffee plots) is still common (and the former significantly increased from baseline, though modestly) more needs to be done to promote the use of live/green cover, as doing this has not changed over time and roughly only one out of four farmers do this.
3. Improve the access to financing: while close to one out of four farmers requested a loan, farmers are still using other sources for these loans, as the share of all sampled farmers reporting any MOCCA anchor firm as the source of the loan was quite small. Having cash at hand is key to implement renovation and rehabilitation practices (particularly renovation), thus highlighting the fact that loans can be necessary to increase the adoption of such practices. However, this needs to be evaluated against the need to do these practices, and the need for external funding if farmers do not have their own resources to invest. Further, since this is a decision that farmers make by themselves, it becomes difficult for MOCCA to have a direct effect on this indicator, except indirectly thru improving the conditions under which loans may be offered. Given the current cost of inputs, affordable financing may become more necessary in the next production cycle, as the primary use of the loans is to purchase inputs for coffee, and farmers will have more challenging to buy the (more expensive) inputs.
4. Access to products of research: even though receiving information about coffee research products increased since the baseline more needs to be done in this area, as the increase was most significant only in two countries (Peru and Guatemala). MOCCA needs to identify a strategy that would allow implementers to identify key products they want to communicate, and how they could do this to reach more farmers. This is particularly key, given that most farmers receiving it reported they have used the information to make farming decisions.

5. Given that buying seedlings from certified nurseries was not common because there are no nursery certification systems in any of the countries MOCCA operates in, MOCCA should continue supporting market system actors to create certification systems, and to help countries identify sources of genetically pure seed, as these are vital to expanding access to certified or verified materials but by nature (since they depend on decisions made by others) they take longer to develop, for which the program may need additional time and resources.
6. Renovation: given that the share of farmers doing coffee renovation has decreased over time, particularly in Peru and Nicaragua, and that roughly only one out of five farmers reported doing this practice, the future need for renovating coffee may be modest. We analyze additional key variables that are related to renovation needs to better understand this finding. Midline results suggest that 11.5% of the trees needed renovation, and this need was highest in El Salvador (14% of trees need renovation), followed by Nicaragua (13%), Guatemala (11%), Peru (10%), and Honduras (9%). However, when we analyze the number of trees that need renovation, the ranking changes (mostly because this is directly affected by the coffee area), as farmers in Nicaragua had the largest need (1,977 trees), followed by Peru (1,163 trees), Honduras (877 trees), Guatemala (553 trees) and El Salvador (438 trees). Further, the average maximum age of the coffee plantations was highest in Guatemala (9.2 years), followed by Honduras (7.6 years), El Salvador (7.3 years), Nicaragua and Peru (7.1 years). Because of this, we recommend that MOCCA continue with its integral approach of promoting many practices aimed at increasing productivity, which include evaluating the performance of current genetic materials (i.e., may be the plantations are young but under a rust-susceptible variety that may require renovation if other practices are not successful at increasing yields), plant-nutritional practices, practices to improve coffee quality, rehabilitation, soil management, etc. We are not suggesting renovation should not be promoted, instead, that more emphasis may be needed in other practices that will contribute to increase productivity in current coffee plantations.
7. Rehabilitation: MOCCA can still make improvements in this area and should continue dedicating resources to the promotion of rehabilitation practices, as even though a high share of farmers rehabilitate coffee, very few (6%) do this based on a production assessment or use more than a single pruning method. Further, MOCCA can promote the adoption of the two practices less used (stress formation and rejuvenation), and stumping, while continuing with the promotion of normal pruning (which was the most common pruning practice adopted). Although we observed a statistically significant increase in the share of farmers doing rehabilitation at midline only in El Salvador, we recommend MOCCA to continue promoting this practice in all countries, especially in El Salvador, because it was in this country where fewer farmers did rehabilitation. Further, normal pruning needs to be promoted more intensively in El Salvador, as fewer farmers implemented this practice (which was the most common) in this country. More efforts are needed to teach farmers to make rehabilitation decisions based on a production assessment, as doing this was not common.
8. Efficient use of fertilizers: the increase observed in the use of organic fertilizer may most likely be related to the recent increase in the cost of chemical inputs. Despite this, we also observed an increase in the use of chemical fertilizers. Since this (i.e., high cost of inputs) is expected to last, we recommend MOCCA to continue the promotion of the use of organic fertilizers, combined with the efficient use of chemical fertilizers, because it is still not common for farmers to fertilize based on nutritional deficiencies, and when they do this, it is more common to do it based on

visual characteristics of the plants instead of results from a soil analysis. Teaching farmers to fertilize based on nutritional deficiencies will probably require expanding training length or identifying additional ways to incentivize the adoption of this practice and may be more necessary in Guatemala and El Salvador (where doing this was less common vs. all other countries). Although we observed an increase in the share of farmers applying the full dosage, the magnitude of this increase was small, and still one-half of the farmers do not apply the full dosage. More efforts should be dedicated in El Salvador to promote the use of chemical or organic fertilizers, as this was the only country where we did not observe a statistically significant increase at midline. Finally, we recommend promoting the use of organic fertilizers in Central America more than in Peru (as doing this is more common in Peru), and the use of chemical fertilizers more in Peru than in Central America (except among farmers with organic certifications), as doing this is less common in Peru.

9. Coffee quality: it seems necessary to increase the promotion of the practice of classifying coffee cherries after harvest, particularly in Nicaragua and Guatemala, where doing this was less common. Further, even though we observe an increase in the knowledge about the cup quality, few farmers (albeit more than at baseline) are receiving a premium because of this. If farmers are not compensated (or do not know they are being compensated) for quality, they will be less likely to adopt practices that could positively affect this.
10. Access to better markets: although we observe that a higher share of farmers reported selling coffee to firms participating in the MOCCA project (higher than at baseline), the share of the volume sold to these firms is small, which may be an indicative that building trusting business relationships takes time, and farmers increase the share of coffee they commercialize via MOCCA anchor firms gradually, and only if they are convinced that they will obtain the best outcome by selling to the anchor firm.
11. Overall, the delays in the establishment of partnerships with anchor firms and the implementation of activities and trainings due to the pandemic appear to have had an effect in the progress of some of indicators evaluated, and we recommend MOCCA to provide additional trainings (which may require more time) if it wants to reach its current coffee targets.



## 6.2 Cacao

We next summarize main conclusions and recommendations from the market system and farmer level midline evaluation.

### Gender equity

Like in the coffee sector, an important element of the gender equity work has involved encouraging women to participate in technical assistance sessions. On average, roughly 25% of participants have been women. In most MOCCA countries there is a widespread perception that women's role is to process chocolate. MOCCA has sought to broaden ideas of the type of role women can play, incorporating them as TA providers and in other leadership roles. They've also been invited to nursery trainings and been taught how to graft. MOCCA has also carried out gender gap analyses with partner NCIs and anchor firms to inform actions to improve inclusion of women through better access to services and markets focusing on women's access to resources, practices and participation, beliefs, and institutions (including laws and policies). The goal is to change common perceptions about gender roles in cacao related work. In relation to fomenting gender equity in access to financial services, the challenge is immense in all countries. The obstacles women face to obtain credit are even more onerous than those that men face. A crucial challenge is related to the fact that land is most often under men's names.

Impressions about gender equity achievements in Honduras were mixed. A couple informants commented that no progress was made in this regard so far, while others highlight that more women and youth have been included in trainings, especially by inviting farmers' wives and children. The challenge, however, is that because of migration patterns most cacao farmers are older, and it is difficult to find young women interested in the sector. In El Salvador and Nicaragua, gender equity hasn't been the focus of most informants' work, beyond some women participating in technical assistance events and nursery management trainings. In Guatemala there's been work with a group of women chocolate makers, trying to strengthen their organization. In Ecuador there is the perception that gender equity and inclusion issues are indeed receiving more attention. There are more opportunities and incentives for women to participate in the technical assistance program. In Peru more women are participating in technical assistance activities, and in some cases, they are providing the TA themselves. Of course, machismo continues to be widespread and for some men it is difficult to have women leading and making decisions. MOCCA is encouraging the systematic incorporation of gender equity concerns in all of its work.

### Recommendations for MOCCA from informants

1. Support farmers with access to tools, high quality genetic material and inputs.
2. Widen the TA coverage.
3. Provide opportunities for farmers from different places to share their experiences and knowledge on R&R.
4. Farmers need support to build adequate infrastructure for post-harvest practices that allow them to sell better quality cacao.
5. Widen alliances with buyers so that farmers do not depend solely on one buyer. Support farmers with making connections with firms that may be interested in their cacao.
6. Continue supporting the various initiatives attempting to strengthen something like an NCI so that public policies that support the cacao sector are prioritized.
7. Establish additional demonstration plots.

8. Create spaces and opportunities for exchange of ideas between coffee and cacao actors.
9. Continue strengthening traceability initiatives.
10. Improve access to finance opportunities.
11. Support the organizational strengthening of farmer organizations, be it associations or cooperatives, as this could help them channel their demands for better market access and financing in a more powerful and effective manner.

Regarding the results from the **farmer level evaluation**, we now discuss the main conclusions in terms of changes in key indicators observed at this level, in six groups.

#### ***Household characteristics***

- The percentage of households where at least one member had recently migrated and reported receiving remittances within twelve months before the interview remains low (less than 10%) and similar to baseline. However, we observed an overall increase in the subsidies received from the government or NGOs (from 20.7% at baseline to 27.5%), and this was exceptionally high in Peru (from 34.5% at baseline to 61%)

#### ***Farm characteristics***

- Farmers in Central America reported a smaller cacao area, while farmers in Ecuador and Peru reported the largest area (3.32 ha and 2.14 respectively), and the country average was 2.04 ha. The number of plots per household remains almost at the baseline level, with more than 80% of farmers having only one cacao plot. Only 14.6% of farmers in all countries established new cacao plots since the baseline. Although it varies across the countries, Peru stands out with 33.3% compared to El Salvador's 3.8%. Similar to baseline figures, owning land with a deed is common in all countries except Peru and Honduras, where the share of farmers owning land without a deed or not having land was slightly higher.
- The share of farmers doing a diagnosis of their farm increased considerably since the baseline across all MOCCA countries, except in Guatemala where no farmer reported doing this. The overall ratio increased from under 30% to over 40%.

#### ***Access to financing***

- Access to financial services for cocoa farmers across countries is very low; with only 12.9% of farmers requesting and obtaining a loan, being this highest in Peru (21.6%) and lowest in El Salvador (1.9%). Among producers requesting a loan, the formal system like banks was the most common source of credit. These findings are similar to baseline results and are not entirely under MOCCA's area of influence, as even if there are attractive conditions offered by loan suppliers, the decision whether to request a loan depend on the farmers only. Further, 54.3% of farmers used their loan on the cacao crop, mainly on inputs (28.6%), equipment/tools (25.7%) and cacao renovation (14.3%), and compared to the baseline, the use on renovation and inputs are categories that increased at midline.

#### ***Adoption of farm level practices***

- The shade in cacao plots continues at similar levels to the baseline, although we observed a slight increase in the proportion of plots with more than 40% shade and management practices such as pruning the shade trees (which increased from 31% at baseline to 41%).
- Concerning renovation, we found, on average, that 16.9% of farmers renovated cacao during the year of reference, similar to the share reported at baseline. Honduras was the only country with over 20% renovation rate, and El Salvador reported the lowest rate (lower than 6%). In all countries except Peru, the renovation rates were statistically the same as for the baseline, but in Peru this was significantly lower (than at baseline). However, we observed that a significantly higher share of farmers renovated cacao trees based on an assessment of the plantation (from <1% at baseline to 14% at midline, when we estimate this at the sample level<sup>45</sup>). The main reason farmers gave for implementing this practice was that they considered it a good way to increase yields. Around 70% of the farmers considered the renovation practices important, a decrease from the 80% who reported this at baseline.
- More than 90% of the farmers rehabilitated their cacao in the 2021-2022 agricultural year, an increase from the 85% who reported this at baseline (panel analysis results). All farmers in Honduras implemented at least one rehabilitation practice, while only 75.7% of Ecuadorian farmers and 86.7% of Nicaraguan farmers did this. This suggests that there is more room for improving the adoption of this practice in Ecuador, less in Nicaragua, and much less in all other countries. However, panel analysis results show that the adoption of rehabilitation practices varied according to the type of pruning done. Pruning buds was the most adopted pruning method, followed by pruning lateral branches, and for these practices, adoption increased over time. The fact that only 16% of farmers reported pruning of rehabilitation suggests that there is room for improvement on the promotion of this practice. Other practices with room for improvement are, in order, height pruning, pruning fake stems, pruning misplaced branches, and pruning dead branches.
- Among farmers reporting pests affecting their crop (11.8%), 98.4% controlled them. In contrast, among farmers reported diseases affected their crop (89%), 10% of them used at least one control method. El Salvador and Peru are the countries where more farmers implemented control methods for pests and diseases.
- Related to plant nutrition practices, 33.7% of farmers applied fertilizer in the 2021-2022 agricultural year (mainly chemical fertilizers--67% of them reported applying only chemical fertilizers or both chemical and organic fertilizers). Further, the share of farmers who fertilized based on nutritional deficiencies is still low (4.9% of the sampled farmers<sup>46</sup> at baseline and 8.6% at midline). The countries where the highest share of farmers fertilized based on nutritional deficiencies were El Salvador, followed far behind by Peru and Ecuador.<sup>47</sup>
- In general, practices related to managing the floor (soil and weeds) show high levels of implementation among farmers. The use of dead cover in cacao plots (66.1%) and covering space between cacao rows with residues from weeding (63.6%) remain the most common practices,

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<sup>45</sup> To obtain this, we multiply the share of farmers who renovated times the share of farmers who renovated using a diagnostic tool.

<sup>46</sup> As above, we obtained these values by multiplying the share of farmers who applied fertilizer times the share who did so based on nutritional deficiencies, to estimate the unconditional shares (i.e., at the sample level).

<sup>47</sup> Ranked according to the unconditional shares (i.e., at the sample level, which we estimated in a similar way as described in the previous footnote).

followed by live barriers (41.9%). Results show that implementing dead or alive soil cover practices marked a significant improvement from baseline (for the former practice, 65.8% vs. 55.3% at baseline, and the latter, 34.2% vs. 25% at baseline). The share of farmers implementing cost-saving practices is higher in South American countries and using a weed-wacker is the most common practice, followed by scheduling weeding activities. This varied by country, and while doing the former was common in Peru and Ecuador, doing the latter was common in Guatemala, Nicaragua, and El Salvador. The use of herbicides was extremely low across all countries, even lower than at baseline.

- Although we also observed a slight increase in practices related to nursery management, the proportion of farmers implementing this is still low. Compared to the baseline, the share of farmers with nurseries increased from 10.8% to 19.9%, while the share of farmers doing grafting was almost the same as at baseline (14.4% at baseline vs. 12.8%).
- Harvest practices continue to be widely adopted, especially selective cacao harvesting, which increased from 71.7% at baseline to 89.5% at midline (of the full sample of farmers).

### ***Cacao quality***

- 77.4% of the farmers can identify physical characteristics that affect cacao quality, an increase from the 57.2% who reported this at baseline; and knowing this at midline was more common in Honduras (82.1%) and less common in Guatemala (41.3%).
- 63% of cacao farmers have certification (vs. 51% at baseline). At midline, organic certification was the most popular across the countries.

### ***Yields and sales***

- Using panel data results, we observed that the average yield across all countries was 434 kg dry cacao/ha at midline. In Guatemala, farmers harvested 625 kg dry cacao/ha, followed closely by Peru (547 kg dry cacao/ha). In contrast, farmers in Nicaragua had the lowest yields (270 kg dry cacao/ha). When averaging all countries, cacao yields increased from baseline. However, this increase was driven by an increase in yields in El Salvador and Peru. These results are slightly different when looking at midline means, as the number of observations in the panel analysis is different.
- Most farmers sold cacao at midline, with overall annual sales totaling US\$1,642. Although farmers in Ecuador had the largest production area (3.32 ha), generating a yearly cacao income of US\$2,273, farmers in Peru obtained US\$2,447. In contrast, the value of sales in Central America was much smaller, ranging from US\$364 in Honduras to US\$775 in Nicaragua. When we analyze the panel results, we observed that the amount of cacao sold (kg dry/ha) was significantly higher at midline (though with a modest increase in the absolute value), but the value of sales (US\$/ha) was statistically the same over time.
- Although in Ecuador the volume sold thru a MOCCA anchor firm was high, this was not the case in all other countries, as only in Nicaragua, farmers reported selling part of their harvest to this type of buyer, and no farmer reported this in any other country.

### **Recommendations for MOCCA from farmer-level results**

Although we observe a positive trend in the adoption rates of several of the MOCCA-promoted practices, we recommend the following to project implementers, to increase the benefits cacao farmers realize from the project:

1. Despite MOCCA's achievements with financial institutions and other market system actors in improving the quality of financial products (i.e., interest rates, terms) and streamlining procedures for small farmers, the farmer level data shows that the share of farmers accessing financing for agriculture is still low. This is likely a function of time as these changes trickle down to lenders, but it is also a function of contextual changes outside the scope of MOCCA that are influencing the willingness of both financial institutions and farmers to engage in lending in these sectors. It also may be that the improvements are not yet sufficiently attractive to farmers. While many farmers are not actively seeking financial services, informants perceive that financial opportunities that better tend to the needs and realities of cacao farmers are necessary. While MOCCA should continue and strengthen steps taken to accelerate linkages between financial institutions and farmers, working at both the demand and supply sides (for example the credit advisors), MOCCA target numbers may need to be further adjusted given the challenges in this regard. Although financing may be necessary for farmers to implement renovation practices, this needs to be analyzed against the renovation needs, as for young plantations, this need will be small. In the current setting with inputs cost being much higher compared to previous years, financing may be more necessary, as farmers who were granted a loan use it mostly to acquire inputs.
2. Since the share of farmers reporting plots with >40% shade increased at midline, we recommend evaluating this against the crop performance under high levels of shade. This because the incidence of diseases may increase under more shade, possibly affecting the crop health and yields, or requiring more resources to control diseases, which will reduce farmers' profits.
3. Midline results, when compared to baseline results, suggest that the needs for renovation may be modest, as when we analyzed all countries combined, the share of farmers renovating cacao decreased at midline. Since this needs to be analyzed in context, given that this need may be low because farmers have already renovated, we analyze additional key variables that are related to renovation needs. The results suggest that in Guatemala and El Salvador, it was not common for farmers to renovate at midline. We estimated that only 9.2% of the cacao trees needed to be renovated at midline, and this need was highest in Nicaragua, followed by Honduras, Guatemala, Ecuador, El Salvador and Peru, but in absolute values (i.e., total number of trees that needed to be renovated), Ecuador had the highest number (understandable, since the cacao area was the highest), followed by Nicaragua, Peru, Honduras, Guatemala and El Salvador. The average maximum age of cacao trees was 16.2 years, and this age was highest in Ecuador (28.2 years), followed by Honduras (22.1 years), Guatemala (15.7 years), Nicaragua (12.9 years), Peru (11.9 years) and El Salvador (6.6 years). Because of this, we recommend that MOCCA continues to dedicate efforts to promote renovation in all countries, but perhaps with greater efforts in Ecuador and Honduras; identify why farmers are not renovating in Guatemala (given their plantations appear to be older than in other countries, suggesting that there are other factors limiting the adoption of this practice); and continue with its integral approach of promoting many practices aimed at increasing productivity, which include plant-nutritional practices, practices to improve quality, rehabilitation (with special attention to practices with low adoption), soil

management, genetic materials, etc. With these, we consider that more emphasis may be needed in other practices that will contribute to increase productivity in current cacao plantations.

4. Since the share of farmers rehabilitating cacao (with at least one pruning method) is extremely high, we suggest focusing more efforts to promote the adoption of practices currently adopted by few farmers, and with high potential to positively affect the crop health and yields, such as pruning for rehabilitation, height pruning, pruning fake steams, misplaced branches, and dead branches. It may be worth continuing stressing the importance of all practices, so farmers do not dis-adopt the two they are adopting most.
5. Although one may consider promoting the use of herbicides to control weeds, this needs to be evaluated against the profitability of doing this, given the current higher prices of inputs.
6. If grafting cacao is a key indicator for the project, we suggest finding ways to increase the adoption of this practice, as its adoption has not changed from baseline.
7. Although yields increased for the full sample, this was driven by an increase in El Salvador and Peru. Thus, it becomes necessary to dedicate efforts to promote the adoption of practices that could directly positively affect yields, particularly in all other countries. We suggest identifying the factors affecting yields, so these factors can be taken into considerations when assisting farmers. This needs to be done in coordination with field trainers, as they are probably better informed about factors limiting yields, given they visit the farms and interact more closely with farmers.
8. One reason why yields have not increased at midline may be related to the low use of fertilizers in the 2021-2022 agricultural year. This could have been influenced by the uncertainty farmers face in post-pandemic markets, and the cost of this input. Although this will require identifying a strategy to make fertilizer affordable and accessible, which will be challenging, it will also require MOCCA teaching farmers how to use this input efficiently, given that the share of farmers who fertilized based on nutritional deficiencies is still low.
9. Access to improved markets: more efforts are necessary to provide greater access to improved markets in all countries except Ecuador, because in these countries, most of the volume sold was sold to other types of buyers.
10. Similar to coffee findings, the delays in the establishment of partnerships with anchor firms and the implementation of activities and trainings due to the pandemic appear to have had an effect in the progress of some of indicators evaluated, and we recommend MOCCA to provide additional trainings (which may require more time) if it wants to reach its current cacao targets.

### **6.3 Key results from an exploratory econometric analysis for two cases**

After the submission of this report, CIAT conducted an exploratory analysis of the effect of the training model used to train farmers and the number of training sessions received by farmers, on two outcome variables: the number of practices adopted and yields. We did this using panel data for coffee in Nicaragua and cacao in Peru. While three of these variables are self-explanatory, the training model refers to the MOCCA-promoted training model. We compare the MOCCA model with other models used by anchor firms to train farmers. We expect that the MOCCA model will have a positive significant effect on outcome variables as it allows for higher interaction between project implementers and beneficiary farmers.

This analysis shows that the training model used has a statistically significant positive effect on the number of practices adopted (but not on yields): farmers trained with the MOCCA model adopted (on average)

5.4 more coffee and 1.5 more cacao practices than farmers trained with other models. This is encouraging, as it demonstrates that training models that allows for more interaction between beneficiaries and implementers positively affect adoption of practices promoted, so MOCCA and its partners should keep this in mind when deciding (or shifting) the mechanisms used to train farmers.

Finally, this exercise showed that for the final evaluation, we will need to better define some of the outcome (dependent) variables (e.g., instead of using % of farmers doing renovation, we can create a variable that captures the share of the area requiring renovation, or other related variable) to better capture the contribution of the project to observed changes, and conduct more detailed analysis on the factors affecting the outcome variables of interest. We recommend this to be pursued during the final project evaluation.

#### **6.4 Actionable project-level recommendations based on overall results**

Considering the results of the mid term evaluation including interviews with MOCCA partners and surveys of farm households, as well as conversations with MOCCA team, we propose the following recommendations for consideration in prioritizing investments for the remaining project funds or potential additional funding.

##### **1. Extend project length to ensure achievements of MOCCA results**

We recommend extending the end date of the project for the following reasons:

- The complexity of the project in terms of countries and crops and partnering strategy (especially engaging private sector partners in an active role) meant that startup was later than originally planned as it took time to establish partnerships to determine target farmer groups to collect baseline data and set up operations to then begin work.
- The pandemic generated an additional setback as field work and group activities were suspended to protect both beneficiary communities and project staff, and because the mobilization was limited by government restrictions in many countries. As a result, MOCCA was forced to reinvent their project approach in the context of increased use of distance learning and smaller group approaches, plus everything became tentative across all sectors and organizations for an important period, and even once operations reinitiated for many sectors and organizations, waves of COVID in countries and illness of staff and beneficiaries impacted the continuity and speed of project activities. Despite these challenges, we see important advances in project activities and visible acceleration of reach of beneficiary groups, partners, and project targets such that we believe with additional time, and costs as needed, to compensate for time lost at project start, would be a worthy investment.
- Extending project end date would allow for data on additional harvests to be collected to capture the results of project activities on core indicators such as sales and income, which are best assessed at harvest. Given the nature of project investments – focused on increasing adoption of productivity practices, including R&R practices as well as improved market incentives – results in yields are often only visible in later harvests (for example R & R practices tend to show returns one to five years after the practice is carried out). For example, an exploratory analysis using farmer-level coffee and cacao panel data for Nicaragua and Peru to assess the effect of the

training model used and the number of trainings farmers have received on yields showed that, though there have been yield differences between baseline and midline, these MOCCA-related activities are not yet influencing significantly this outcome indicator. (MEL)

- Important investments have been made in establishing trusting relationships with a diverse range of market actors that have allowed MOCCA to engage with partners in a way that increases trust over time and with it the willingness to implement more important changes in their practices and supply chains. The results of these investments will likely be more observable with additional crop cycles. Activity 2
- Extending time could allow MOCCA to phase out or back some of their direct involvement in, for example, TA activities to assess and accompany partners in incorporating these MOCCA-led activities into their business models. Activity 1
- Additional time will be needed if MOCCA is to be successful in some activities, namely in supporting market system actors in each country to establish and implement nursery certification systems (which are important so farmers can differentiate high quality planting material), and to take fuller advantage of the yet-to-be implemented research fund (with more time, a wider range of research topics can be considered). (Activity 3 and 4)

## **2. Focus TA on a smaller list of prioritized productivity practices and consider complementary investments to support adoption where necessary**

MOCCA partners in general valued highly MOCCAs contributions to TA, highlighting the usefulness of demonstration plots and the curriculums for both cacao and coffee, suggesting that greater coverage and more demonstration plots would be welcome. We recommend that in the second half of the project, MOCCA might better focus their TA on a smaller number of core practices related to productivity. Prioritized practices should focus on medium term productivity and not just quick returns through chemical fertilizers for a single harvest. This focalization may be country specific, considering how widespread current adoption is, adoption trends with MOCCA to midline, and the importance for returns to profitability. In some cases, complementary investments (for example with inputs providers or production) may be needed to ensure supporting services for the proposed practices are in place. We outline below recommendations for different groups of practices that can be further tailored or prioritized according to country or commodity. Overall, we suggest a focus on a small number of rehabilitation practices, improved nutrient management via organic methods as well as conventional fertilization better targeted to site specific soil conditions and crop needs for greater efficiency, and improved integrated soil cover/weed management strategy, and disease control, in that order. We recommend that renovation can be de prioritized given apparent lower need than anticipated among MOCCA beneficiaries. Below we provide some suggestions for each case.

### ***Rehabilitation – focus on few critical practices for productivity of mature plantations***

- Coffee – Levels of adoption for rehabilitation practices are high (63% of farmers) but unchanged since baseline, and largely focused on the most common rehabilitation practice. There has been little traction promoting additional rehabilitation practices such as rejuvenation and stress formation. The use of farm diagnostics tools to inform R and R practices has also been relatively low in coffee. We suggest exploring the integration of yield impact estimations with the farm diagnostic tool to help relate R and R investment needs to potential yield returns. CATIE, under



PROCAGICA, may have generated recent evidence in this regard for Central American countries that could be used to help assess and promote rehabilitation practices with high productivity returns. In past projects TA has promoted implementation of the new practices on single or a few plants on each farm to encourage farmers to observe the results over time to inform future decisions.

- Cacao – The majority of farmers implement rehabilitation practices in cacao, up slightly from baseline (85% to 90%). But the focus is on pruning of buds and lateral branches which are largely associated with formation of new plants. Practices such as pruning for rehabilitation, height pruning, pruning of fake stems and dead branches, and grafting, much more critical in restoring the productivity in mature plantations are much less implemented. We recommend these practices be prioritized based on greatest contribution to productivity in each country context. The use of diagnostics tool to guide rehabilitation practices is also low and the above recommendation on improving information on the impact of practices on yields might help here. CATIE is already engaged and their prior and ongoing work (i.e., KoLFACI) should be useful.
- Consider equipment needs and availability in production areas that might make these practices easier or more efficient to implement such as appropriate pruning tools and equipment if not in use and readily available.

***Nutrition management should emphasize improved efficiency in use of conventional fertilizers, integrated with organic practices***

In both coffee and cacao, most farmers do not manage fertility based on crop needs or an assessment of deficiencies based on visual assessment of the crop nor on soil sample analysis. While in coffee, fertilizer use has increased for both organic and inorganic fertilizers, farmers are still not applying the optimum amounts to maximize productivity. Given the low adoption rates, the importance of adequate fertilization for crop yields (and for positive response to R&R practices) in the current context of rising fertilizer prices across the region, this should be a priority area for TA moving forward. Below a few suggestions of how this might be achieved.

- MOCCA should seek to identify ways to increase site specific information on soil nutrient levels vis a vis crop needs available for MOCCA farmers via soil samples from their farms or digital soil maps that may already be available and provide localized soil nutrient information.
- MOCCA should seek to partner with inputs suppliers, or buyers or others who supply inputs, to support crop and site-specific formulations for farmers to improve the efficiency of fertilizer use and should also disseminate information where available on timing and mode of application of fertilizers to improve the efficiency of conventional and organic fertilizers. With rising prices, we believe inputs suppliers and other actors will be similarly interested in helping farmers make the most efficient use of fertilizers.
- MOCCA should prioritize a small number of best bets for organic fertilizer that can be integrated with conventional fertilizer to promote in TA. We observe at midline an increased interest in organic fertilizers among farmers, which combined with current analyses of the impacts of the crisis in Ukraine on the agricultural sector in Latin America, suggest that there will be an increase interest in organic fertilization as a strategy for cost mitigation. MOCCA can contribute to managing this crisis by stepping up content on organic methods for managing soil nutrients including bio-inputs, micronutrients, and others. This might include supporting local production,

formulation, distribution, or application of these inputs to ensure accessibility, quality, and effectivity in use.

***Integrate soil and weed management with a focus on soil cover***

- In coffee there has been a slight increase in the use of mulch, but very little use and no increase in use of green mulches. One important approach to improving live soil cover in coffee plantations is selective weed management where one weeds out the undesirable weeds (higher growing competitive weeds) and leaves the beneficial weeds (low growing, ground covering, noncompetitive weeds) such that over time the beneficial weeds dominate and naturally suppress bad weeds, reducing weeding costs over time while promoting better soil coverage. This is an alternative approach to actually seeding green manures into coffee plantations that may be considered, if not already part of the MOCCA curriculum, as it may be easier for farmers to adopt.
- In cacao use of mulch and green mulches has increased as well as adoption of weed control practices such as timing of weeding and the use of weedwhackers. This work should continue.

***Disease monitoring and control practices should receive continued or increased emphasis***

In cacao, farmers at midline show low levels of disease management practices. For both coffee and cacao, farmers report low levels of using disease monitoring tools to support disease management. Given the history of disease epidemics in cacao and coffee and their disastrous effects in the region, this is a practice that MOCCA should prioritize. Diseases are most easily managed when they are detected early, hence the importance of monitoring tools. In some countries, national level pest and disease monitoring systems may also be leveraged to provide farmers with early warnings that signal the need to carry out on farm observation for diseases based on trends observed in their area or country. This way it is not a simple reminder to look always, but an alert that this issue may become critical soon on their farm.

***Renovation – de prioritize***

- Coffee – In coffee, adoption of renovation practices has decreased since baseline (24% to 21%), and overall is low. In looking at coffee plantations, the need seems also relatively low (11.5% need renovation) and average age of coffee plants is relatively low, so demand for renovation seems lower than originally estimated. Therefore, we recommend that MOCCA focus less on renovation practices, and focus more on rehabilitation practices, nutrition, soil management and other practices that support overall productivity of the plantation.
- Cacao – In cacao, farmers also did not increase adoption of renovation practices from baseline though more were doing so based on an assessment of the plot (14% at midline vs less than 1% at baseline). Work moving forward might focus more on Honduras and Ecuador where trees are oldest.

**3. Increase support for or engagement with TA models with lowest levels of practice adoption to improve results and understand the relationship between TA models and farmer benefits**

Given the diversity of TA models and levels of responsibility of MOCCA vs partners, there may be some interesting lessons MOCCA can offer by further documenting the relationship between TA models and

adoption of practices. There are interesting differences between coffee and cacao that should be explored, including considering application of the different models across the two sectors. As mentioned above, an exploratory analysis using farmer-level coffee and cacao panel data for Nicaragua and Peru to assess the effect of the training model used and the number of trainings farmers have received on yields and the number of practices adopted, showed that the MOCCA model has a statistically significant positive effect on the latter, regardless of the crop. These results are encouraging and highlight the importance of the TA model used to train farmers. Given that MOCCA has almost reached targets for TA, we suggest the following for the remaining life of the project:

- Focus on improving the quality of TA in existing partnerships to ensure all achieve the expected levels of quality and maintain this through project end.
- Focus on creating capacity or conditions needed for partners to internalize or continue TA post project. This might include training of trainer capacity building for TA supervisors within anchor firms or a deeper look at partner business models and how TA could be better incorporated into their value proposition to farmers and to the business.
- Leverage MOCCA's training materials and methods to support expanding adoption beyond MOCCA partners (crowding in) in support of system-level change. This could include making materials available in a user-friendly way for other TA providers as well as new large scale development programs. It could also include providing training for non MOCCA partners interested in adopting the content or methods to support use or adaptation of the content and methods by others.

#### **4. Research dissemination to farmers should be accelerated, particularly in coffee**

Where farmers received research results, they indicated they were useful for making on farm decisions. Unfortunately, most farmers still do not have systematic access to research results. While research activities have moved forward in cacao, the proposed research fund in coffee is still under negotiation. We recommend that MOCCA continue the work in cacao with emphasis on reaching farmers with results and in coffee that MOCCA accelerate implementation of activities planned with PROMECAFE to fund research and research dissemination. MOCCA should take an inclusive approach here, seeking to disseminate research to farmers, regardless of whether the research itself was supported by MOCCA, as well as to support research that is relevant to farmers but that may not yet be at the stage for dissemination of results.

#### **5. Continue to strengthen NCIs in each country as well as national and regional platforms and might consider broadening the agenda to include emergent issues**

MOCCA's engagement with NCIs in each country to strengthen national level coordination and support for the sector is important to continue. Where strong institutions or platforms are in place, they can be major partners in driving system level change post project in so far as they are aware of and on board with MOCCAs achievements and proposed changes to the market system supporting small farmers. Where they are not yet in place, supporting their emergence is an opportunity to construct an institutional framework that is inclusive of small farmers. Regional platforms are similarly important places for lessons to be shared across countries and for countries to address issues and challenges regionally as a block, supporting efficiencies in identifying and scaling solutions, or political power when coming together around global policy issues. While to date this work has focused more on research and in the case of coffee

on the development of nursery certification regulations, this agenda could be expanded in two directions. First, these national and regional platforms can be used to support the kind of peer learning and spaces for sharing experiences recommended in Recommendation ?? above to support uptake of and support for MOCCA models by other actors in the system and build towards the critical mass needed for system level change. Second, these platforms can be used to identify and support emergent issues within the sectors. As examples, there is growing concern and discussion about how the sectors (both coffee and cacao) will address the new EU legislation on deforestation free commodities, rising inputs prices, living incomes, and, particularly in coffee, gender equity. These platforms can be important spaces for collective action to improve comprehension of emergent issues and to quickly identify potential solutions by bringing together diverse perspectives.

**6. Work on market access should continue with a focus on improving price incentives for quality and strengthening market linkages for farmers to high quality markets**

- In coffee MOCCA should ensure that farmers receive quality premiums and are aware of how quality is influencing the prices they receive to ensure farmers perceive the incentives to improve quality management practices. As an example, cherry sorting is a practice that is directly linked to quality and despite inclusion in TA content, has not been widely implemented. It provides an example of where right incentives might be still lacking to drive adoption of this practice despite strong attention given to this practice in TA.
- In coffee MOCCA should continue to nurture and monitor incipient relationships between farmers and anchor firms. There have been important increases in farmers selling to MOCCA anchor firms, but the value of sales remains low. If we assume this is because the additional farmers incorporated began with smaller volumes of sales, we will anticipate that, if the experience is positive, the volumes and therefore value of sales should increase over the next seasons. Anchor firms themselves have reported an increase in sourcing volumes and suppliers and their capacity to continue to grow.
- In cacao MOCCA should continue the work to expand the number of buyers present in each country and engaging with farmer organizations to diversify market options based on quality. In cacao in particular, direct sales to MOCCA partner anchor firms seem to be lower than for coffee farmers (most farmers sold to other buyers) so this is another area where MOCCA can expand work, especially given the improvements in quality management in harvest practices, knowledge of factors influencing quality, and certifications.
- In cacao and coffee, MOCCA could strengthen the capacity of farmer organizations to play a role in market access by supporting productivity and quality management of farmers, by agglomerating supply to facilitate collective bargaining and interesting volumes as well as uniformity across larger lots, or for post-harvest processing as needed. For some buyers, purchases from farmer organizations are also interesting for meeting their sustainability commitments or for fair trade certifications. While MOCCA partners with a great number of farmer organizations, in many cases, particularly for coffee, the focus of the partnership is around provision of TA, and this could be complemented with strengthened engagement around quality upgrading where organizations play an intermediate role between farmers and buyers.
- MOCCA should consider how it might support partners to respond to emerging market requirements including zero deforestation. While this did not come up in the evaluation, the coffee and cacao sectors in many of the MOCCA countries are in the process of considering new

EU legislation that will target both sectors requiring European importers to provide evidence that the produce is free of deforestation (that it was produced on land that was not deforested before a baseline year). There is a similar initiative under consideration in the US. Given how important European markets, and US markets are for MOCCA farmers, it might be worth engaging around this issue with anchor firms and NCIs in the target countries to support advocacy around these issues and to begin to assess potential impacts and systems for improving traceability of products back to farm plot in a way that is inclusive to small farmers. There are already some initiatives underway in this regard including the use of Terra I in Honduras for coffee deforestation risk assessment and GRAS in other origins for coffee as well.

#### **7. Continue to support access to finance, nurturing existing partnerships, but end of project targets should be adjusted**

While MOCCA has engaged a wide range of financial service providers and managed to negotiate numerous and creative improvements to their offer of financial services for small coffee and cacao farmers and their organizations, as well as partnering with anchor firms to expand access to finance, the numbers of farmers requesting and obtaining loans remains low, and MOCCA achievements vs targets in this area remain below target. Specifically:

- We recommend MOCCA continue current efforts under the access to finance activity to see whether many of the relatively recent advances with financial institutions translate into financial flows to farmers, and whether the recent acceleration in flow of finance to farmers continues to expand where headway has been made. It may be that the currently higher prices of coffee and inputs drive an increase in demand for credit in coffee as well as an increase in financial flows to the sector, such that the investments MOCCA has made in adapting products for small coffee and cocoa farmers serve to facilitate their access in this context. Meaning, MOCCA may have greased the wheels which may help the flow of finance in the context of increased demand, which will be observable over this next crop period.
- We recommend reconsidering initial MOCCA targets for access to finance in light of the apparently low demand from farmers and would not recommend additional efforts (beyond continuing to engage with partnerships already activated).
- In cacao we recommend exploring with anchor firm partners the possibility of expanding their role in access to finance for their suppliers, following the example of coffee anchor firms. For coffee, significant amounts of finance facilitated by MOCCA (funds reported in project indicators) has come through anchor firms. It is worth exploring whether cacao anchor firms could expand their provision of finance to farmers, particularly as some of the firms are the same in coffee and cacao. MOCCA might consider discussing with anchor firms in cacao as well as a formal exchange between anchor firms in coffee and cacao around this topic to identify lessons that can be transferred.
- Building on the important role some anchor firms play in supporting access to finance for farmers, MOCCA might consider ways to support de-risking loans to increase the flows of finance to anchor firms and from anchor firms to farmers. Key partners might include the private sector arms of development banks including IDB INVEST, IFC/WB and FMO for example.

- MOCCA should also consider whether and how farmer organizations might be supported to play a stronger role in access to finance, based on some successful experiences that could be shared and replicated.
- On the demand side, we recommend a focus on responsible demand, meaning engaging farmers to support their ability to make decisions about requesting and managing finance including financial literacy, cost of finance, loan management, and improved capacity to assess profitability and cash flow aspects of their production system vis a vis potential investment to be financed with loans. If farmers are not currently engaging with the formal financial system, supporting that initial engagement with electronic payments, savings or other instruments could be a first step in overcoming barriers.

#### **8. Complement continued work on certification systems to encourage supply of quality genetic material, while expanding understanding and work on the demand for quality genetic material**

On the **supply side**, MOCCA has advanced in terms of the supply of quality genetic material, particularly in consolidating and disseminating information on best practices, and supporting nurseries and seed lots to improve their production practices, as well as to improve genetic purity and traceability in both coffee and cacao. MOCCA has also advanced in the creation of private and public certification systems (WCR Verified and support for creation or strengthening of public regulations for genetic material). This work should be prioritized and accelerated in order to have impact within the project timeframe. On the **demand side**, more work is to be done in two directions. First, from our interviews with MOCCA partners, it is unclear to nursery operators, large and small, whether small farmers are willing or able to pay more for certified materials. And while this is hard to judge when there are not yet certifications that make it possible to offer certified materials, the data from farmers indicate that most farmers continue to produce their own plants on farm in both coffee and cacao and few farmers *purchase* plants. So even if certified materials are available, it will require a huge behavior change, with potentially large financial implications, for farmers to shift towards buying as opposed to producing their own plants. In this context **we suggest the following**:

- If not already done, consider more detailed comparison of costs and benefits to farmers of purchased plants vs producing themselves to understand clearly what incentives would need to be in place to make this happen. In the on-farm production scenarios it would be important to consider whether farmers could themselves improve their own seedling production practices on farm, including seed selection or purchase of certified seed (meaning comparing professionally produced materials with plants produced by farmers on their farms using best practices). Engaging farmers in this discussion to understand incentives or barriers for producing or purchasing plants will be important.
- Consider a focus on current large-scale buyers or producers of plants where improvements can be introduced into an existing system where purchased plants is already the norm. A great example is the achievement in El Salvador, where a large-scale public renovation project will only purchase plants from MOCCA supported nurseries for distribution to coffee farmers. Anchor firms and development projects are also large-scale producers or buyers of plants who could be next users of MOCCA nursery models to ensure that what they deliver optimizes quality and productivity of the plants distributed. Farmer organizations, on a smaller scale, are also important producers and providers of plants or seeds to farmers, often incorporating this into their business

model to ensure productivity and quality of the beans they will be able to later harvest and sell from their members. Continuing and expanding the work with these actors to ensure that the plants they deliver are high quality may be a first step in helping farmers to see the difference between plants produced on farm vs plants that are acquired from “professional” nurseries.

- Consider a focus on ‘quality’ plants even in the absence of formal certification systems (or while they are formalized). Are there informal or voluntary mechanisms that can be used with smaller nurseries to signal their capacity for high quality plants? Once nurseries have satisfied clients, this can be reputationally reinforced, maybe considering online platforms that allow for nurseries to present their credentials and clients to show their satisfaction, while more formal systems can come online. This includes a consideration of creating two certification standards or levels – one that certifies good nursery production practices (contributing to vigorous and healthy plants) and another that certifies genetic quality (contributing to known or traceable genetic characteristics). Both are important but the former could be advanced more quickly while the latter depends on systems being in place to certify and multiply genetics at scale.
- Consider what might be done to improve farmer practices in their own management of nurseries, given the majority still produce their plants on their own farms.
- When pursuing the creation of certification systems with national market system actors, double down on resources to expedite. This work has been slow to take off but needs to gain traction quickly if the certification mechanisms are to be created during the project timeframe and have impact on project indicators.
- In both coffee and cacao MOCCA has done important work consolidating training content and approaches for improving management of nurseries. We recommend a focus on transferring or making available this content to actors beyond MOCCA partners to carry forward during the second half of the project. This could include relevant public entities including certifiers, nursery operators, and extension services within the public and private sector.
- For cacao, and maybe coffee too, consider ways to support traceability of materials that farmers acquire so that it is easier to know what varieties are planted on their farm and where to support both multiplication of materials as well as differentiated management as needed, in harvest and post-harvest, or to facilitate change of genetic material over time.
- There are synergies to be leveraged in engaging with public entities around certification across coffee and cacao as they are the same public entities and procedures that need to be engaged and supported. Joining forces across both commodities could bring efficiencies.

## **9. More intentionally promote peer learning and the creation of peer learning spaces across project contexts, commodities, and partners in support of system-level change**

MOCCA is engaging across six countries and two commodities, with numerous partners in each context. The diversity across these contexts by country, region, and commodity, as well as across partners in the same country provides a wealth of opportunities for exchange of knowledge and peer learning across technician teams, farmers, farmer organizations, anchor firms, public institutions, research institutions, nurseries, among others. MOCCA is uniquely positioned to facilitate this kind of exchange as it can identify successful experiences in one place that may provide insight in places or for partners where others are struggling. This was mentioned by many partners as well – that an opportunity they saw with MOCCA was to learn from such a diversity of experiences but that this opportunity was not being maximized as current

operations focused on single organizations, particularly at the level of anchor firms and farmer organizations, with very few formal opportunities for actors to engage with peers. While we recognize this is happening to some degree and under some activities (we would highlight research activities in cacao as a place where MOCCA has introduced significant new relationships and opportunities for peer learning), it is something MOCCA could do more systematically in the second half of the project. It can help accelerate achievement of project targets by bringing new ideas or motivation from countries where, for example, practice adoption or access to finance has been more successful to countries where it has been less successful. We also consider this to be critical for market system level change helping MOCCA partners and non-MOCCA partners to extend and expand activities and to drive a system level shift in norms based on project successes. This starts with MOCCA partners sharing innovations with others so they can emulate. We believe MOCCA has some successful models that can begin to be shared more widely and by doing so, can build stronger connections between actors within and across sectors to mobilize change. For example, an exploratory analysis using farmer-level coffee and cacao panel data for Nicaragua and Peru to test the effect of the training model used and the number of trainings farmers have received on adoption of practices showed that the training model used by anchor firms has a positive effect on the number of practices that farmers adopt—farmers trained with the MOCCA-promoted models (CREAR for coffee and a similar model for cacao) adopt more practices. This can be facilitated or promoted in MOCCA’s work with national and regional platforms.



## 7 References

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## 8 Annex Tables

*Annex Table 1. Coffee: Descriptive statistics of the variables used in the renovation regression*

| Variables  | El Salvador            | Guatemala              | Honduras                | Nicaragua                 | Peru                    | All countries           |
|--|------------------------|------------------------|-------------------------|---------------------------|-------------------------|-------------------------|
| Farmers who renovated coffee (1=yes)                                       | 0.132<br>[0.340]       | 0.223<br>[0.418]       | 0.152<br>[0.360]        | 0.298<br>[0.459]          | 0.179<br>[0.384]        | 0.197<br>[0.398]        |
| Sex of HH head (1=male)  | 0.579<br>[0.495]       | 0.676<br>[0.469]       | 0.696<br>[0.462]        | 0.804<br>[0.398]          | 0.732<br>[0.444]        | 0.701<br>[0.458]        |
| Coffee area (Ha)   | 0.979<br>[1.315]       | 0.893<br>[1.157]       | 2.020<br>[3.609]        | 3.550<br>[2.977]          | 2.530<br>[1.382]        | 2.020<br>[2.411]        |
| Number of coffee varieties   | 1.264<br>[0.509]       | 1.760<br>[0.883]       | 1.674<br>[0.794]        | 1.304<br>[0.545]          | 2.192<br>[1.134]        | 1.677<br>[0.906]        |
| Number of coffee trees   | 3356.591<br>[5179.387] | 5034.006<br>[8120.712] | 9937.275<br>[18066.780] | 17207.410<br>[15192.920]] | 11527.590<br>[8794.525] | 9519.580<br>[12553.220] |
| Coffee age   | 6.317<br>[5.367]       | 7.503<br>[5.358]       | 6.791<br>[3.141]        | 5.672<br>[1.974]          | 6.154<br>[2.677]        | 6.460<br>[3.958]        |
| Altitude   | 1039.225<br>[207.677]  | 1404.105<br>[334.351]  | 1264.809<br>[205.924]   | 821.513<br>[229.834]      | 1567.286<br>[231.139]   | 1244.582<br>[368.754]   |
| Number of trainings received   | 7<br>[2]               | 6<br>[2]               | 4<br>[3]                | 5<br>[3]                  | 4<br>[2]                | 5<br>[3]                |
| Owns land (1=yes)  | 1.000<br>[0.000]       | 0.916<br>[0.278]       | 1.000<br>[0.000]        | 0.786<br>[0.412]          | 0.763<br>[0.426]        | 0.877<br>[0.328]        |
| HH member migrated within last 6 months (1=yes)                            | 0.031<br>[0.175]       | 0.112<br>[0.316]       | 0.152<br>[0.360]        | 0.125<br>[0.332]          | 0.067<br>[0.251]        | 0.095<br>[0.294]        |
| Access to credit (1=yes)   | 0.025<br>[0.157]       | 0.095<br>[0.294]       | 0.167<br>[0.374]        | 0.494<br>[0.501]          | 1.000<br>[0.000]        | 0.403<br>[0.491]        |
| Received technical information about coffee thru NGO or government (1=yes) | 0.818<br>[0.387]       | 0.799<br>[0.402]       | 0.319<br>[0.468]        | 0.613<br>[0.488]          | 0.509<br>[0.501]        | 0.613<br>[0.487]        |
| <b>Observations</b>  | <b>159</b>             | <b>179</b>             | <b>138</b>              | <b>168</b>                | <b>224</b>              | <b>871</b>              |

*Note: standard deviation values in brackets*

**Annex Table 2. Coffee: Descriptive statistics of the variables used in the rehabilitation regression**

| <b>Variables</b>   | <b>El Salvador</b>     | <b>Guatemala</b>       | <b>Honduras</b>         | <b>Nicaragua</b>         | <b>Peru</b>             | <b>All countries</b>    |
|--|------------------------|------------------------|-------------------------|--------------------------|-------------------------|-------------------------|
| Farmers who rehabilitated (pruned) coffee trees (1=yes)                    | 0.471<br>[0.501]       | 0.542<br>[0.500]       | 0.593<br>[0.493]        | 0.714<br>[0.453]         | 0.723<br>[0.448]        | 0.619<br>[0.486]        |
| Sex of HH head (1=male)  | 0.581<br>[0.495]       | 0.676<br>[0.469]       | 0.700<br>[0.460]        | 0.804<br>[0.398]         | 0.732<br>[0.444]        | 0.701<br>[0.458]        |
| Coffee area (Ha)   | 0.968<br>[1.328]       | 0.893<br>[1.157]       | 2.006<br>[3.585]        | 3.550<br>[2.977]         | 2.530<br>[1.382]        | 2.020<br>[2.411]        |
| Number of coffee varieties   | 1.271<br>[0.514]       | 1.760<br>[0.883]       | 1.671<br>[0.791]        | 1.304<br>[0.545]         | 2.192<br>[1.134]        | 1.677<br>[0.906]        |
| Number of coffee trees   | 3311.961<br>[5228.543] | 5034.006<br>[8120.712] | 9881.029<br>[17942.870] | 17207.410<br>[15192.920] | 11527.590<br>[8794.525] | 9519.580<br>[12553.220] |
| Coffee age   | 6.280<br>[5.420]       | 7.503<br>[5.358]       | 6.746<br>[3.142]        | 5.672<br>[1.974]         | 6.154<br>[2.677]        | 6.460<br>[3.958]        |
| Altitude   | 1043.973<br>[207.739]  | 1404.105<br>[334.351]  | 1267.582<br>[207.967]   | 821.513<br>[229.834]     | 1567.286<br>[231.139]   | 1244.582<br>[368.754]   |
| Number of trainings received   | 7<br>[2]               | 6<br>[2]               | 4<br>[3]                | 5<br>[3]                 | 4<br>[2]                | 5<br>[3]                |
| Owens land (1=yes)   | 1.000<br>[0.000]       | 0.916<br>[0.278]       | 0.986<br>[0.119]        | 0.786<br>[0.412]         | 0.763<br>[0.426]        | 0.877<br>[0.328]        |
| HH member migrated within last 6 months (1=yes)                            | 0.032<br>[0.177]       | 0.112<br>[0.316]       | 0.157<br>[0.365]        | 0.125<br>[0.332]         | 0.067<br>[0.251]        | 0.095<br>[0.294]        |
| Access to credit (1=yes)   | 0.000<br>[0.000]       | 0.095<br>[0.294]       | 0.164<br>[0.372]        | 0.494<br>[0.501]         | 1.000<br>[0.000]        | 0.403<br>[0.491]        |
| Received technical information about coffee thru NGO or government (1=yes) | 0.819<br>[0.386]       | 0.799<br>[0.402]       | 0.314<br>[0.466]        | 0.613<br>[0.488]         | 0.509<br>[0.501]        | 0.613<br>[0.487]        |
| <b>Observations</b>  | <b>155</b>             | <b>179</b>             | <b>140</b>              | <b>168</b>               | <b>224</b>              | <b>871</b>              |

*Note: standard deviation values in brackets*

*Annex Table 3. Coffee: MOCCA indicators by El Salvador anchor firms and sex of household head, at midline*

| Key indicators  | BFA       |           |           |         | CSC             |           |            |          | Country   |            |       |         |
|---|-----------|-----------|-----------|---------|-----------------|-----------|------------|----------|-----------|------------|-------|---------|
|   | Female    | Male      | Total     | p-value | Female          | Male      | Total      | p-value  | Female    | Male       | Total | p-value |
| <b>USDA indicators</b>  |           |           |           |         |                 |           |            |          |           |            |       |         |
| Yield (kg green coffee/ha)  | 748.9     | 900.0     | 839.1     | 0.3     | 424.3           | 303.6     | 361.9      | 0.1      | 541.9     | 566.3      | 555.3 | 0.8     |
| Coffee area (ha)  | 0.73      | 1.45      | 1.16      | 0.16    | 0.89            | 1.03      | 0.96       | 0.31     | 0.83      | 1.22       | 1.04  | 0.08    |
| Farmers (%) with access to financing for agriculture                  | 8.0       | 10.8      | 9.7       | 0.719   | No observations |           |            |          | 2.7       | 4.0        | 3.4   | 0.645   |
| Value of annual coffee sales (US\$) (with zero sales)                 | 1,791     | 3,807     | 2,994     | 0.025** | 789             | 588       | 676        | 0.586    | 1,128     | 1,779      | 1,502 | 0.133   |
| Annual amount of coffee sold (kg green coffee) (with zero sales)      | 488       | 1,054     | 826       | 0.035** | 235             | 56        | 141        | 0.010*** | 328       | 495        | 421   | 0.196   |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 0.0       | 2.7       | 1.6       | 0.416   | 0.0             | 0.0       | 0.0        | n.a      | 0.0       | 1.0        | 0.6   | 0.391   |
| <b>Anchor firm indicators</b>   |           |           |           |         |                 |           |            |          |           |            |       |         |
| Farmers (%) who know the quality of their coffee                      | 8.00      | 16.21     | 12.90     | 0.352   | 6.12            | 1.59      | 3.57       | 0.2029   | 6.76      | 7.00       | 6.90  | 0.9504  |
| Farmers (%) who received a premium for their coffee quality           | 0         | 0         | 0         | n.a     | 0               | 0         | 0          | n.a      | 0         | 0          | 0     | n.a     |
| Farmers (%) with any certification                                    | 0         | 0         | 0         | n.a     | 0               | 0         | 0          | n.a      | 0         | 0          | 0     | n.a     |
| <b>Number of households</b>   | <b>25</b> | <b>37</b> | <b>62</b> |         | <b>49</b>       | <b>63</b> | <b>112</b> |          | <b>74</b> | <b>100</b> |       | 174     |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

*Annex Table 4. Coffee: MOCCA indicators by Guatemala anchor firms and sex of household head, at midline*

| Key indicators  | OLAM      |           |           |         | UNEX      |           |           |         | VOLCAFE   |           |           |         | Country   |            |            |         |
|---|-----------|-----------|-----------|---------|-----------|-----------|-----------|---------|-----------|-----------|-----------|---------|-----------|------------|------------|---------|
|   | Female    | Male      | Total     | p-value | Female    | Male      | Total     | p-value | Female    | Male      | Total     | p-value | Female    | Male       | Total      | p-value |
| <b>USDA indicators</b>  |           |           |           |         |           |           |           |         |           |           |           |         |           |            |            |         |
| Yield (kg green coffee/ha)  | 1261.6    | 1667.4    | 1521.6    | 0.89*   | 705.3     | 758.4     | 748.6     | 0.642   | 759.3     | 741.3     | 748.0     | 0.900   | 916.6     | 992.6      | 969.2      | 0.487   |
| Coffee area (ha)  | 0.69      | 1.00      | 0.89      | 0.270   | 0.95      | 1.30      | 1.24      | 0.442   | 0.40      | 1.00      | 0.78      | 0.023** | 0.60      | 1.11       | 0.96       | 0.02**  |
| Farmers (%) with access to financing for agriculture                  | 4.3       | 2.4       | 3.1       | 0.680   | 7.7       | 3.4       | 4.2       | 0.499   | 0.0       | 0.0       | 0.0       | n.a     | 27.8      | 19.0       | 21.7       | 0.673   |
| Value of annual coffee sales (US\$) (with zero sales)                 | 3,551     | 6,832     | 5,506     | 0.129   | 2,820     | 3,799     | 3,615     | 0.608   | 890       | 3,595     | 2,548     | 0.043** | 2,002     | 4,319      | 3,565      | 0.015** |
| Annual amount of coffee sold (kg green coffee) (with zero sales)      | 678       | 1,531     | 1,186     | 0.157   | 652       | 959       | 901       | 0.467   | 239       | 857       | 623       | 0.054*  | 450       | 1,035      | 848        | 0.013** |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 47.8      | 41.5      | 43.8      | 0.629   | 0.0       | 0.0       | 0.0       | n.a     | 5.6       | 11.9      | 9.5       | 0.314   | 18.1      | 15.2       | 16.1       | 0.585   |
| <b>Anchor firm indicators</b>   |           |           |           |         |           |           |           |         |           |           |           |         |           |            |            |         |
| Farmers (%) who know the quality of their coffee                      | 8.7       | 12.2      | 10.9      | 0.673   | 7.7       | 1.7       | 2.8       | 0.246   | 0         | 5.2       | 2.2       | 0.169   | 5.7       | 4.2        | 5.2        | 0.623   |
| Farmers (%) who received a premium for their coffee quality           | 0         | 20        | 14.3      | 0.576   | 0         | 0         | 0         | n.a     | 0         | n.a       | n.a       | n.a     | 0         | 11.1       | 11.1       | 0.588   |
| Farmers (%) with any certification                                    | 47.8      | 34.1      | 39.1      | 0.289   | 0         | 0         | 0         | n.a     | 2.8       | 0         | 1.1       | 0.206   | 16.7      | 8.9        | 11.4       | 0.87    |
| <b>Number of households</b>   | <b>23</b> | <b>41</b> | <b>64</b> |         | <b>13</b> | <b>58</b> | <b>71</b> |         | <b>36</b> | <b>59</b> | <b>95</b> |         | <b>72</b> | <b>158</b> | <b>230</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

*Annex Table 5. Coffee: MOCCA indicators by Honduras anchor firms and sex of household head, at midline*

| Key indicators  | BECAMO    |           |           |          | COFFEE PLANET |           |           |         | RGC      |          |          |         | Country   |            |            |         |
|---|-----------|-----------|-----------|----------|---------------|-----------|-----------|---------|----------|----------|----------|---------|-----------|------------|------------|---------|
|   | Female    | Male      | Total     | p-value  | Female        | Male      | Total     | p-value | Female   | Male     | Total    | p-value | Female    | Male       | Total      | p-value |
| <b>USDA indicators</b>  |           |           |           |          |               |           |           |         |          |          |          |         |           |            |            |         |
| Yield (kg green coffee/ha)  | 870.2     | 1093.7    | 1014.1    | 0.0740*  | 640.1         | 728.5     | 712.1     | 0.5226  | 1833.6   | 1059.5   | 1280.6   | 0.2467  | 817.2     | 884.8      | 865.0      | 0.4330  |
| Coffee area (ha)  | 2.8       | 2.9       | 2.9       | 0.9057   | 1.2           | 1.6       | 1.5       | 0.3541  | 0.7      | 1.4      | 1.2      | 0.287   | 2.0       | 2.1        | 2.1        | 0.9319  |
| Farmers (%) with access to financing for agriculture                  | 22.6      | 17.9      | 19.5      | 0.5997   | 6.7           | 16.4      | 14.5      | 0.344   | 0.0      | 0        | 0        | n.a.    | 13.8      | 14.4       | 14.2       | 0.9137  |
| Value of annual coffee sales (US\$) (with zero sales)                 | 9,883     | 9,931     | 9,913     | 0.988    | 3,861         | 6,975     | 6,333     | 0.2046  | 4,849    | 5,804    | 5,496    | 0.6773  | 7,389     | 7,976      | 7,800      | 0.7395  |
| Annual amount of coffee sold (kg green coffee) (with zero sales)      | 1,796     | 1,811     | 1,805     | 0.9748   | 502           | 1,061     | 953       | 0.1768  | 841      | 796      | 810      | 0.9172  | 1,314     | 1,325      | 13,21      | 0.9686  |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 3.2       | 12.5      | 9.2       | 0.155    | 33.3          | 24.6      | 26.3      | 0.497   | 41.7     | 63.6     | 55.9     | 0.23    | 19.0      | 25.9       | 23.9       | 0.3     |
| <b>Anchor firm indicators</b>   |           |           |           |          |               |           |           |         |          |          |          |         |           |            |            |         |
| Farmers (%) who know the quality of their coffee                      | 3.2       | 8.9       | 6.9       | 0.3204   | 20.0          | 19.7      | 19.7      | 0.9776  | 0.0      | 80.0     | 57.1     | 0.0624* | 8.6       | 18.0       | 15.2       | 0.0964* |
| Farmers (%) who received a premium for their coffee quality           | 0         | 0         | 0         | n.a.     | 33.3          | 25.0      | 26.7      | 0.7895  | n.a.     | 0        | 0        | n.a.    | 20.0      | 16.0       | 16.7       | 0.8338  |
| Farmers (%) with any certification                                    | 41.9      | 67.9      | 58.6      | 0.0185** | 26.7          | 23.0      | 23.7      | 0.7655  | 100      | 20.0     | 42.9     | 0.0624* | 39.7      | 44.6       | 43.1       | 0.5251  |
| <b>Number of households</b>   | <b>31</b> | <b>56</b> | <b>87</b> |          | <b>15</b>     | <b>61</b> | <b>76</b> |         | <b>2</b> | <b>5</b> | <b>7</b> |         | <b>48</b> | <b>122</b> | <b>170</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

*Annex Table 6. Coffee: MOCCA indicators by Nicaragua anchor firms and sex of household head, at midline*

| Key indicators  | ALDEA GLOBAL |           |           |         | ECOM     |           |           |         | FDL       |           |           |         |
|---|--------------|-----------|-----------|---------|----------|-----------|-----------|---------|-----------|-----------|-----------|---------|
|   | Female       | Male      | Total     | p-value | Female   | Male      | Total     | p-value | Female    | Male      | Total     | p-value |
| <b>USDA indicators</b>  |              |           |           |         |          |           |           |         |           |           |           |         |
| Yield (kg green coffee/ha)  | 1173.1       | 1731.0    | 1608.5    | 0.2924  | 1216.9   | 1591.7    | 1536.8    | 0.6377  | 868.7     | 907.7     | 898.5     | 0.7239  |
| Coffee area (ha)  | 2.6          | 2.9       | 2.8       | 0.6741  | 2.1      | 3.2       | 3.0       | 0.4071  | 2.3       | 4.4       | 3.9       | 0.0275  |
| Farmers (%) with access to financing for agriculture                  | 88.9         | 53.1      | 61.0      | 0.054*  | 14       | 18.9      | 18.2      | 0.777   | 37.7      | 47.4      | 40.0      | 0.459   |
| Value of annual coffee sales (US\$) (with zero sales)                 | 10,524       | 11,295    | 11,118    | 0.819   | 12,367   | 14,634    | 14,256    | 0.782   | 6,491     | 13,536    | 11,820    | 0.044** |
| Annual amount of coffee sold (kg green coffee) (with zero sales)      | 2,807        | 2,782     | 2,787     | 0.977   | 2,958    | 3,534     | 3,438     | 0.764   | 2,051     | 3,789     | 3,366     | 0.050** |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 100          | 96.9      | 97.6      | 0.602   | 57.1     | 40.5      | 43.2      | 0.4279  | 21.1      | 49.2      | 42.5      | 0.0305  |
| <b>Anchor firm indicators</b>   |              |           |           |         |          |           |           |         |           |           |           |         |
| Farmers (%) who know the quality of their coffee                      | 0            | 0         | 0         | n.a.    | 0        | 0         | 0         | n.a.    | 5.3       | 1.6       | 2.5       | 0.3834  |
| Farmers (%) who received a premium for their coffee quality           | n.a.         | n.a.      | n.a.      | n.a.    | n.a.     | n.a.      | n.a.      | n.a.    | 0         | 0         | 0         | n.a.    |
| Farmers (%) with any certification                                    | 88.9         | 81.3      | 82.9      | 0.6014  | 16.7     | 28.6      | 26.8      | 0.5548  | 42.1      | 24.6      | 28.8      | 0.1443  |
| <b>Number of households</b>   | <b>9</b>     | <b>32</b> | <b>41</b> |         | <b>6</b> | <b>35</b> | <b>41</b> |         | <b>19</b> | <b>61</b> | <b>80</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

Annex Table 6. Continued.

| Key indicators  | MERCON-TNS |           |           |         | MERCON CH2 |           |           |         | Country   |            |            |         |
|---|------------|-----------|-----------|---------|------------|-----------|-----------|---------|-----------|------------|------------|---------|
|   | Female     | Male      | Total     | p-value | Female     | Male      | Total     | p-value | Female    | Male       | Total      | p-value |
| <b>USDA indicators</b>  |            |           |           |         |            |           |           |         |           |            |            |         |
| Yield (kg green coffee/ha)  | 925.0      | 643.0     | 670.3     | 0.2592  | 892.7      | 1170.2    | 1100.8    | 0.2772  | 968.8     | 1173.9     | 205.2      | 0.2541  |
| Coffee area (ha)  | 2.7        | 4.1       | 4.0       | 0.3506  | 4.2        | 3.0       | 3.3       | 0.3121  | 2.9       | 3.7        | 3.5        | 0.1194  |
| Farmers (%) with access to financing for agriculture                  | 0          | 20        | 20        | 0.408   | 57.1       | 40.9      | 44.8      | 0.470   | 48.9      | 34.1       | 37.0       | 0.065*  |
| Value of annual coffee sales (US\$) (with zero sales)                 | 4,628      | 7,839     | 7,538     | 0.459   | 14,465     | 11,036    | 11,894    | 0.623   | 9,301     | 12,134     | 11,554     | 0.223   |
| Annual amount of coffee sold (kg green coffee) (with zero sales)      | 2,504      | 2,342     | 2,358     | 0.883   | 11,769     | 3,116     | 5,360     | 0.089*  | 3,910     | 3,256      | 3,391      | 0.455   |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 100        | 86.7      | 87.9      | 0.515   | 85.7       | 81.8      | 82.8      | 0.82    | 57.8      | 65.9       | 64.3       | 0.309   |
| <b>Anchor firm indicators</b>   |            |           |           |         |            |           |           |         |           |            |            |         |
| Farmers (%) who know the quality of their coffee                      | 0          | 0         | 0         | n.a.    | 0          | 0         | 0         | n.a.    | 2.2       | 0.6        | 0.9        | 0.2865  |
| Farmers (%) who received a premium for their coffee quality           | n.a.       | n.a.      | n.a.      | n.a.    | n.a.       | n.a.      | n.a.      | n.a.    | 0         | 0          | 0          | n.a.    |
| Farmers (%) with any certification                                    | 0.0        | 3.4       | 3.1       | 0.7535  | 71.4       | 77.3      | 75.9      | 0.7633  | 48.9      | 38.1       | 40.3       | 0.1891  |
| <b>Number of households</b>   | <b>3</b>   | <b>30</b> | <b>33</b> |         | <b>7</b>   | <b>22</b> | <b>29</b> |         | <b>44</b> | <b>180</b> | <b>224</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters



*Annex Table 7. Coffee: MOCCA indicators by Peru anchor firms and sex of household head, at midline*

| Key indicators  | MIDAGRI   |            |            |         | OLAM/NESPRESSO |           |           |         | RGC       |           |           |         | Country   |            |            |          |
|---|-----------|------------|------------|---------|----------------|-----------|-----------|---------|-----------|-----------|-----------|---------|-----------|------------|------------|----------|
|   | Female    | Male       | Total      | p-value | Female         | Male      | Total     | p-value | Female    | Male      | Total     | p-value | Female    | Male       | Total      | p-value  |
| <b>USDA indicators</b>  |           |            |            |         |                |           |           |         |           |           |           |         |           |            |            |          |
| Yield (kg green coffee/ha)  | 869.6     | 1043.0     | 1007.1     | 0.091*  | 912.3          | 994.6     | 980.9     | 0.576   | 874.7     | 911.6     | 891.3     | 0.714   | 874.9     | 1020.3     | 981.0      | 0.035**  |
| Coffee area (ha)  | 2.36      | 2.79       | 2.70       | 0.119   | 2.15           | 2.21      | 2.20      | 0.913   | 1.93      | 2.77      | 2.31      | 0.028** | 2.17      | 2.71       | 2.56       | 0.007**  |
| Farmers (%) with access to financing for agriculture                  | 22.9      | 20.7       | 21.2       | 0.786   | 0.0            | 4.0       | 3.3       | 0.663   | 3.7       | 0.0       | 2.0       | 0.372   | 13.4      | 15.9       | 15.3       | 0.628    |
| Value of annual coffee sales (US\$) (with zero sales)                 | 7,617     | 10,296     | 9,724      | 0.041** | 6,332          | 8,200     | 7,889     | 0.547   | 6,195     | 9,176     | 7,533     | 0.103   | 6,948     | 9,858      | 9,056      | 0.002*** |
| Annual amount of coffee sold (kg green coffee) (with zero sales)      | 2,021     | 2,696      | 2,552      | 0.030** | 1,769          | 2,099     | 2,044     | 0.593   | 1,592     | 2,381     | 1,946     | 0.051*  | 1,829     | 2,572      | 2,367      | 0.000*** |
| Farmers (%) with access to improved markets thru MOCCA's anchor firms | 91.4      | 93.3       | 92.9       | 0.697   | 60.0           | 76.0      | 73.3      | 0.477   | 100       | 95.5      | 97.6      | 0.272   | 92.5      | 91.2       | 91.6       | 0.739    |
| <b>Anchor firm indicators</b>   |           |            |            |         |                |           |           |         |           |           |           |         |           |            |            |          |
| Farmers (%) who know the quality of their coffee                      | 91.4      | 94.1       | 93.5       | 0.573   | 100.0          | 84.0      | 86.7      | 0.354   | 37.0      | 50.0      | 42.9      | 0.372   | 70.1      | 87.4       | 82.7       | 0.001**  |
| Farmers (%) who received a premium for their coffee quality           | 25.9      | 38.4       | 36.0       | 0.229   | 66.7           | 100       | 95.7      | 0.006** | 0         | 18.2      | 9.5       | 0.172   | 22.5      | 45.5       | 40.4       | 0.008**  |
| Farmers (%) with any certification                                    | 97.1      | 93.3       | 94.1       | 0.396   | 100            | 100       | 100       | n.a     | 100       | 100       | 0         | n.a     | 98.5      | 95.1       | 96.0       | 0.220    |
| <b>Number of households</b>   | <b>35</b> | <b>135</b> | <b>170</b> |         | <b>5</b>       | <b>25</b> | <b>30</b> |         | <b>27</b> | <b>22</b> | <b>49</b> |         | <b>67</b> | <b>182</b> | <b>249</b> |          |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

*Annex Table 8. Cacao: Descriptive statistics of the variables used in the renovation regression*

| Variables  | Central America            | Ecuador                    | Peru                       | All countries              |
|--|----------------------------|----------------------------|----------------------------|----------------------------|
| Farmers who renovated cacao (1=yes)  | 0.153<br>[0.361]           | 0.233<br>[0.426]           | 0.140<br>[0.348]           | 0.163<br>[0.370]           |
| Sex of HH head (1=male)  | 0.736<br>[0.422]           | 0.844<br>[0.365]           | 0.738<br>[0.441]           | 0.757<br>[0.429]           |
| Number of MOCCA trainings  | 3.122<br>[2.151]           | 2.194<br>[2.345]           | 3.347<br>[2.952]           | 3.037<br>[2.569]           |
| Number of MOCCA trainings squared  | 14.349<br>[20.332]         | 10.246<br>[23.312]         | 19.871<br>[30.093]         | 15.809<br>[25.465]         |
| Cacao area (Ha)  | 1.442<br>[1.582]           | 3.178<br>[4.229]           | 2.061<br>[1.495]           | 2.024<br>[2.382]           |
| Cacao area squared   | 4.567<br>[14.241]          | 27.763<br>[84.654]         | 6.468<br>[10.269]          | 9.759<br>[39.406]          |
| Number of cacao varieties  | 1.485<br>[1.307]           | 1.194<br>[0.513]           | 1.335<br>[0.754]           | 1.368<br>[0.988]           |
| Number of cacao trees  | 1190.528<br>[1158.606]     | 2574.883<br>[3391.150]     | 2235.866<br>[1719.466]     | 1878.723<br>[2059.180]     |
| Number of cacao trees squared  | 2751489<br>[6774360]       | 18000000<br>[55500000]     | 7937631<br>[13000000]      | 7759327<br>[26500000]      |
| Cacao age  | 12.029<br>[10.867]         | 17.914<br>[16.810]         | 9.402<br>[7.590]           | 12.084<br>[11.553]         |
| Cacao age squared  | 262.060<br>[490.816]       | 599.874<br>[1269.821]      | 145.642<br>[305.300]       | 279.186<br>[682.383]       |
| Altitude   | 387.084<br>[234.724]       | 339.408<br>[460.196]       | 748.151<br>[384.204]       | 524.568<br>[395.3825]      |
| Altitude squared   | 204591.100<br>[221762.900] | 324228.300<br>[602851.800] | 706442.100<br>[633325.000] | 431114.900<br>[551656.300] |
| Owns land (1=yes)  | 0.957<br>[0.203]           | 1.000<br>[0.000]           | 0.360<br>[0.481]           | 0.722<br>[0.448]           |
| Remittances (1=yes)  | 0.147<br>[0.355]           | 0.012<br>[0.113]           | 0.079<br>[0.271]           | 0.094<br>[0.292]           |
| HH member migrated within last 6 months (1=yes)                            | 0.080<br>[0.272]           | 0.090<br>[0.289]           | 0.116<br>[0.321]           | 0.096<br>[0.295]           |
| Access to credit (1=yes)   | 0.061<br>[0.241]           | 0.090<br>[0.289]           | 0.207<br>[0.407]           | 0.126<br>[0.332]           |
| Received technical information about coffee thru NGO or government (1=yes) | 0.368<br>[0.484]           | 0.129<br>[0.338]           | 0.512<br>[0.501]           | 0.381<br>[0.486]           |
| Has shade crop with cacao  | 0.988<br>[0.110]           | 0.896<br>[0.307]           | 0.750<br>[0.434]           | 0.873<br>[0.332]           |
| <b>Observations</b>  | <b>163</b>                 | <b>77</b>                  | <b>164</b>                 | <b>404</b>                 |

**Annex Table 9. Cacao: Descriptive statistics of the variables used in the rehabilitation regression**

| Variables   | Central America            | Ecuador                    | Peru                       | All countries              |
|---|----------------------------|----------------------------|----------------------------|----------------------------|
| Farmers who rehabilitated cacao (1=yes)                                   | 0.904<br>[0.297]           | 0.766<br>[0.426]           | 0.982<br>[0.134]           | 0.909<br>[0.286]           |
| Sex of HH head (1=male)   | 0.789<br>[0.409]           | 0.844<br>[0.365]           | 0.738<br>[0.441]           | 0.777<br>[0.416]           |
| Number of MOCCA trainings   | 2.692<br>[2.082]           | 2.194<br>[2.345]           | 3.347<br>[2.952]           | 2.887<br>[2.606]           |
| Number of MOCCA trainings squared   | 11.552<br>[20.441]         | 10.246<br>[23.312]         | 19.871<br>[30.093]         | 15.112<br>[26.206]         |
| Cacao area (Ha)   | 1.372<br>[1.733]           | 3.178<br>[4.229]           | 2.061<br>[1.495]           | 2.082<br>[2.500]           |
| Cacao area squared  | 4.859<br>[16.697]          | 27.763<br>[84.654]         | 6.468<br>[10.269]          | 10.570<br>[41.936]         |
| Number of cacao varieties   | 1.211<br>[0.645]           | 1.194<br>[0.513]           | 1.335<br>[0.754]           | 1.264<br>[0.674]           |
| Number of cacao trees   | 1175.158<br>[1240.784]     | 2574.883<br>[3391.150]     | 2235.866<br>[1719.466]     | 1968.77<br>[2153.481]      |
| Number of cacao trees squared   | 2907035<br>[7821108]       | 1800000<br>[55500000]      | 7937631<br>[13300000]      | 8500500<br>[28100000]      |
| Cacao age   | 10.366<br>[7.465]          | 17.914<br>[16.810]         | 9.402<br>[7.590]           | 11.557<br>[10.788]         |
| Cacao age squared   | 162.703<br>[260.895]       | 599.874<br>[1269.821]      | 145.642<br>[305.300]       | 249.644<br>[667.042]       |
| Altitude  | 420.238<br>[249.476]       | 339.408<br>[460.196]       | 748.151<br>[384.204]       | 554.192<br>[408.097]       |
| Altitude squared  | 238292.200<br>[249179.100] | 324228.200<br>[602851.800] | 706442.100<br>[633325.000] | 473203.900<br>[574745.700] |
| Owns land (1=yes)   | 0.956<br>[0.206]           | 1.000<br>[0.000]           | 0.360<br>[0.481]           | 0.690<br>[0.463]           |
| Remittances (1=yes)   | 0.079<br>[0.271]           | 0.012<br>[0.113]           | 0.079<br>[0.271]           | 0.064<br>[0.246]           |
| HH member migrated within last 6 months (1=yes)                           | 0.035<br>[0.185]           | 0.090<br>[0.289]           | 0.116<br>[0.321]           | 0.084<br>[0.278]           |
| Access to credit (1=yes)  | 0.053<br>[0.224]           | 0.090<br>[0.289]           | 0.207<br>[0.407]           | 0.132<br>[0.339]           |
| Received technical information about cacao thru NGO or government (1=yes) | 0.526<br>[0.502]           | 0.129<br>[0.338]           | 0.512<br>[0.501]           | 0.433<br>[0.496]           |
| Has shade crop with cacao   | 0.982<br>[0.132]           | 0.896<br>[0.307]           | 0.750<br>[0.434]           | 0.856<br>[0.351]           |
| <b>Observations</b>   | <b>114</b>                 | <b>77</b>                  | <b>164</b>                 | <b>355</b>                 |

*Annex Table 10. Cacao: MOCCA indicators by Ecuador anchor firms and sex of household head, at midline*

| Key indicators  | ANECACAO |           |           |         | APECAP   |           |           |         | APEOSAE  |          |          |         |
|---|----------|-----------|-----------|---------|----------|-----------|-----------|---------|----------|----------|----------|---------|
|   | Female   | Male      | Total     | p-value | Female   | Male      | Total     | p-value | Female   | Male     | Total    | p-value |
| <b>USDA indicators</b>  |          |           |           |         |          |           |           |         |          |          |          |         |
| Yield (kg dry/ha)   | 172.1    | 194.1     | 187.4     | 0.726   | 103.5    | 206.6     | 199.2     | n.a.    | n.a.     | 49.1     | n.a.     | n.a.    |
| Area cacao (ha)   | 7.25     | 6.25      | 6.54      | 0.639   | 0.99     | 1.01      | 1.01      | n.a.    | n.a.     | 1.62     | n.a.     | n.a.    |
| Value of annual cacao sales (US\$) includes only producers who sold | 5,105    | 6,186     | 5,857     | 0.776   | 270      | 265       | 265       | n.a.    | n.a.     | 222      | n.a.     | n.a.    |
| Value of annual cacao sales (US\$)                                  | 5,105    | 5,945     | 5,700     | 0.820   | 270      | 245       | 246       | n.a.    | n.a.     | 222      | n.a.     | n.a.    |
| Annual amount of cacao sold (kg dry)                                | 2,455    | 1,653     | 1,887     | 0.450   | 104      | 230       | 221       | n.a.    | n.a.     | 85       | n.a.     | n.a.    |
| <b>Anchor firm indicators</b>                                       |          |           |           |         |          |           |           |         |          |          |          |         |
| Farmers (%) with any certification                                  | 16.7     | 50.0      | 41.7      | 0.165   | 100      | 100       | 100       | n.a.    | n.a.     | 100      | n.a.     | n.a.    |
| <b>Number of households</b>   | <b>7</b> | <b>17</b> | <b>24</b> |         | <b>1</b> | <b>13</b> | <b>14</b> |         | <b>0</b> | <b>4</b> | <b>4</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

Annex Table 10. Continued

| Key indicators   | Fortaleza |           |           |         | UNOCACE  |           |           |         | Country   |           |            |         |
|--|-----------|-----------|-----------|---------|----------|-----------|-----------|---------|-----------|-----------|------------|---------|
|  | Female    | Male      | Total     | p-value | Female   | Male      | Total     | p-value | Female    | Male      | Total      | p-value |
| <b>USDA indicators</b>   |           |           |           |         |          |           |           |         |           |           |            |         |
| Yield (kg dry/ha)  | 294.7     | 219.3     | 232.2     | 0.194   | 441.6    | 402.2     | 409.1     | 0.942   | 269.0     | 246.8     | 250.8      | 0.858   |
| Area cacao (ha)  | 1.33      | 1.75      | 1.67      | 0.576   | 2.74     | 4.91      | 4.55      | 0.481   | 3.67      | 3.24      | 3.32       | 0.676   |
| Value of annual cacao sales (US\$)<br>includes only producers who sold | 818       | 942       | 921       | 0.752   | 1,084    | 3,446     | 3,035     | 0.285   | 2,514     | 2,448     | 2,460      | 0.959   |
| Value of annual cacao sales (US\$)                                     | 613       | 828       | 786       | 0.532   | 1,084    | 3,273     | 2,908     | 0.315   | 2,262     | 2,275     | 2,273      | 0.991   |
| Annual amount of cacao sold (kg dry)                                   | 273       | 300       | 295       | 0.830   | 2,584    | 1,084     | 1,334     | 0.167   | 1,490     | 724       | 867        | 0.051*  |
| <b>Anchor firm indicators</b>  |           |           |           |         |          |           |           |         |           |           |            |         |
| Farmers (%) with any certification                                     | 100       | 100       | 100       | n.a.    | 100      | 100       | 100       | n.a.    | 78.3      | 89.3      | 86.5       | 0.1679  |
| <b>Number of households</b>  | <b>8</b>  | <b>33</b> | <b>41</b> |         | <b>4</b> | <b>20</b> | <b>24</b> |         | <b>20</b> | <b>87</b> | <b>107</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

**Annex Table 11. Cacao: MOCCA indicators by El Salvador anchor firms and sex of household head, at midline**

| Key indicators  | Independent producers |           |           |         |
|---|-----------------------|-----------|-----------|---------|
|   | Female                | Male      | Total     | p-value |
| <b>USDA indicators</b>  |                       |           |           |         |
| Yield (kg dry/ha)   | 112.1                 | 396.5     | 339.7     | 0.495   |
| Area cacao (ha)   | 1.01                  | 0.94      | 0.96      | 0.903   |
| Value of annual cacao sales (US\$) includes only producers who sold | 436                   | 2,432     | 2,061     | 0.611   |
| Value of annual cacao sales (US\$)                                  | 317                   | 2,078     | 1,706     | 0.569   |
| Annual amount of cacao sold (kg dry)                                | 101                   | 278       | 241       | 0.620   |
| <b>Anchor firm indicators</b>                                       |                       |           |           |         |
| Farmers (%) with any certification                                  | n.a.                  | n.a.      | n.a.      | n.a.    |
| <b>Number of households</b>   | <b>11</b>             | <b>41</b> | <b>52</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

**Annex Table 12. Cacao: MOCCA indicators by Guatemala anchor firms and sex of household head, at midline**

| Key indicators  | Cacao Verapaz |           |           |         |
|---|---------------|-----------|-----------|---------|
|   | Female        | Male      | Total     | p-value |
| <b>USDA indicators</b>  |               |           |           |         |
| Yield (kg dry/ha)   | 685.5         | 596.2     | 625.3     | 0.781   |
| Area cacao (ha)   | 0.60          | 1.22      | 1.02      | 0.113   |
| Value of annual cacao sales (US\$) includes only producers who sold | 524           | 820       | 719       | 0.230   |
| Value of annual cacao sales (US\$)                                  | 524           | 767       | 688       | 0.318   |
| Annual amount of cacao sold (kg dry)                                | 207           | 400       | 337       | 0.155   |
| <b>Anchor firm indicators</b>                                       |               |           |           |         |
| Farmers (%) with any certification                                  | 86.7          | 80.6      | 82.6      | 0.6228  |
| <b>Number of households</b>   | <b>15</b>     | <b>31</b> | <b>46</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

*Annex Table 13. Cacao: MOCCA indicators by Honduras anchor firms and sex of household head, at midline*

| Key indicators   | Fenaprocaaho |           |           |         |
|--|--------------|-----------|-----------|---------|
|  | Female       | Male      | Total     | p-value |
| <b>USDA indicators</b>   |              |           |           |         |
| Yield (kg dry/ha)  | 953.1        | 133.7     | 406.9     | 0.167   |
| Area cacao (ha)  | 1.20         | 1.84      | 1.62      | 0.039** |
| Value of annual cacao sales (US\$)<br>includes only producers who sold | 333          | 1,941     | 1,416     | 0.457   |
| Value of annual cacao sales (US\$)                                     | 281          | 1,731     | 1,239     | 0.439   |
| Annual amount of cacao sold (kg dry)                                   | 552          | 183       | 308       | 0.278   |
| <b>Anchor firm indicators</b>  |              |           |           |         |
| Farmers (%) with any certification                                     | 73.7         | 89.2      | 83.9      | 0.1397  |
| <b>Number of households</b>  | <b>19</b>    | <b>37</b> | <b>56</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters



*Annex Table 14. Cacao: MOCCA indicators by Nicaragua anchor firms and sex of household head, at midline*

| Key indicators  | APCA     |           |           |         | CACAONICA R L |           |           |         | CACHERCAM RL |          |           |         | OTROS*   |           |           |         | Country   |           |           |           |
|---|----------|-----------|-----------|---------|---------------|-----------|-----------|---------|--------------|----------|-----------|---------|----------|-----------|-----------|---------|-----------|-----------|-----------|-----------|
|   | Female   | Male      | Total     | p-value | Female        | Male      | Total     | p-value | Female       | Male     | Total     | p-value | Female   | Male      | Total     | p-value | Female    | Male      | Total     | p-value   |
| <b>USDA indicators</b>  |          |           |           |         |               |           |           |         |              |          |           |         |          |           |           |         |           |           |           |           |
| Yield (kg dry/ha)   | n.a.     | 364.1     | n.a.      | n.a.    | 195.0         | 240.4     | 233.2     | 0.468   | 259.9        | 411.8    | 366.2     | 0.109   | 205.9    | 208.4     | 207.8     | 0.969   | 215.8     | 282.1     | 269.9     | 0.165     |
| Area cacao (ha)   | n.a.     | 2.10      | n.a.      | n.a.    | 1.05          | 2.08      | 1.92      | 0.116   | 0.81         | 1.00     | 0.94      | 0.670   | 0.74     | 1.74      | 1.48      | 0.080*  | 0.82      | 1.83      | 1.64      | 0.036**   |
| Value of annual cacao sales (US\$) includes only producers who sold | n.a.     | 1,562     | n.a.      | n.a.    | 475           | 866       | 805       | 0.272   | 386          | 942      | 775       | 0.271   | 264      | 490       | 431       | 0.181   | 341       | 926       | 818       | 0.095*    |
| Value of annual cacao sales (US\$)                                  | n.a.     | 1,562     | n.a.      | n.a.    | 475           | 866       | 805       | 0.272   | 386          | 942      | 775       | 0.271   | 231      | 426       | 376       | 0.221   | 316       | 880       | 775       | 0.091*    |
| Annual amount of cacao sold (kg dry)                                | n.a.     | 774       | n.a.      | n.a.    | 205           | 478       | 435       | 0.129   | 189          | 473      | 388       | 0.279   | 146      | 270       | 238       | 0.207   | 168       | 472       | 415       | 0.091*    |
| <b>Anchor firm indicators</b>                                       |          |           |           |         |               |           |           |         |              |          |           |         |          |           |           |         |           |           |           |           |
| Farmers (%) with any certification                                  | n.a.     | 100       | n.a.      | n.a.    | 100           | 100       | 100       | n.a.    | 0            | 0        | 0         | n.a.    | 12.5     | 56.5      | 45.2      | 0.0315  | 28.6      | 72.1      | 64.0      | 0.0019*** |
| <b>Number of households</b>   | <b>0</b> | <b>15</b> | <b>15</b> |         | <b>3</b>      | <b>16</b> | <b>19</b> |         | <b>3</b>     | <b>7</b> | <b>10</b> |         | <b>8</b> | <b>23</b> | <b>31</b> |         | <b>14</b> | <b>61</b> | <b>75</b> |           |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

**Annex Table 15. Cacao: MOCCA indicators by Peru anchor firms and sex of household head, at midline**

| Key indicators  | Agrotec  |           |           |         | APPCACAO  |           |            |         | ECOM      |           |           |         | Country   |            |            |         |
|---|----------|-----------|-----------|---------|-----------|-----------|------------|---------|-----------|-----------|-----------|---------|-----------|------------|------------|---------|
|   | Female   | Male      | Total     | p-value | Female    | Male      | Total      | p-value | Female    | Male      | Total     | p-value | Female    | Male       | Total      | p-value |
| <b>USDA indicators</b>  |          |           |           |         |           |           |            |         |           |           |           |         |           |            |            |         |
| Yield (kg dry/ha)   | 572.6    | 500.3     | 508.3     | 0.625   | 543.8     | 518.0     | 525.1      | 0.751   | 530.7     | 817.2     | 698.7     | 0.017** | 545.3     | 542.5      | 543.1      | 0.964   |
| Area cacao (ha)   | 1.09     | 1.37      | 1.34      | 0.557   | 2.18      | 2.41      | 2.35       | 0.496   | 3.09      | 3.41      | 3.28      | 0.748   | 2.22      | 2.10       | 2.13       | 0.679   |
| Value of annual cacao sales (US\$) includes only producers who sold | 1,181    | 1,488     | 1,454     | 0.695   | 2,575     | 2,869     | 2,788      | 0.665   | 3,076     | 4,360     | 3,829     | 0.176   | 2,472     | 2,469      | 2,470      | 0.994   |
| Value of annual cacao sales (US\$)                                  | 1,181    | 1,488     | 1,454     | 0.695   | 2,575     | 2,833     | 2,763      | 0.703   | 3,076     | 4,118     | 3,701     | 0.280   | 2,472     | 2,439      | 2,447      | 0.942   |
| Annual amount of cacao sold (kg dry)                                | 622      | 703       | 694       | 0.825   | 1,093     | 1,312     | 1,252      | 0.484   | 1,497     | 1,987     | 1,791     | 0.329   | 1,114     | 1,143      | 1,137      | 0.893   |
| <b>Anchor firm indicators</b>                                       |          |           |           |         |           |           |            |         |           |           |           |         |           |            |            |         |
| Farmers (%) with any certification                                  | 25.0     | 58.5      | 54.8      | 0.0745* | 73.3      | 72.5      | 72.7       | 0.931   | 0         | 0         | 0         | n.a.    | 48.0      | 58.9       | 56.3       | 0.1758  |
| <b>Number of households</b>   | <b>8</b> | <b>65</b> | <b>73</b> |         | <b>30</b> | <b>80</b> | <b>110</b> |         | <b>12</b> | <b>18</b> | <b>30</b> |         | <b>50</b> | <b>163</b> | <b>213</b> |         |

Note: p-value in parenthesis, and differences in means between groups are significant at the 10% level (\*), 5% level (\*\*) or 1% level (\*\*\*)

\*1 ha (hectare) = 10,000 square meters

*Annex Sample 1. List of departments or provinces sampled for farmers' midline evaluation (N in parenthesis)*

| Crop   | Ecuador  | El Salvador  | Guatemala   | Honduras  | Nicaragua   | Peru   |
|--------|--|--|---|---|---|--|
| Coffee | N.A  | Ahuachapan (3)<br>La Libertad (1)<br>La Union (28)<br>Morazan (83)<br>Santa Ana (21)<br>Sonsonate (38) | Baja Verapaz (95)<br>Chimaltenango (1)<br>Huehuetenango (64)<br>Santa Rosa (70) | COMAYAGUA (12)<br>COPAN (44)<br>EL PARAISO (11)<br>INTIBUCÁ (6)<br>LA PAZ (13)<br>LEMPIRA (35)<br>OCOTEPEQUE (76) | Boaco (3)<br>Jinotega (133)<br>Madriz (18)<br>Matagalpa (70)<br>RAAN (3)        | Amazonas (49)<br>Cajamarca (200)   |
| Cacao  | Guayas (10)<br>Los Rios (22)<br>Manabi (51)<br>Santo Domingo de los Tsachilas (5)<br>Zamora Chinchipe (14) | Sonsonate (7)<br>Ahuachapan (7)<br>La Libertad (2)<br>La Paz (8)<br>Morazan (12)<br>Usultán (16)       | Alta Verapaz (46)   | Atlantida (23)<br>Colon (2)<br>Cortes (31)  | Jinotega (21)<br>Matagalpa (10)<br>RACCN (19)<br>RACCS (7)<br>Rio San Juan (18) | Amazonas (49)<br>Cajamarca (75)<br>Huanuco (2)<br>Junin (34)<br>Pasco (53) |

**Annex Sample 2. List of municipalities sampled for farmers' midline evaluation (N in parenthesis)**

| Crop   | Ecuador | El Salvador                    | Guatemala                  | Honduras                     | Nicaragua                   | Peru                      |
|--------|---------|--------------------------------|----------------------------|------------------------------|-----------------------------|---------------------------|
| Coffee | N.A     | Candelaria De La Frontera (21) | Barberena (6)              | Cololaca (2)                 | El Cua (16)                 | Atapaca (6)               |
|        |         | Comasagua (1)                  | Casillas (12)              | Concepción (8)               | Jinotega (27)               | Chirinos (33)             |
|        |         | Corinto (21)                   | Concepcion Huista (1)      | Dolores (5)                  | Matagalpa (23)              | CHONTALI (10)             |
|        |         | Juayua (38)                    | Cubulco (60)               | El Paraiso (11)              | Pantasma (4)                | Cochamal (1)              |
|        |         | Nueva Esparta (28)             | Cuilapa (8)                | El Rosario (5)               | San José De Bocay (27)      | Dos de Mayo (3)           |
|        |         | Perquin (19)                   | El Chol (1)                | Fraternidad (1)              | San José de los Remates (3) | HUABAL (10)               |
|        |         | San Fernando (31)              | Granados (2)               | Intibucá (1)                 | San Rafael del Norte (15)   | Huambo (6)                |
|        |         | San Simon (12)                 | Jacaltenango (9)           | La Labor (4)                 | San Sebastian de Yali (5)   | La Coipa (80)             |
|        |         | Tacuba (3)                     | La Democracia (3)          | La Paz (13)                  | SanJuan de Rio Coco (16)    | LAS PIRIAS (1)            |
|        |         |                                | Nenton (3)                 | La Unión (19)                | TELPANECA (2)               | Omia (16)                 |
|        |         |                                | Nueva Santa Rosa (14)      | Lepaera (3)                  | Tuma-La Dalia (47)          | Rodríguez de Mendoza (26) |
|        |         |                                | Pueblo Nuevo Viñas (1)     | Ocotepeque (1)               | Waslala (3)                 | San Ignacio (43)          |
|        |         |                                | Rabinal (12)               | San Agustín (5)              | Wiwili Jinotega (39)        | San Jose de Lourdes (4)   |
|        |         |                                | Salamá (5)                 | San Francisco Del Valle (28) |                             | SAN JOSE DEL ALTO (10)    |
|        |         |                                | San Antonio Huista (13)    | San Juan (5)                 |                             |                           |
|        |         |                                | San Jerónimo (13)          | San Manuel Colohete (11)     |                             |                           |
|        |         |                                | San Martín Jilotepeque (1) | San Marcos (41)              |                             |                           |
|        |         |                                | San Miguel Chicaj (2)      | San Pedro De Copan (25)      |                             |                           |
|        |         |                                | San pedro Necta (4)        | Santa Rosa De Copan (1)      |                             |                           |
|        |         |                                | San sebastian huehue (2)   | Siguatpeque (7)              |                             |                           |

|       |  |  |   |   |   |   |
|-------|--|--|---|---|---|---|
|       |  |  | Santa Barbara (5)<br>Santa Cruz Naranjo (6)<br>Santa María Ixhuatán (23)<br>Santiago petatán (1)<br>Todos Santos (3)<br>Union Cantinil (20) | Sinuapa (1)   |   |   |
| Cacao | Bolivar (18)<br>Buena Fe (4)<br>Chone (11)<br>Cristobal Colon (3)<br>El Guabo (3)<br>El Triunfo (3)<br>Junin (5)<br>Milagro (3)<br>Mocache (5)<br>Montalvo (2)<br>Panda (14)<br>Pasaje (2)<br><br>Pichincha (6)<br><br>Quevedo (1)<br>Quinsaloma (4)<br><br>Tosagua (11)<br><br>Valle Hermoso (2)<br>Ventana (6)<br>Yaguachi (4) | Berlin (3)<br>Caluco (1)<br>Guatajiagua (1)<br>Guaymango (2)<br>Izalco (4)<br>Jiquilisco (2)<br>Jocoaitique (1)<br>Jucuapa (8)<br>Nahuizalco (2)<br>Oscala (4)<br>Puerto El Trinifo (3)<br>San Francisco<br>Menendez (5)<br>San Pedro Nonualco<br>(2)<br>San Simon (2)<br>Santa Maria Ostuma<br>(1)<br>Santiago Nonualco<br>(4)<br>Tepecoyo (2)<br>Yamabal (4)<br>Zacatecoluca (1) | Cahabon (35)<br>Coban (11)  | Balfate (1)<br>Choloma (13)<br>Jutiapa (23)<br>Omoa (18)<br>Sonaguera (1) | Bocay (9)<br>El Castillo (12)<br>El Cua (2)<br>Nueva Guinea (7)<br>Rio Blanco (10)<br>San Carlos (6)<br>Waslala (19)<br>Wiwili (10) | Bagua (29)<br>Bellavista (13)<br>Copallin (9)<br>Coviriali (15)<br>Huarango (29)<br>La Peca (2)<br>Oxapampa (13)<br>Palcazu (4)<br>Pangoa (5)<br>Puerto Inca (6)<br>San Ignacio (13)<br>San Jose de Lourdes<br>(9)<br>Satipo (15)<br><br>Tabaconas (26)<br>Utcubamba (25) |

***New Annex Table 1. Coffee: differences in # of practices and yields by training model***

|                      |           | Other model | MOCCA model |
|----------------------|-----------|-------------|-------------|
| # practices adopted  | Decreased | 44.17%      | 23.36%      |
|                      | Same      | 4.17%       | 9.35%       |
|                      | Increased | 51.67%      | 67.29%      |
|                      |           |             |             |
| Yields (green kg/ha) | Decreased | 15.0%       | 29.91%      |
|                      | Increased | 85.0%       | 70.09%      |
| N                    |           | 120         | 107         |

***New Annex Table 2. Coffee: descriptive statistics of regression variables***

| Variables  | Baseline | Mid line |
|--|----------|----------|
| Sex (1=male)   | 81.40%   | 81.40%   |
| Migration of a HH member within last 12 months (1=yes)                           | 8.33%    | 14.60%   |
| Received remittances (1=yes)   | 4.62%    | 4.39%    |
| Had credit (1=yes)   | 47.20%   | 54.10%   |
| Received information of the crop research products from NGOs/Government (1=yes)  | 10.18%   | 13.60%   |
| Joint decision (head + spouse) about the use of income from coffee sales (1=yes) | 19%      | 40.49%   |
| Has shade (1=yes)  | 99.1%    | 100%     |
| Has at least one certification (1=yes)   | 26.80%   | 41.60%   |
| Sold thru MOCCA anchor firm (1=yes)  | 61.10%   | 65.30%   |
| % trees under a rust-susceptible variety   | 4.61%    | 1.08%    |
| Farmers' age (years)   | 42.3     | 44.5     |
| Distance to nearest town (hours)   | 0.9      | 0.9      |
| Area with the crop (ha)  | 3.3      | 3.4      |
| Tree density (trees / ha)  | 4780.3   | 16678.6  |
| # varieties grown  | 1.2      | 1.2      |
| Age of trees (years)   | 4.66     | 5.71     |
| Elevation (masl)   | 840      | 840      |
| N  | 108      | 205      |

***New Annex Table 3. Coffee: exploratory results for the # of practices adopted***

| <b>Dependent variable: # practices adopted</b>                                  | <b>Nicaragua</b>    |
|---|---------------------|
| Training model used (1=MOCCA)   | 5.376***<br>(1.595) |
| # trainings received by farmer  | -0.008<br>(0.221)   |
| Sex of HH head (1=male)   | -                   |
| Age of HH head (years)  | -0.602<br>(1.800)   |
| Age of HH head squared  | 0.013<br>(0.018)    |
| Joint decision on use of income from coffee sales (1=yes)                       | -0.538<br>(0.949)   |
| Area (Ha)   | -0.512<br>(0.829)   |
| Area squared  | 0.026<br>(0.067)    |
| # of varieties grown  | 0.109<br>(0.785)    |
| # coffee trees/ha   | 0.000<br>(0.000)    |
| # coffee trees/ha squared   | -0.000<br>(0.000)   |
| Age of coffee trees (years)   | -0.682<br>(0.579)   |
| Age of coffee trees squared   | 0.056<br>(0.041)    |
| Distance to closest town (hours)  | -                   |
| Elevation (masl)  | -                   |
| Elevation squared   | -                   |
| Access to credit (1=yes)  | 2.117**<br>(0.823)  |
| Received information of the crop research products from NGOs/Government (1=yes) | 2.839**<br>(1.394)  |
| Shade with coffee (1=yes)   | 5.670<br>(4.905)    |
| Sold thru MOCCA anchor firm (1=yes)   | -1.150<br>(1.140)   |
| Reported incidence of rust in the crop (1=yes)                                  | 0.039<br>(0.740)    |
| % trees under a rust-susceptible variety  | -0.002<br>(0.027)   |
| Reported incidence of rust in the crop x Trees under a rust-susceptible variety | 0.049<br>(0.059)    |
| Migration of a HH member within last 12 months (1=yes)                          | 0.995<br>(1.522)    |

|   |                   |
|---|-------------------|
| Received remittances (1=yes)  | 1.585<br>(2.301)  |
| Migration of a HH member within last 12 months x Received remittances | -1.613<br>(3.679) |
| Constant  | 5.542<br>(57.759) |
| <b>N</b>  | <b>313</b>        |
| <b>Number of id</b>   | <b>205</b>        |
| <b>R-squared</b>  | <b>0.623</b>      |

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

***New Annex Table 4. Coffee: exploratory results for yields***

| <b>Dependent variable: Yields (green kg/ha)</b>                                 | <b>Nicaragua</b>        |
|---|-------------------------|
| Training model used (1=MOCCA)   | -11.273<br>(188.493)    |
| # trainings received by farmer  | 19.927<br>(24.800)      |
| Age of HH head (years)  | 15.690<br>(26.167)      |
| Age of HH head squared  | -0.158<br>(0.271)       |
| Sex of HH head (1=male)   | 95.291<br>(221.251)     |
| Received information of the crop research products from NGOs/Government (1=yes) | -258.547<br>(179.975)   |
| Joint decision on use of income from coffee sales (1=yes)                       | -611.513**<br>(299.083) |
| Male HH head x Joint decision on use of income from coffee sales                | 231.482<br>(330.590)    |
| # of varieties grown  | -174.618<br>(109.614)   |
| # coffee trees/ha   | 0.016<br>(0.013)        |
| # coffee trees/ha squared   | -0.000<br>(0.000)       |
| Age of coffee trees (years)   | -79.344<br>(93.399)     |
| Age of coffee trees squared   | 3.022<br>(6.330)        |
| Distance to closest town (hours)  | -151.559*<br>(83.237)   |
| Elevation (masl)  | -1.714<br>(1.543)       |
| Elevation squared   | 0.002*<br>(0.001)       |
| Access to credit (1=yes)  | 370.291***              |



|   |             |
|---|-------------|
|   | (131.234)   |
| Shade with coffee (1=yes)   | 403.407     |
|   | (1,016.111) |
| Has at least one certification (1=yes)  | -81.102     |
|   | (131.688)   |
| Reported incidence of rust in the crop (1=yes)                                  | 114.271     |
|   | (126.626)   |
| % trees under a rust-susceptible variety  | -5.639      |
|   | (5.535)     |
| Reported incidence of rust in the crop x Trees under a rust-susceptible variety | 26.017**    |
|   | (11.143)    |
| Migration of a HH member within last 12 months (1=yes)                          | -56.290     |
|   | (200.419)   |
| Received remittances (1=yes)  | 828.981*    |
|   | (431.846)   |
| Migration of a HH member within last 12 months x Received remittances           | -968.683    |
|   | (596.494)   |
| Constant  | 814.653     |
|   | (1,394.654) |

---

|                     |            |
|---------------------|------------|
| <b>N</b>            | <b>311</b> |
| <b>Number of id</b> | <b>205</b> |

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Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

***New Annex Table 5. Cacao: differences in # of practices and yields by training model***

|                     |           | Other model | MOCCA model |
|---------------------|-----------|-------------|-------------|
| # practices adopted | Decreased | 34%         | 33%         |
|                     | Same      | 9%          | 10%         |
|                     | Increased | 57%         | 57%         |
|                     |           |             |             |
| Yields (dry kg/ha)  | Decreased | 35%         | 18%         |
|                     | Increased | 65%         | 82%         |
| N                   |           | 110         | 103         |

***New Annex Table 6. Cacao: descriptive statistics of regression variables***

| Variables   | Baseline | Mid line |
|---|----------|----------|
| Sex (1=male)  | 76.5%    | 76.5%    |
| Migration of a HH member within last 12 months (1=yes)                          | 19.7%    | 12.7%    |
| Received remittances (1=yes)  | 3.3%     | 8.5%     |
| Had credit (1=yes)  | 25.8%    | 21.6%    |
| Received information of the crop research products from NGOs/Government (1=yes) | 17.4%    | 14.1%    |
| Joint decision (head + spouse) about the use of income from cacao sales (1=yes) | 17.1%    | 17.8%    |
| Has shade (1=yes)   | 100%     | 75.6%    |
| Owns the farm (1=yes)   | 57.3%    | 39.4%    |
| Farmers' age (years)  | 48.8     | 49.8     |
| Distance to nearest town (hours)  | 41.2     | 41.2     |
| Area with the crop (ha)   | 2.4      | 2.1      |
| Tree density (trees / ha)   | 1028     | 1121     |
| # varieties grown   | 1.2      | 1.4      |
| Age of trees (years)  | 8.2      | 10.1     |
| Number of certifications  | 0.4      | 0.7      |

***New Annex Table 7. Cacao: exploratory results for the # of practices adopted***

| Dependent variable: # practices adopted  | Peru      |
|--|-----------|
| # trainings received by farmer   | 0.123     |
|  | 0.079     |
| Training model used (1=MOCCA)  | 1.449 **  |
|  | 0.597     |
| Sex (1=male)   | 0.160     |
|  | 0.478     |
| Farmers' age (years)   | -0.026    |
|  | 0.106     |
| Farmers' age squared   | 0.000     |
|  | 0.001     |
| Migration of a HH member within last 12 months (1=yes)                             | -0.663    |
|  | 0.602     |
| Received remittances (1=yes)   | 0.539     |
|  | 0.680     |
| Had credit (1=yes)   | 1.608 *** |
|  | 0.481     |
| Received information of the crop research products from<br>NGOs/Government (1=yes) | 2.438 *** |
|  | 0.706     |
| Joint decision (head + spouse) about the use of income from cacao sales<br>(1=yes) | 1.629 **  |
|  | 0.603     |
| Distance to nearest town (hours)   | 0.015 *** |
|  | 0.006     |
| Elevation (masl)   | 0.000 *** |
|  | 0.000     |
| Elevation squared  | 0.000 *** |
|  | 0.000     |
| Area with the crop (ha)  | 0.012     |
|  | 0.277     |
| Area with the crop squared   | -0.019    |
|  | 0.022     |
| Tree density (trees / ha)  | 0.005 *** |
|  | 0.002     |
| Tree density squared   | 0.000 *** |
|  | 0.000     |
| # varieties grown  | 1.248 *** |
|  | 0.318     |
| Age of trees (years)   | -0.118    |
|  | 0.081     |
| Age of trees squared   | 0.003 *   |
|  | 0.002     |

|                              |           |
|------------------------------|-----------|
| Has shade with cacao (1=yes) | 2.889 *** |
|                              | 0.567     |
| Owns the farm (1=yes)        | -0.960 ** |
|                              | 0.433     |
| Constant                     | -0.551    |
|                              | 3.094     |
| <b>N</b>                     | 219       |
| <b>sigma_u</b>               | 1.932     |
| <b>sigma_e</b>               | 1.955     |
| <b>rho</b>                   | 0.494     |

Errores estándar abajo del parámetro; nivel de significancia: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

***New Annex Table 8. Cacao: exploratory results for yields***

| Dependent variable: Yields (dry kg/ha)   | Peru       |
|--|------------|
| # trainings received by farmer   | 0.836      |
|  | 11.3       |
| Training model used (1=MOCCA)  | -52.483    |
|  | 86.667     |
| Sex (1=male)   | 54.701     |
|  | 56.432     |
| Farmers' age (years)   | 2.619      |
|  | 11.795     |
| Farmers' age squared   | -0.058     |
|  | 0.110      |
| Migration of a HH member within last 12 months (1=yes)                             | -95.463    |
|  | 73.433     |
| Received remittances (1=yes)   | 35.697     |
|  | 84.974     |
| Received remittances x Migration of a HH member within last 12 months              | -280.167 * |
|  | 143.884    |
| Had credit (1=yes)   | 33.588     |
|  | 67.231     |
| Received information of the crop research products from<br>NGOs/Government (1=yes) | 32.227     |
|  | 90.882     |
| Joint decision (head + spouse) about the use of income from cacao sales<br>(1=yes) | -37.854    |
|  | 75.365     |
| Distance to nearest town (hours)   | -0.338     |
|  | 0.680      |
| Elevation (masl)   | -0.001 *** |

|                              |          |     |
|------------------------------|----------|-----|
|                              | 0.000    |     |
| Elevation squared            | 0.000    | *** |
|                              | 0.148    |     |
| # varieties grown            | -80.977  | *   |
|                              | 47.739   |     |
| Tree density (trees / ha)    | 0.824    | *** |
|                              | 0.242    |     |
| Tree density squared         | 0.000    | *** |
|                              | 0.000    |     |
| Age of trees (years)         | 21.564   | **  |
|                              | 10.489   |     |
| Age of trees squared         | -0.455   | *   |
|                              | 0.2      |     |
| Has shade with cacao (1=yes) | -142.827 |     |
|                              | 88.465   |     |
| Number of certifications     | -31.042  |     |
|                              | 33.979   |     |
| Owens the farm (1=yes)       | 105.386  |     |
|                              | 67.136   |     |
| Constant                     | 90.526   |     |
|                              | 361.213  |     |
| <hr/>                        |          |     |
| <b>N</b>                     | 215      |     |

Errores estándar abajo del parámetro; nivel de significancia: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 9 Annex Maps. Coffee: Stakeholder maps and intervention areas

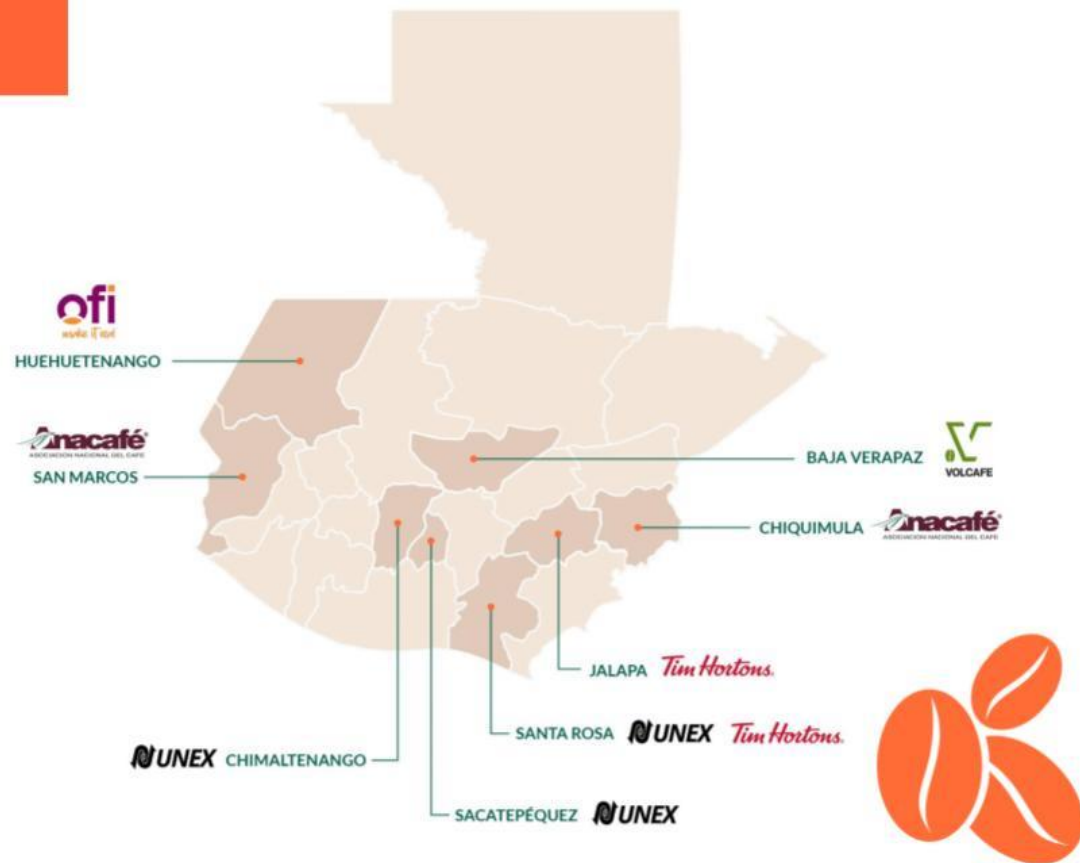
# El Salvador

| Departament      | Farmers trained | Nurseries trained |
|------------------|-----------------|-------------------|
| Ahuachapán       | 147             | 120               |
| Santa Ana        | 258             | 9                 |
| Morazán          | 389             |                   |
| La Unión         | 160             |                   |
| La Libertad      | 788             | 1                 |
| Sonsonate        | 302             |                   |
| Other (disperse) | 282             |                   |
| Total            | 2,326           | 130               |



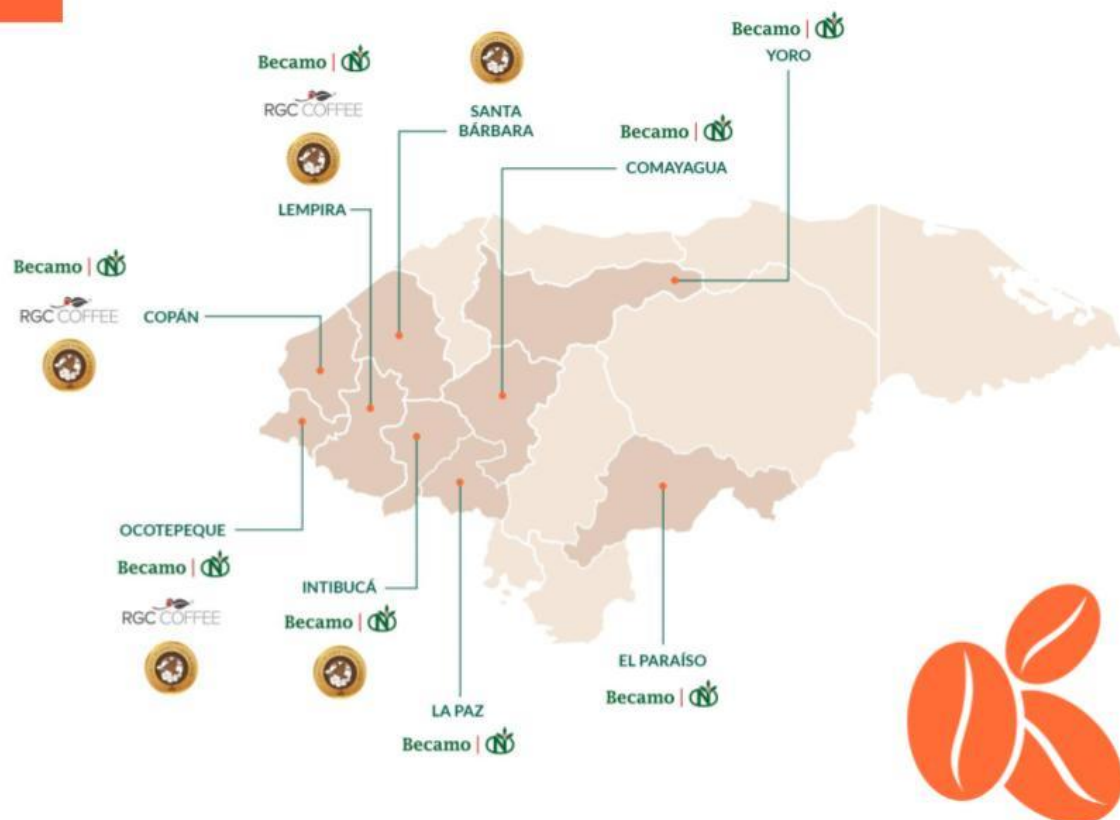
# Guatemala

| Departament   | Farmers trained | Nurseries trained |
|---------------|-----------------|-------------------|
| Huehuetenango | 5,189           |                   |
| Baja Verapaz  | 2,107           |                   |
| Chiquimula    | 1,901           |                   |
| Jalapa        | 88              |                   |
| San Marcos    | 2,547           |                   |
| Santa Rosa    | 1,864           | 56                |
| Sacatepéquez  | 2,305           |                   |
| Chimaltenango | 772             | 38                |
| Total         | 16,773          | 94                |



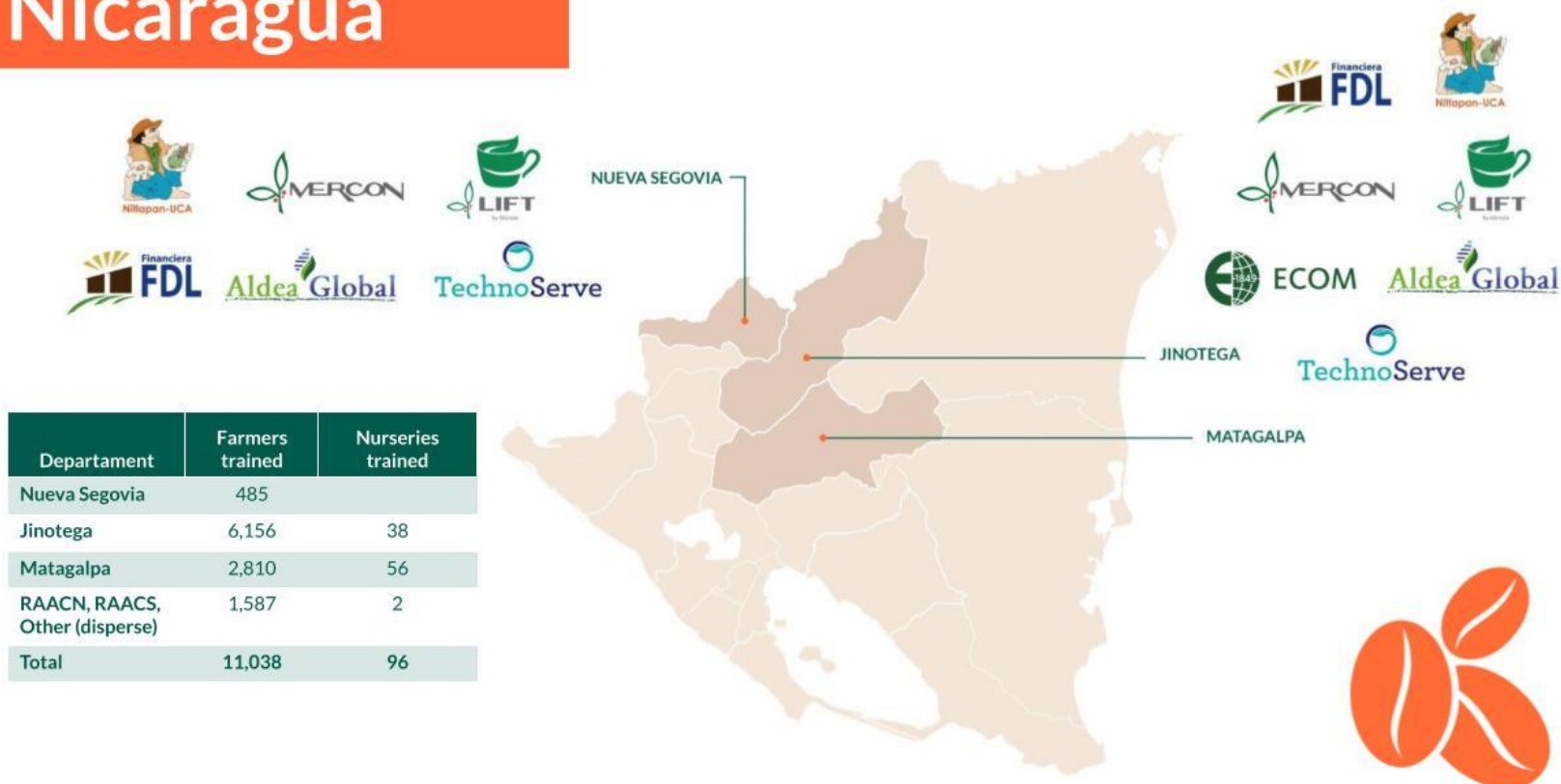
# Honduras

| Departament   | Farmers trained | Nurseries trained |
|---------------|-----------------|-------------------|
| Copán         | 1,695           | 1                 |
| Lempira       | 2,726           | 18                |
| Santa Bárbara | 22              |                   |
| Comayagua     | 292             |                   |
| El Paraíso    | 430             |                   |
| La Paz        | 102             | 18                |
| Intibucá      | 649             | 29                |
| Ocatepeque    | 3,139           | 31                |
| Yoro          | 27              |                   |
| Total         | 9,082           | 97                |





# Nicaragua



# Perú

| Departament | Farmers trained | Nurseries trained |
|-------------|-----------------|-------------------|
| Cajamarca   | 4,291           | 142               |
| Amazonas    | 3,648           | 51                |
| San Martín  | 3,556           |                   |
| Ucayali     | 71              |                   |
| Huánuco     | 1,924           |                   |
| Total       | 13,490          | 193               |



*New Annex 10. Cacao: Stakeholder maps and intervention areas*

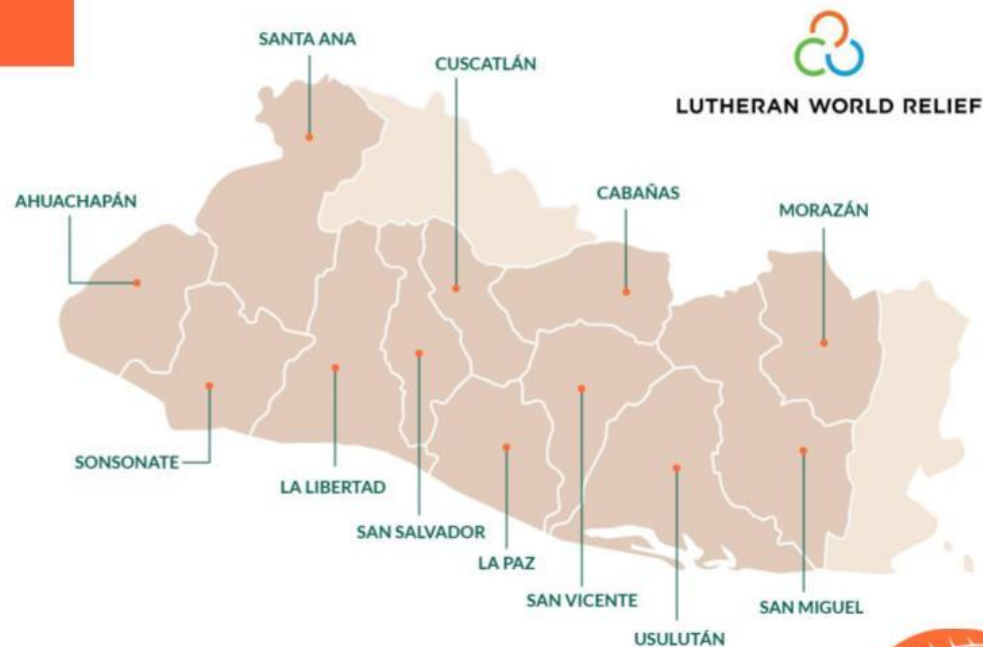
# Ecuador

| Departament                    | Farmers trained | Nurseries trained |
|--------------------------------|-----------------|-------------------|
| Manabi                         | 1,670           | 13                |
| Santo Domingo de los Tsáchilas | 164             |                   |
| Esmeraldas                     | 332             |                   |
| Pichincha                      | 305             |                   |
| Napo                           | 25              |                   |
| Sucumbios                      | 203             |                   |
| Orellana                       | 230             |                   |
| Pastaza                        | 13              |                   |
| Morona Santiago                | 73              |                   |
| Zamora Chinchipe               | 315             | 6                 |
| Bolivar                        | 137             |                   |
| El Oro                         | 530             |                   |
| Azuay                          | 26              |                   |
| Santa Elena                    | 101             |                   |
| Guayas                         | 1,480           |                   |
| Los Ríos                       | 1,380           |                   |
| Total                          | 6,984           | 19                |



# El Salvador

| Departament  | Farmers trained | Nurseries trained |
|--------------|-----------------|-------------------|
| Ahuachapán   | 239             |                   |
| Santa Ana    | 112             |                   |
| Cuscatlán    | 53              | 2                 |
| Cabañas      | 52              | 1                 |
| Morazán      | 233             |                   |
| San Miguel   | 24              |                   |
| Usulután     | 318             |                   |
| San Vicente  | 106             |                   |
| La Paz       | 280             |                   |
| San Salvador | 18              | 5                 |
| La Libertad  | 232             | 1                 |
| Sonsonate    | 369             | 2                 |
| Total        | 2,036           | 11                |



# Guatemala

| Departament  | Farmers trained | Nurseries trained |
|--------------|-----------------|-------------------|
| Alta Verapaz | 920             | 20*               |
| Petén        | 146             |                   |
| Izabal       | 347             |                   |
| Total        | 1,413           | 20                |

\*Most nursery operators received virtual training



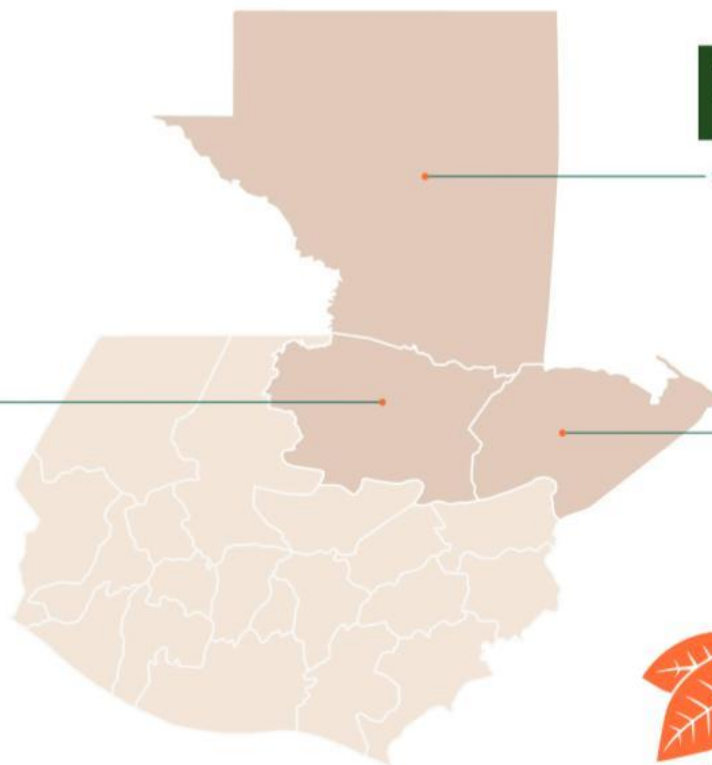
ALTA  
VERAPAZ



PETÉN



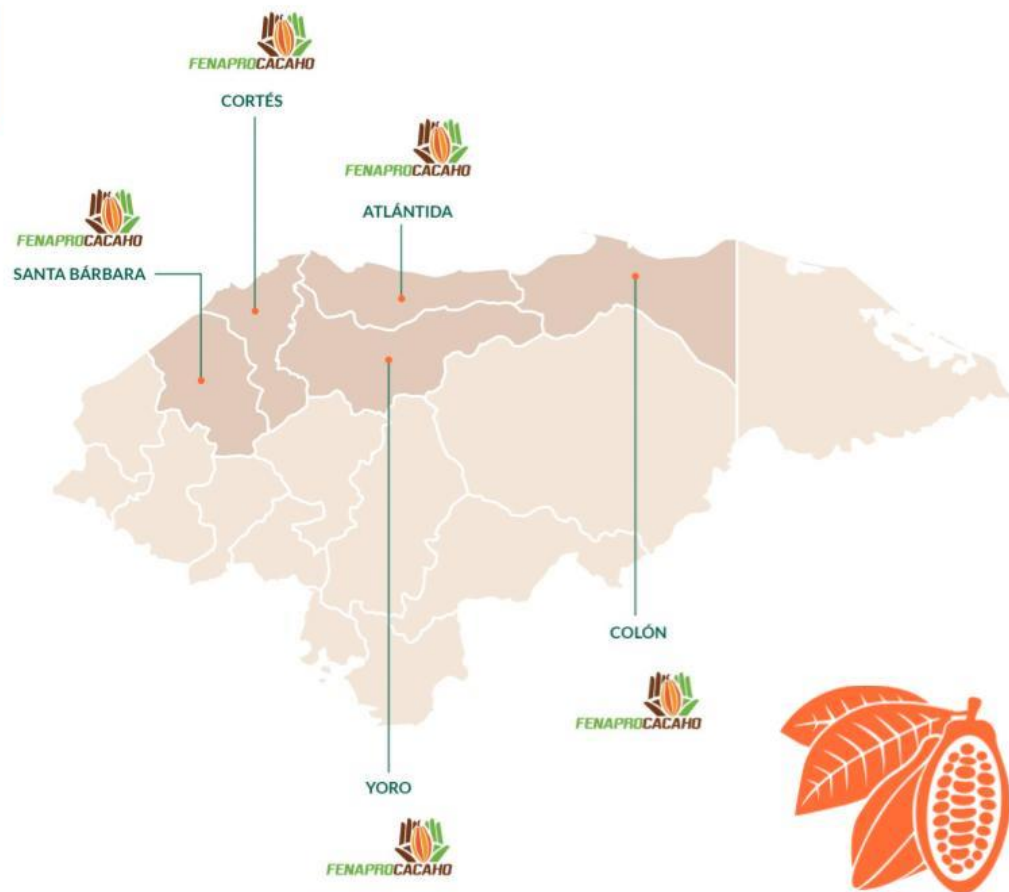
IZABAL



# Honduras

| Departament      | Farmers trained | Nurseries trained |
|------------------|-----------------|-------------------|
| Santa Bárbara    | 52              |                   |
| Cortés           | 694             |                   |
| Atlántida        | 409             |                   |
| Colón            | 178             |                   |
| Yoro             | 170             |                   |
| Other (Disperse) | 24              | 25                |
| <b>Total</b>     | <b>1,527</b>    | <b>25*</b>        |

\*Most nursery operators received virtual training



# Nicaragua

| Departament      | Farmers trained | Nurseries trained |
|------------------|-----------------|-------------------|
| Nueva Segovia    | 94              |                   |
| Jinotega         | 444             |                   |
| RAAN             | 376             |                   |
| RAAS             | 212             |                   |
| Matagalpa        | 728             | 76                |
| Rio San Juan     | 177             | 44                |
| Other (disperse) | 173             |                   |
| Total            | 2,204           | 120               |

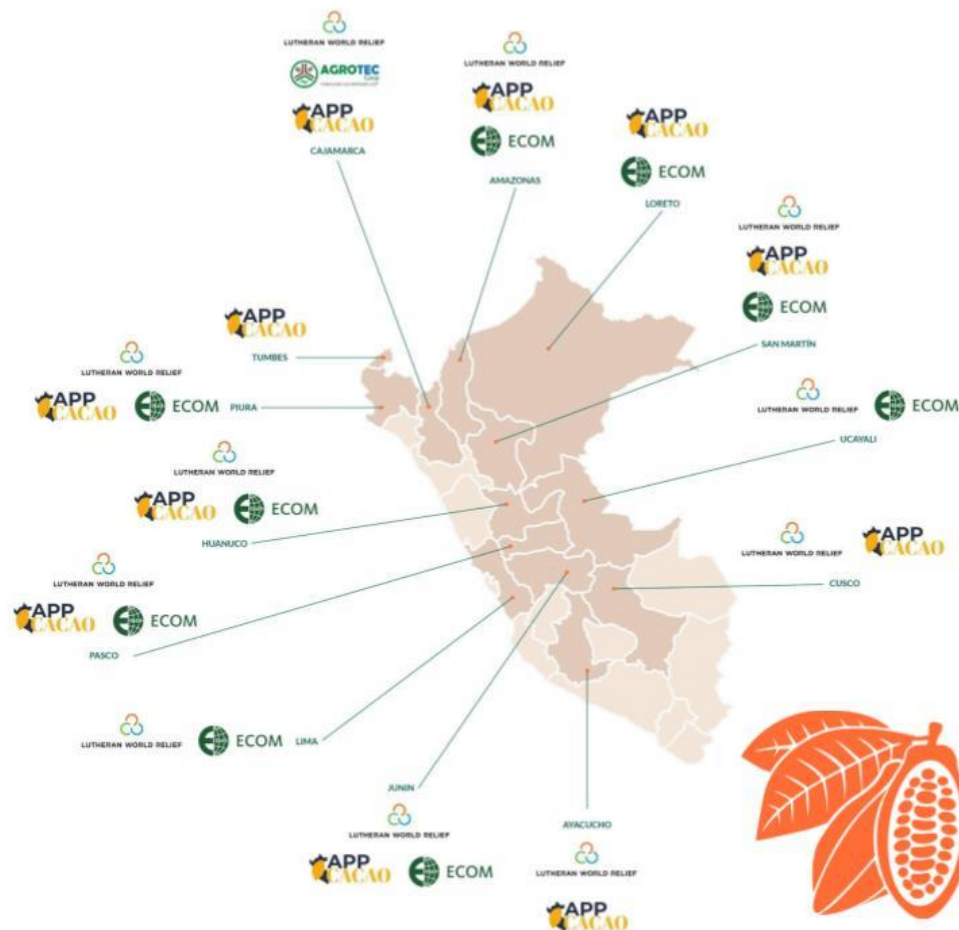




# Perú

| Departament      | Farmers trained | Nurseries trained |
|------------------|-----------------|-------------------|
| Cajamarca        | 1,193           | 6                 |
| Amazonas         | 1,344           | 13                |
| Loreto           | 16              |                   |
| San Martín       | 3,669           | 6                 |
| Ucayali          | 303             |                   |
| Cusco            | 338             |                   |
| Ayacucho         | 71              |                   |
| Junin            | 1,040           |                   |
| Lima             | 40              |                   |
| Pasco            | 1,256           |                   |
| Huanuco          | 750             | 2                 |
| Piura            | 49              |                   |
| Tumbes           | 13              |                   |
| Other (disperse) |                 | 76                |
| <b>Total</b>     | <b>10,082</b>   | <b>76*</b>        |

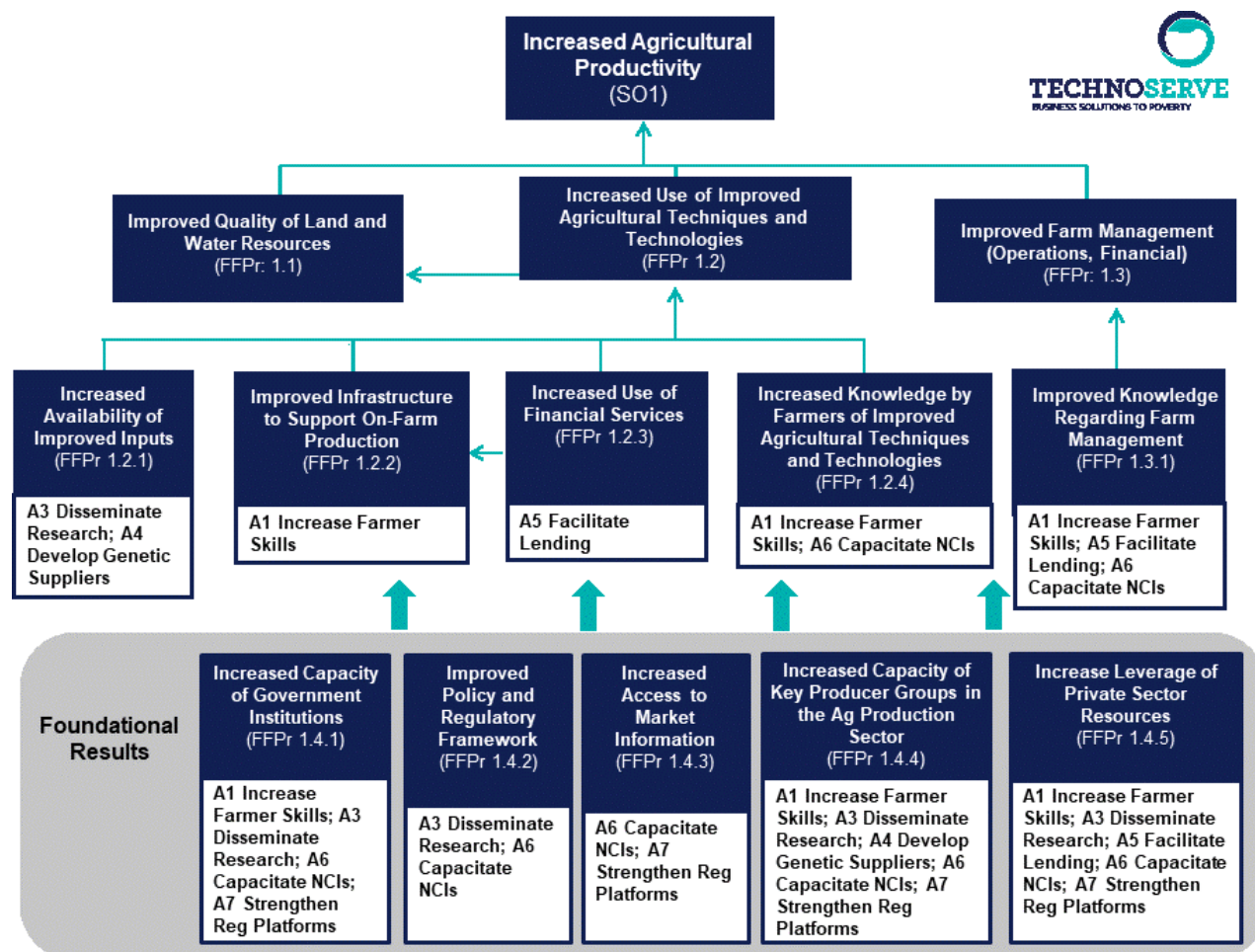
\*Most nursery operators received virtual training





## 10 Annex – Project Level Results Framework

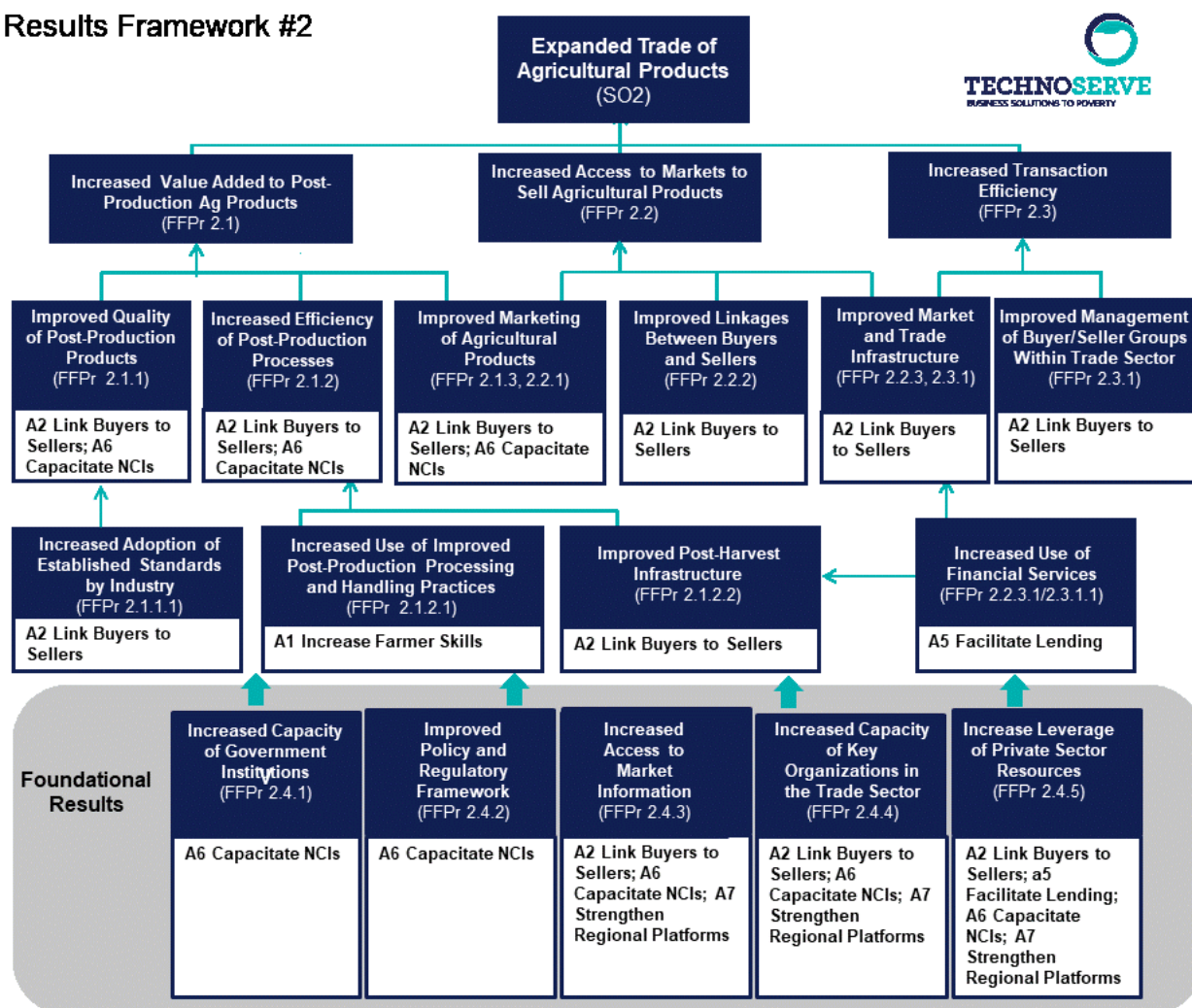
Graphical Representation



### Activities

- Activity 1 – Training: Increase Farmer Knowledge and skills
- Activity 2 – Market Access: Facilitate Buyer/seller Relationships
- Activity 3 – Inputs: Facilitate Research and Disseminate Findings
- Activity 4 – Inputs: Develop Suppliers of High Quality Genetic Material for Planting
- Activity 5 – Financial Services: Facilitate Agricultural Lending
- Activity 6 – Capacity Building: National Commodity Institutions
- Activity 7 – Capacity Building: Regional Platforms

## Results Framework #2



## Activities

- Activity 1 – Training: Increase Farmer Knowledge and skills
- Activity 2 – Market Access: Facilitate Buyer/seller Relationships
- Activity 3 – Inputs: Facilitate Research and Disseminate Findings
- Activity 4 – Inputs: Develop Suppliers of High Quality Genetic Material for Planting
- Activity 5 – Financial Services: Facilitate Agricultural Lending
- Activity 6 – Capacity Building: National Commodity Institutions
- Activity 7 – Capacity Building: Regional Platforms

## **11 Annex – MEL Plan (Mid-Term Evaluation SOW)**

### **Evaluation Plan**

#### **11.1 A. Introduction**

This Evaluation Plan outlines our approach to collecting and utilizing data on project activities and outcomes. In combination with our performance management system, our Evaluation Plan will serve as a critical tool for tracking, managing, communicating, and learning from the project's initiatives and results. It will be used by project leadership and staff as a roadmap to ensure timely collection of high-quality data to inform adaptive management activities; it will ensure accountability and transparency by serving as the basis for reporting on project activities and results to MOCCA's clients (USDA), partners, and other stakeholders; and its rich results will be leveraged to advance USDA's learning agenda.

MOCCA's evaluation design is theory-based, integrated, rigorous, and results-oriented. It is theory-based in the sense that we orient our evaluation activities with reference to the project's results framework, rooting each evaluation activity as an opportunity to test and refine our theory of change. The system is integrated in that methods and tools for monitoring and evaluation are developed concurrently to maximize complementarities and rigor. Our evaluation approach is rigorous in that it draws on proven qualitative and quantitative methods, ensuring the generation of rich and relevant data and insights to guide and learn from project activities. Finally, it is results-oriented in the sense that the system and its components are all designed to support and maximize the project's results, including its immediate development objectives and impact, as well as its contributions to Food for Progress's learning agenda.

In the remainder of this document, we provide a brief overview of the project and its activities, then describe our overall approach to evaluation and its alignment with the Food for Progress Learning Agenda. Next, we discuss in detail our methodologies for the baseline study, midterm, and endline evaluations, and discuss special studies that we propose and the methodologies by which we will complete them. Finally, we discuss our plans for the management of evaluation activities, including: roles and responsibilities of project staff, partners, and stakeholders; plans to review and update the evaluation; and strategies for the dissemination of our evaluation results.

#### **11.2 B. Project Overview**

The Maximizando Oportunidades en Café y Cacao en las Americas (Maximizing Opportunities in Coffee and Cacao in the Americas, or MOCCA) project will facilitate a resilient and growing trade of coffee and cacao from the Andean and Central American regions, sustained by profitable farmers making ongoing investments to maintain the health of their trees and the performance of their farms. The project will be implemented in six countries, focusing on both sectors in Honduras, Guatemala, El Salvador, Nicaragua and Peru, and on the cacao value chain only in Ecuador. MOCCA will use a facilitative approach that leverages the resources of the private sector to drive incentives (and behavior change) throughout the market system. MOCCA will ensure market system actors are incentivized, capacitated, and networked to provide high-quality and affordable goods and services to farmers and other value chain participants, improving productivity and trade. Our theory of change posits that if farmers understand the benefits of renovation and rehabilitation (R&R), possess the knowledge and skills to conduct R&R, and have access to high-quality inputs and affordable financing, then they will carry out low-cost R&R practices that will

increase profitability and catalyze a cycle of R&R investments that in turn will lead to a more secure and sustainable supply of coffee and cacao for U.S. and other regional and international markets.

### *B1. Summary of Activities*

**Activity 1 – Training: Increase farmer knowledge and skills.** MOCCA will first ensure that farmers have received formal training, and as a result have adopted the minimum number of GAPs (including climate-resilient practices) required to increase tree yields on a sustainable basis. Second, we will build the capacity of local market actors to deliver affordable and high-quality extension services so that these farmers have access to troubleshooting advice and continuing learning on agronomic and climate-resilient best practices. We will emphasize R&R modules and climate-resilient practices in our formal trainings, and will build the capacity of local training and extension service providers (such as government extension agents), to support farmers to rehabilitate and renovate their farms.

**Activity 2 – Market Access: Facilitate buyer-seller relationships.** MOCCA will increase farm gate prices by transitioning farmers from low-value to high-value trading models that reward quality and incentivize farmers to invest in their farms.

**Activity 3 – Inputs: Facilitate research and disseminate findings.** MOCCA will support local and regional organizations (including National Commodity Institutes, or NCIs, and local research institutes) to augment their research, while strengthening the capacities of the PROMECAFE platform and a new PROMECACAO platform to collaborate with country research organizations to prioritize research, share findings, and develop a regional research funding pipeline that is functional and sustainable, allowing target countries to conduct research benefiting their coffee and cacao market systems.

**Activity 4 – Inputs: Develop Suppliers of High Quality Genetic Material for Planting.** To address the critical need for genetically pure, high-production, good-quality, disease-resistant, and healthy seedlings, MOCCA will expand the network of nurseries and clonal gardens, and will build their capacity to provide better genetic material and manage their businesses.

**Activity 5 – Financial Services: Facilitate agricultural lending.** MOCCA will catalyze access short-term working capital as well as to long-term finance for R&R activities, by: a) assessing existing local and regional lending institutions and risk-reduction mechanisms to strengthen the financial ecosystem supporting smallholder farmers (SHFs); b) facilitating the creation of funding platforms; and by c) facilitating partnerships between lenders and anchor firms sourcing from SHFs, who can reduce market risk through multi-year contracts with fixed prices, and can deliver agronomic training.

**Activity 6 – Capacity Building: National Commodity Institutions.** MOCCA will develop customized capacity development support for each relevant NCI and will work with them on a set of activities to support critical needs related to R&R and the MOCCA project, such as farmer training and R&D.

**Activity 7 – Capacity Building: Regional platforms.** MOCCA will collaborate with various ongoing coffee platforms (PROMECAFE, SCC, GCP) to accelerate R&R efforts and sector competitiveness. We will work with the SCC to develop a fund dedicated to increasing resilience in coffee landscapes and to ensure future supply by supporting R&R. In cacao MOCCA will create a PROMECACAO platform to promote knowledge sharing/technology transfer among key actors. This platform will focus on sustainable production, increased market transparency, and improved regulatory environments.

## *B2. MOCCA's Evaluation Approach*

In this section we describe our evaluation approach. First, our evaluation activities are integrated with our monitoring. For monitoring, TechnoServe uses a custom database, called "Info MOCCA", for automating the collection, aggregation, and analysis of monitoring data<sup>48</sup>. The system ensures the accurate and timely reporting of key program activities, and provides project management with near-real time access to information that will complement evaluation data (which will be collected separately). While we will collect, analyze, and report monitoring data separately from our evaluation data, our data collection instruments and methods will be developed collaboratively between our monitoring, evaluation, and technical teams. This collaboration will ensure that the data and results that we generate will be compatible and comparable (with qualifications relating to the differing sampling methods used for each), and will be technically relevant and useful. This integration will help bolster both our contributions to the learning agenda, as well as our adaptive management activities.

Second, our evaluation approach is informed by the scope and complexity of MOCCA's activities, specifically the fact that MOCCA will be implemented across multiple countries, targeting two sectors (coffee and cacao) in each country (with the exception of Ecuador, where the project will focus only in cacao), and tailoring activities to both the market-systems and smallholder levels. These realities require a strategic approach to evaluation that will be rigorous without exhausting project resources. In response to these needs, MOCCA will target the evaluation at two major levels in each of the six countries of implementation. We will target MOCCA's impact at the **market-systems level** using a mixed-methods evaluation that leads with qualitative methods. We will target project impact at the **farmer level** using primarily quantitative methods and determining representative samples in each country (note that in Ecuador, surveys will be applied only to cacao farmers). MOCCA's overall approach across the three evaluation instances – baseline, mid-term and final evaluation – will be homogenous across the six countries and two value chains.

After a public procurement process in which 15 external evaluation firms participated, TechnoServe selected the International Center for Tropical Agriculture (CIAT) to implement the evaluation plan. CIAT will work in collaboration with (and under the supervision of) the MOCCA MEL Director, as well as with MOCCA leadership. For example, development of the farmer survey will be a joint activity led by the CIAT with input from TechnoServe's Impact Team, MOCCA's technical leadership, and the MOCCA MEL Director to ensure that this instrument addresses data needs that respond simultaneously to MOCCA's technical, monitoring, and evaluation needs. Following the development of the preliminary instrument, it will then be tailored to the country-level to ensure that it is locally relevant.

### **Methodology adjustment due to COVID-19 Pandemic**

Our originally proposed methodology for evaluation was designed to allow for the implementation of an "optimal" evaluation of MOCCA's outcomes and results among **farmers** using a difference-in-difference (DiD) design with propensity score matching (PSM), in addition to a "contingency" design in case it was

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<sup>48</sup> Info MOCCA is a collection of technology tools, support resources, and institutional knowledge that our project teams can leverage to reduce the cost of collecting, analyzing, and reporting data. Data can be collected offline in the field using an Android mobile device and synced to Salesforce once internet connectivity is restored. These near real-time insights give program teams the ability to monitor throughout the program implementation lifecycle.



not possible to find an appropriate counterfactual group using propensity score matching<sup>49</sup>. However, given the limitations imposed by the COVID 19 pandemic, we will not implement the originally proposed methodology, as properly identifying a counterfactual group has not been possible since many communities do not allow that people (in this case enumerators) that do not reside in the community enter if there is prevalence of COVID and/or are reluctant to be surveyed during community lockdowns. In addition, we are committed to protecting people's safety as well as to avoiding the risk of propagating the virus.

Our “contingency design” will use pre/post methods to identify changes in key project outcomes and results among project beneficiaries (ie., contribution analysis), and will contextualize those using qualitative data and secondary sources to draw conclusions (with appropriate qualifications about causality) about the project's contribution to the impact on the beneficiary population of farmers. The before-and-after (project implementation) comparison attempts to estimate the impact of the project by tracking changes in outcome variables of interest among beneficiary farmers over time. Although this methodology presents its limitations (e.g., causality cannot be established), given the current situation caused by the pandemic, a contribution analysis is the only option. To implement this, we will collect baseline and (in the future) end line data only among project beneficiaries, and will collect additional information about other factors that could have had an effect on the indicators of interest (e.g., other projects, government support), to corroborate that our findings are most likely given by the MOCCA intervention and not by other factors.

Our market-systems evaluation will use a theory-based paradigm to test for systemic change in the coffee and cacao market systems. Data for the market-systems evaluation will integrate results from the farmer survey with qualitative data drawn from focus groups and key informant interviews of diverse value chain actors, stakeholders, and experts in the coffee and cacao sectors of MOCCA's implementation areas. However, for the baseline, given that we will conduct the market evaluation first, the farmer evaluation will incorporate results from the qualitative market-systems evaluation into the analysis as complementary information.

Finally, our evaluation methods will comply with best practices regarding protection of human subjects in research, data management, and applicable Institutional Review Board (IRB) approvals.

### **11.3 C. Alignment with the Food for Progress Learning Agenda**

MOCCA's multi-sectoral and multi-country implementation offers ample opportunities to support and enrich the Food for Progress Learning Agenda. Our learning agenda will focus on testing the hypothesized relationships underlying the theory of change—for example: relationships between market opportunities, supply response, and farm/household-level incomes; and the effectiveness of different interventions to realize these potentially beneficial relationships. Our learning agenda will focus on key questions relating

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<sup>49</sup> We do not propose to use a randomized control trial (RCT) methodology given the broad geographic scope and complexity of the project's activities. A rigorous experimental design framework would require *a priori* identification of project beneficiaries, and that we withhold treatment from a pool of those beneficiaries (preferably using random assignment between treatment and control), for at least a significant portion of the project timeline. In TechnoServe's experience, it is difficult to maintain the integrity of the control group throughout project implementation, particularly given the project's objectives of reaching a large number of beneficiaries and interacting with them through market-level interventions as well as farm-level interventions. The challenge of protecting a control group from project interventions is particularly difficult given the project facilitative approach, which lessens its direct control over the specific geography of project intervention.

to the farm productivity and market linkages, and delve into the factors driving results, in order to better inform future initiatives. The Learning Agenda questions to which we anticipate contributing knowledge as a result of our evaluation activities include:

**Value creation.** What effects do different supply chain development interventions have on farmer uptake of improved technologies, and production and management practices? (Learning Agenda question 1).

**Market linkages.** What types of market linkages and supply-chain coordination and development models for the coffee and cacao sectors across MOCCA's implementation countries are most effective in linking farmers to profitable markets and helping farmer conduct R&R more effectively? (Learning Agenda question 16).

## 11.4 E. Midterm Evaluation

### *E1. Evaluation Purpose and Scope*

The purpose of the midterm evaluation will be to provide early insights into the project's performance—broadly writ—during the first portion of its implementation in order to enable adaptive management during the second half of the project's period of performance. To that end, the scope of the midterm evaluation will include a comprehensive review of MOCCA's project strategy, as well as moderately scaled external data collection in order to assess project performance at the farmer and market-systems levels.

### *E2. Preliminary Key Evaluation Questions*

Our team will address the following preliminary midterm evaluation questions:

**Relevance.** Does MOCCA target appropriate objectives (as defined by its key stakeholders, including USDA), host country governments, and intended beneficiaries?

**Effectiveness.** Is MOCCA being implemented successfully, and is its theory of change relevant to the achievement of its objectives?

**Efficiency.** Are MOCCA's financial and resource expenditures economical and appropriate for the realization of its objectives? Are there areas of excess or insufficient expenditure whose adjustment would increase returns on money being spent?

**Sustainability.** What elements in the MOCCA strategy inhibit or increase its effects' sustainability potential?

**Impact.** Is the project realizing its intended results to date, and is it likely to achieve its targeted higher-level results and goals?

### *E3. Methodology*

The midterm evaluation will use mixed methods—both qualitative and quantitative—to evaluate the project's systems and strategy, farm-level outcomes, and market-systems outcomes.

Our evaluation of project systems and strategy will hone in on questions of project relevance, effectiveness, and efficiency. It will be conducted at the project level and will rely primarily on qualitative

sources, including: project documents and monitoring data; and interviews of different stakeholders, such as project leadership, staff, beneficiaries, partners, and USDA.

The farm-level analysis will replicate the methods and instruments used in the baseline study, incorporating revisions and updates based on baseline results and relevant developments in the project or implementation context. A follow up survey to understand changes in production and commercialization since baseline will be collected from a randomly drawn sample of 50 percent of the baseline respondents (targeting 160 respondents per sector), allowing for comparison in outcomes between the baseline and midterm periods. CIAT will be able to use monitoring data to assess preliminary changes in adoption of good agricultural practices. Given that at midterm the project will have been underway for one year, it will be possible to complement descriptive and statistical analyses with two additional types of analysis. First, we will conduct a targeting analysis by identifying project beneficiaries within the farmer survey sample, allowing us to assess the project's penetration in addition to the characteristics of project beneficiaries. This will be important to identifying whether there are any particular groups (such as women, youth, ultra-poor, or ethnic minorities) that may be under-represented in project activities, as well as to differentiate outcomes across different farmer characteristics, including culture and demographics.

The midterm evaluation will also include an update of the market-systems analysis conducted at baseline. Its purpose will be to identify whether the project is making inroads against its objectives pertaining to market-systems transformation. The midterm market system analysis will not repeat the broad mapping of the sector, but instead will focus on assessing behavior changes in key market actors directly involved in project activities. The focus will be to explore how likely it is that these changes will continue, expand or be adapted by assessing how autonomous and sustainable these behaviors are, in order to provide inputs to the MOCCA project team on changes in project activities or strategy vis a vis market systems interventions.

As with the farm-level survey, the market-systems analysis will utilize similar methods and teaming approach as the Baseline Study, updated to reflect needed revisions from baseline as well as changes to project or implementation context.

#### *E4. Selection of the Evaluation Team*

The midterm evaluation will be administered by an external evaluation firm under the supervision of the TechnoServe Regional MEL Advisor, and in collaboration with the MOCCA leadership and MOCCA MEL Director. Selection of the evaluation team will be informed by the results of the Baseline Study. If CIAT, the external evaluation firm selected for the baseline study, performs well, then TechnoServe will seek approval to sole-source the both the midterm and endline evaluation activities in order to maximize the synergies and complementarities between the two activities, as well as to increase efficiency and reduce risk of the activities.

#### *E5. Key Audience and Use of Evaluation Findings and Recommendations*

The midterm evaluation will have two key audiences. The first audience will be internal, consisting of TechnoServe Head Office and MOCCA project leadership, which will utilize the midterm evaluation's results to identify changes needed in the project's management, approach, or systems. The second audience will be USDA, which will receive a full report of midterm evaluation findings and intended



changes to result from those findings, as well as the opportunity to advise on adaptive management or course corrections that are perceived to be necessary or appropriate.

### *Adjustments to timeline*

*Since we adjusted the baseline timeline due to the limitations imposed by the COVID-19 Pandemic, we also adjusted the timeline to implement the Mid-Term Evaluation, as to allow at least one year between studies.*

### **E6. Timeline**

| Activity   | Month of MOCCA Implementation<br>2021-2022 |       |       |       |       |       |       |       |       |            |        |
|--|--|-------|-------|-------|-------|-------|-------|-------|-------|------------|--------|
|  | 1 Nov                                      | 2 Dec | 3 Jan | 4 Feb | 5 Mar | 6 Apr | 7 May | 8 Jun | 9 Jul | 10 Mid-Aug | 11 Sep |
| Develop midterm evaluation TORs and share with USDA for comment  | x  |       |       |       |       |       |       |       |       |            |        |
| Undertake competitive bidding process for local data collection firms (only applicable if needed)                  |  | x     |       |       |       |       |       |       |       |            |        |
| Update project systems evaluation protocol and instruments   |  |       | x     |       |       |       |       |       |       |            |        |
| Update farmer evaluation protocol and instruments as needed  |  |       | x     |       |       |       |       |       |       |            |        |
| Identify and hire firms for data collection  |  |       |       | x     |       |       |       |       |       |            |        |
| Conduct mid-term data collection   |  |       |       |       | x     | x     | x     |       |       |            |        |
| Data cleaning and analysis   |  |       |       |       |       |       |       | x     |       |            |        |
| Submission of preliminary draft  |  |       |       |       |       |       |       |       | x     |            |        |
| Submit midterm evaluation report to USDA   |  |       |       |       |       |       |       |       |       | x          |        |
| Identify adaptive management plan and submit to USDA   |  |       |       |       |       |       |       |       |       | x          |        |
| Revise, finalize, and begin implementation of adaptive management plan based on feedback and discussions with USDA |  |       |       |       |       |       |       |       |       |            | x      |

## **11.5 H. Evaluation Management**

In keeping with Food for Progress and McGovern-Dole program legislation (USDA/FAS, 2013 Monitoring and Evaluation Policy p.3), the baseline, mid-term, and endline assessments will be contracted to an independent third party, which will be responsible for data collection, analysis, and reporting. This independent evaluation firm will be managed by MOCCA MEL Director, in coordination with TechnoServe's Regional MEL Advisor who operates independently of MOCCA project implementation.

### *H1. Staff Roles and Responsibilities*

The TechnoServe Regional MEL Advisor will be responsible for the finalization of the Evaluation Plan following project award. The Evaluation Plan will be finalized in collaboration with MOCCA's technical leadership and the MOCCA MEL Director. Finalization of the Evaluation Plan in collaboration with these key staff members will ensure that it is grounded in the project's theory of change, that its implementation approach is feasible, and that key project staff/leadership will have bought into the Evaluation Plan from the beginning.

Implementation of evaluation activities at baseline, midterm, and endline will be supervised by the MOCCA MEL Director and managed by external parties.

## *H2. Project Partner and Key Stakeholder Roles and Responsibilities*

**Project Partners and Stakeholders:** TechnoServe will involve project partners and stakeholders to comment throughout project implementation in order to promote shared ownership of the project and to ensure the project is addressing stakeholder concerns. The mandate of our MOCCA Steering Committee will include updating partners on project progress towards achieving results.

**USDA-FAS Staff:** TechnoServe will invite USDA to review and approve the TOR for each evaluation study, to have a conversation with external contractors prior to the start of the evaluation, and to comment on and discuss the findings of the evaluations with the project team.

Any changes that need to be made to project activities based on the findings from the evaluations will be communicated immediately to USDA for approval.

## *H3. Regular Review and Update*

TechnoServe will update the Evaluation Plan after the baseline study is complete, and will carry out annual reviews of the PMP and Evaluation Plan to ensure they are still in line with the realities of project implementation. If any changes need to be made to these documents, TechnoServe will communicate these changes to USDA for approval in a timely fashion.

## *H4. Dissemination Strategy*

TechnoServe will submit semi-annual progress reports and evaluation reports to USDA. Additionally, the final evaluation report may be made publicly available on the FAS website in accordance with the Open Government Initiative. TechnoServe will also disseminate key project results to project participants and stakeholders through a wide variety of channels. This will include, but is not limited to discussing project approaches and results during annual stakeholder meetings, participating in USDA learning forums, publishing stories about the project on the TechnoServe website, and discussing any key findings with USDA staff. Stakeholders will be given an opportunity to provide feedback and suggestions using a results chain on how the project is progressing and on what can be improved to attain maximum success. This approach will help build stakeholder ownership.

## 12 Annex – Data collection instruments

### Evaluación Intermedia de MOCCA

Marzo 2022

#### Guía para Entrevista Semi-Estructurada con GERENTES MOCCA EN PAÍS

##### Antes de comenzar:

Explicar el objetivo del estudio y de la entrevista. Leer la Declaración de Consentimiento y pedir consentimiento para la entrevista y para grabar. La entrevista durará aproximadamente una hora. Se harán preguntas sobre su rol en MOCCA, su percepción sobre los principales avances, logros y retos.

Institución: \_\_\_\_\_

Cargo(s): \_\_\_\_\_

Contacto(s) (correo electrónico o teléfono): \_\_\_\_\_

Lugar de la entrevista: \_\_\_\_\_

Fecha de la entrevista: \_\_\_\_\_

1. A modo de introducción, cuénteme un poco sobre su rol en el marco del proyecto MOCCA. ¿Qué papel juega usted en relación al proyecto?
2. ¿Cuáles son las principales actividades que han desarrollado en el marco del convenio con MOCCA en PAÍS hasta ahora?
3. ¿Con qué actores ha sido más fácil trabajar? ¿Con cuáles ha sido más difícil y por qué?

*MOCCA tiene definido 7 actividades principales. Me gustaría saber su opinión en cuanto a los principales logros y retos en torno a cada una de las 7 actividades. Le iré haciendo preguntas sobre cada una en orden.*

4. ¿Cuáles considera ser los logros principales en relación a las capacitaciones y la asistencia técnica brindada como parte del trabajo de MOCCA en PAÍS? ¿Y los principales retos?
4. ¿Cuáles considera ser los logros principales en relación al intento de que los productores puedan acceder mejores precios por sus productos como parte de MOCCA en PAÍS? ¿Y los principales retos?

5. ¿Cuáles considera que han sido los principales logros en relación a la investigación y al intento de mejorar el acceso a la información para los productores en el marco de MOCCA en PAÍS? ¿En qué se puede mejorar hacia delante?
6. ¿Cuáles considera que han sido los principales logros en relación al intento de mejorar la calidad de material genético en el marco de MOCCA en PAÍS? ¿En qué se puede mejorar hacia delante?
7. ¿Cuáles considera que han sido los principales logros en relación al intento de mejorar el acceso a servicios financieros para los productores en el marco de MOCCA en PAÍS? ¿En qué se puede mejorar hacia delante?
8. ¿Cuáles son los principales logros del intento de fortalecer las capacidades de las Instituciones Nacionales de Productos Básicos en el marco de MOCCA en PAÍS? Qué más se podría o debería hacer?
9. ¿Cuáles son los principales logros del intento de fortalecer las capacidades de las plataformas regionales en el marco de MOCCA? Qué más se podría o debería hacer?
10. MOCCA es un programa que ha tenido que adaptarse frente a los retos de la actual situación sanitaria. ¿Cree que el Covid afectó o sigue afectando el trabajo de MOCCA? Si sí, ¿en que sentido?
11. Además del Covid, ¿qué otros factores del contexto han afectado las actividades o a los beneficiarios de MOCCA en la práctica?
12. Para terminar, ¿hay algo importante que no hayamos preguntado que quisiera mencionar en relación a los avances o retos de MOCCA?

### **Agradecimiento**

**Entrevistador/a:** Documentar la entrevista en cuanto antes.

Evaluación Intermedia de MOCCA  
Marzo 2022

Guía para Entrevista Semi-Estructurada con SOCIOS MOCCA

**Antes de comenzar:**

Explicar el objetivo del estudio y de la entrevista.

Leer la Declaración de Consentimiento y pedir consentimiento para la entrevista y para grabar.

La entrevista durará aproximadamente una hora. Se harán preguntas sobre su rol en MOCCA, su percepción sobre los principales avances, logros y retos.

Institución: \_\_\_\_\_

Cargo(s): \_\_\_\_\_

Contacto(s) (correo electrónico o teléfono): \_\_\_\_\_

Lugar de la entrevista: \_\_\_\_\_

Fecha de la entrevista: \_\_\_\_\_

1. A modo de introducción, cuénteme un poco sobre el rol de su organización en el marco del proyecto MOCCA. ¿Qué papel juega su organización en relación al proyecto? ¿Qué rol juega usted personalmente?

2. ¿Cuáles son las principales actividades que han desarrollado en el marco del convenio con MOCCA hasta ahora?

3. ¿Con qué actores ha sido más fácil trabajar? ¿Con cuáles ha sido más difícil y por qué?

*MOCCA tiene definido 7 actividades principales. Me gustaría saber su opinión en cuanto a los principales logros y retos en torno a cada una de las 7 actividades. Le iré haciendo preguntas sobre cada una en orden.*

4. ¿Cuáles considera ser los logros principales en relación a las capacitaciones y la asistencia técnica brindada como parte del trabajo de MOCCA? ¿Y los principales retos?

5. ¿Cuáles considera ser los logros principales en relación al intento de que los productores puedan acceder mejores precios por sus productos como parte de MOCCA? ¿Y los principales retos?

6. ¿Cuáles considera que han sido los principales logros en relación a la investigación y al intento de mejorar el acceso a la información para los productores en el marco de MOCCA? ¿En qué se puede mejorar hacia delante?
7. ¿Cuáles considera que han sido los principales logros en relación al intento de mejorar la calidad de material genético en el marco de MOCCA? ¿En qué se puede mejorar hacia delante?
8. ¿Cuáles considera que han sido los principales logros en relación al intento de mejorar el acceso a servicios financieros para los productores en el marco de MOCCA? ¿En qué se puede mejorar hacia delante?
9. ¿Cuáles son los principales logros del intento de fortalecer las capacidades de las Instituciones Nacionales de Productos Básicos en el marco de MOCCA? Qué más se podría o debería hacer?
10. ¿Cuáles son los principales logros del intento de fortalecer las capacidades de las plataformas regionales en el marco de MOCCA? Qué más se podría o debería hacer?
11. MOCCA es un programa que ha tenido que adaptarse frente a los retos de la actual situación sanitaria. ¿Cree que el Covid afectó o sigue afectando el trabajo de MOCCA? Si sí, ¿en que sentido?
12. Además del Covid, ¿qué otros factores del contexto han afectado las actividades o a los beneficiarios de MOCCA en la práctica?
13. Para terminar, ¿hay algo importante que no hayamos preguntado que quisiera mencionar en relación a los avances o retos de MOCCA?

## **Agradecimiento**

**Entrevistador/a:** Documentar la entrevista en cuanto antes.

**Cuestionario de línea intermedia, CACAO Centroamérica**  
**Proyecto “Maximizando Oportunidades de Café y Cacao en las Américas (MOCCA)”**

Versión: FEB/21/2022

**PERIODO DE REFERENCIA DE LA ENCUESTA (CENTRO AMERICA): MAYO 2021 – ABRIL 2022**

**INSTRUCCIONES:**

**Encuestador:** En esta entrevista considere que:

**1) Un hogar** se define como la unidad familiar compuesta por miembros de su familia inmediata quienes normalmente **viven y comen sus comidas juntas**.

**2) El (la) jefe de hogar** es la persona responsable de **tomar la mayoría de decisiones** relacionadas a los gastos del hogar y/o cultivos a sembrar.

**SECCIÓN A. CONTROL**

| A1  | A2               | A3               | A5                         | A6                   | A7                   | A8a  | A10                                    |
|---|------------------|------------------|----------------------------|----------------------|----------------------|--|--|
| País  | Encuestador/a    | Supervisor/a     | Departamento/<br>Provincia | Municipio<br>/Cantón | Comunidad/<br>vereda | Código del/la productor/a (de<br>la lista)<br><br>(copie el código arriba de cada página)<br><br>(en programación, esta variable está<br>oculta) | Nombre del<br>productor(a) de la lista |
| [1]<br>Ecuador<br>[2] El<br>Salvador<br>[3]<br>Guatemala<br>[4]<br>Honduras<br>[5]<br>Nicaragua<br>[6] Perú | [1]...<br>[2]... | [1]...<br>[2]... | [1]...<br>[2]...           | [1]...<br>[2]...     | [1]...<br>[2]...     |  |  |
|   |                  |                  |                            |                      |                      |  |  |

**AXX. Contacto con productor**

|   |
|---|
| [1] Es la primer visita => ir a A11<br>[2] Es la segunda visita => ir a A14 |
|   |

| A11. Fecha de la entrevista |                      |                      |                      |                      |                      |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| a. Día                      |                      | b. Mes               |                      | c. Año               |                      |
| <input type="text"/>        | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

**ENCUESTADOR: Lea la declaración de consentimiento**

**A16.** Doy fe de que la declaración de consentimiento verbal fue leída y el/la productor/a sigue dispuesto/a participar en esta entrevista [1]  
**SI** (continúe con la entrevista): \_\_\_\_\_ [2] **NO** (reemplace el hogar)

**A17.** Hora de inicio de la encuesta (24 hrs) (hh:mm) \_\_\_\_\_: \_\_\_\_\_

| A19   | A20. Latitud |            |             | A21. Longitud |            |             | A22                       | A23  |
|---|--------------|------------|-------------|---------------|------------|-------------|---------------------------|--|
| Dato del GPS corresponde a:<br>[1] Casa y finca (están juntas)<br>[2] La casa<br>[3] La finca o chacra<br>[99] Otro lugar, especifique. | a. Grados    | b. Minutos | c. Segundos | a. Grados     | b. Minutos | c. Segundos | Error del GPS<br>(metros) | Elevación<br>(metros sobre el nivel del mar) |
|   |              |            |             |               |            |             |                           |  |

**SECCIÓN D: CARACTERIZACION DE LA FINCA MANEJADA EN EL AÑO AGRICOLA 2021-2022**

**Encuestador: dibuje un mapa de todos los lotes o parcelas de cacao manejados en su finca o fincas durante el año agrícola que va de mayo 2021 hasta abril de 2022 en una página en blanco (coloque el Código del productor que aparece en su listado). Recuerde que el mapa debe tener la información mínima detallada en el protocolo de “instrucciones para dibujar el mapa” impartido durante el entrenamiento. Arranque la página y úsela durante la entrevista.**



Ahora tome la foto de este mapa para seguir

[TOMAR FOTO PARA PODER SEGUIR]

Encuestador, explique a la persona entrevistada que un lote o parcela es “todo terreno de la Explotación Agropecuaria, separado por ríos o quebradas, carreteras, caminos públicos y terrenos de terceros. Si hay un río separando el cacao, se debe registrar como dos lotes/parcelas diferentes. Por favor registre **TODOS** los lotes/parcelas agrícolas de cacao **PROPIOS, ALQUILADOS Y/O PRESTADOS** usados durante el año agrícola 2021-2022. Un lote es lo mismo que una parcela.

| NÚMERO DE PARCELAS MANEJADAS (PROPIOS Y ALQUILADOS) |   | Número |
|---|---|--------|
| D2.1  | Encuestador: Por favor escriba el número de parcelas/lotes de cacao manejadas por el hogar en el año agrícola 2021-2022 |        |

| D10        | D10x   | D10X2  |
|------------|--|--|
| ID de lote | Nombre con el que identifica este lote o parcela | ¿Esta parcela se sembró o se estableció después de la última entrevista realizada? |
| L1         |  | [1]<br>[2] No Sí   |
| L2         |  | [1]<br>[2] No Sí   |
| L3         |  | [1]<br>[2] No Sí   |
| L4         |  | [1]<br>[2] No Sí   |
| L5         |  | [1]<br>[2] No Sí   |

|       |  |               |    |
|-------|--|---------------|----|
| [...] |  | [1]<br>[2] No | Sí |
|-------|--|---------------|----|

*Para cada lote o parcela, por favor dígame...*

| D10x         | D1y1                         | D1y2   | D13   |
|--------------|------------------------------|--|---|
| Lote         | Área total del lote [nombre] | Unidad de área del lote [nombre]<br>[1] Manzanas<br>[2] Tareas<br>[3] Hectáreas<br>[4] Cuerdas<br>[5] Caballerías<br>[99] Otra, ¿Cuál? _____ | ¿Cuál es la tenencia del lote [nombre]?<br>[1] Propia con título inscrito<br>[2] Propia sin título<br>[3] Alquilada a otros<br>[4] Alquilada de otros<br>[5] Prestada o a medias<br>[66] Prefiere no contestar<br>[77] No sé<br>[99] Otro, ¿Cuál? _____ |
| [nombre 1]   |                              |  |   |
| [nombre 2]   |                              |  |   |
| 16[nombre 3] |                              |  |   |
| ...          |                              |  |   |
|              |                              |  |   |

*Ahora le voy a hacer unas preguntas para cada una de las parcelas/lotes con cacao*

| D10x | D17b   | D17c   | D17d   | D17e  |
|------|--|--|--|---|
| Lote | De las [área en D1y1] [unidad en D1y2] que reportó tener el lote | ¿Este CACAO que sembró en el lote [nombre], está en <b>ASOCIO</b> con otro | ¿Qué cultivos se sembraron con este CACAO en | De las [área en D17b] [unidad en D1y2] que reportó tener con cacao en |

|            | [nombre], ¿cuántas [unidad en D1y2] tiene sembradas con Cacao? | cultivo? (incluyendo la sombra, si la sombra genera ingresos o cacao con otro cultivo que no es sombra)?<br><br>[1] Sí<br>[2] No=>Siguiente lote o siguiente tabla | ASOCIO en el lote [nombre] durante este período?<br><br>(mirar códigos de cultivos abajo)<br><br>[Selección Múltiple] | el lote [nombre], ¿cuántas [unidad en D1y2] se sembraron en ASOCIO con [cultivos en d17d]? |
|------------|--|--|---|--|
| [nombre 1] |  |  |   |  |
| [nombre 2] |  |  |   |  |
| [nombre 3] |  |  |   |  |
| ...        |  |  |   |  |
|            |  |  |   |  |

Códigos para cultivos:

|               |                                 |
|---------------|---------------------------------|
| [1] Arroz     | [12] Aguacate                   |
| [2] Frijol    | [13] Mandarina                  |
| [3] Maíz      | [14] Plátano                    |
| [4] Yuca      | [15] Mango                      |
| [5] Papa      | [16] Limón                      |
| [6] Lechuga   | [17] Café                       |
| [7] Tomate    | [18] Otros vegetales            |
| [8] Zanahoria | [19] Otras hortalizas           |
| [9] Pepino    | [20] Otros granos básicos       |
| [10] Repollo  | [21] Otros cultivos permanentes |
| [11] Naranja  | [22] Otro cultivo               |

## SECCIÓN E. MANEJO DEL CULTIVO DEL CACAO Y LA SOMBRA DEL CACAO DURANTE EL AÑO AGRÍCOLA 2021-2022

Para los lotes en los que reportó tener sembrado CACAO, por favor dígame...

| D10x          | E1cw   | E1dw   | E1e   | E3a   | E3b                         | E3aw   | E3bw   | E3c                     |
|---------------|--|--|---|---|-----------------------------|--|--|-------------------------|
| <b>Lote</b>   | ¿Qué nivel de sombra está presente en el lote [nombre]?<br><br>[Leer opciones]<br><br>[0] No hay sombra => saltar a E3A<br>[1] Muy poca sombra (menos del 5%)<br>[2] Poca sombra (5% a 24%)<br>[3] Sombra mediana (25% a 39%)<br>[4] Bastante sombra (40% o más) | ¿Ha plantado nuevos árboles de sombra en los últimos 2 años en el lote [nombre]?<br><br>[1] Sí<br>[2] No | ¿Podó los árboles de sombra en el lote [nombre] en el año agrícola 2021-2022?<br><br>[1] Sí<br>[2] No | En el lote [nombre], tiene<br><br>[1] Sí      [2] No      [3] No, el cacaotal está muy establecido (adulto) |                             |  |  |                         |
|               |  |  |   | Barrera<br>s vivas  | Barrer<br>as<br>muerta<br>s | Coberturas<br>muertas<br>( <i>mulch o<br/>rastrajo</i> ) | Coberturas<br>verdes o<br>cultivos de<br>cobertura | Siembra en<br>contornos |
| [nombre<br>1] |  |  |   |   |                             |  |  |                         |
| [nombre<br>2] |  |  |   |   |                             |  |  |                         |
| [nombre<br>3] |  |  |   |   |                             |  |  |                         |
| ...           |  |  |   |   |                             |  |  |                         |

Sobre las prácticas de conservación de suelo y manejo de arvenses/malezas en su CACAOTAL?

| E1f  | E1g | E3j                                      | E3k   | E3m | E3n | E3p | E3q | E3r |
|--|-----|--|---|-----|-----|-----|-----|-----|
| [Esta pregunta aparece si la respuesta a "E1e = Sí" en por lo menos un lote] |     | [Esta pregunta aparece si la respuesta a | Para el manejo de maleza...<br><br>[1] Sí      [2] No      [77] No sé |     |     |     |     |     |

|   |   | "E3bw=Sí" en por lo menos un lote]  |   |                           |  |                    |   |   |
|---|---|---|---|---------------------------|--|--------------------|---|---|
| En general, ¿en qué etapa(s) del cultivo de cacao hace las podas de los árboles de sombra?  | En general, ¿toma en cuenta la ubicación de la finca y/o la temperatura para hacer las podas a la sombra del cacao? | ¿Qué tipos cultivos de cobertura sembró?<br><br>[Leer opciones]<br>[Selección Múltiple]<br><br>[1] Leguminosas<br>[2] Gramíneas<br>[3] Otro tipo de cultivo<br>[77] No sé | ¿Usa chaleadora, chapiadora, guadaña o shindaiwa? | ¿Calendariza las chapias? | ¿Hace manejo diferenciado de malezas/arvenses nobles vs. agresivas (o sea, hace chapias selectivas)? | ¿Aplicó herbicida? | [Esta pregunta aparece si E3p=Sí]<br><br>¿El herbicida lo aplicó de una manera focalizada (usando ecoweed o boquillas adecuadas)? | ¿Cubre el área entre surcos de cacao con restos del material producto de las limpiezas? |
| [1] Después de la cosecha<br>[2] Antes de las lluvias<br>[3] En cualquier momento<br>[4] Después de la cosecha y antes del invierno<br>[77] No sé | [1] Sí<br>[2] No  |   |   |                           |  |                    |   |   |
|   |   |   |   |                           |  |                    |   |   |

**E4a.** Usted, ¿tiene un diagnóstico productivo de su cacaotal o finca?

[1] Sí \_\_\_\_\_

[2] No \_\_\_\_\_

[77] No sé \_\_\_\_\_

### **AHORA VAMOS A HABLAR SOBRE LAS VARIEDADES DE CACAO SEMBRADAS EN EL AÑO AGRÍCOLA 2021 – 2022**

|             |            |             |             |             |     |
|-------------|------------|-------------|-------------|-------------|-----|
| <b>D10x</b> | <b>D15</b> | <b>E4b1</b> | <b>E4b2</b> | <b>E4b3</b> | ... |
|-------------|------------|-------------|-------------|-------------|-----|

| <b>Lote</b> | <b>¿Cuántos materiales genéticos/variedades de cacao hay sembrados en el lote [nombre]?</b> | <b>Dígame el nombre del material genético 1 sembrado en el lote [nombre]</b> | <b>Dígame el nombre del material genético 2 sembrado en el lote [nombre]</b> | <b>Dígame el nombre del material genético 3 sembrado en el lote [nombre]</b> | <b>[Repetir preguntas según el # de variedades reportadas en D15 para cada lote]</b> |
|-------------|---|--|--|--|--|
| [nombre 1]  |   |  |  |  |  |
| [nombre 2]  |   |  |  |  |  |
| [nombre 3]  |   |  |  |  |  |
| ...         |   |  |  |  |  |
|             |   |  |  |  |  |

| D10x | E4bx     | E4d1  | E4d2   | E4e1  | E4e2                            | E4f  | E5a1w   | E5a2  | E5a3  | E5b   | E5c  | E5d  | E5f   | E6a  | E6b  | E6c   |
|------|----------|---|--|---|---------------------------------|--|---|---|---|---|--|--|---|--|--|---|
| Lote | Variedad | ¿Cuántos árboles de cacao de [material genético] tiene sembrados en el lote [nombre]? | Del total de árboles de [material genético] en el lote [nombre], ¿Cuántos son productivos? | ¿Cuál es la edad de los árboles de [material genético] en el lote [nombre]? | (Años)                          | ¿A qué distancia están sembrados los árboles de [material genético] en el lote [nombre]? | ¿Re-sembró (o sembró nuevos) árboles de [material genético] en el lote [nombre] en el ciclo 2021-2022 ? | ¿Dónde obtuvo las plantas nuevas que sembró de [material genético] en el lote [nombre]? | Si E5a2= [5], ¿cómo seleccionó las plántulas a trasplantar?   | ¿Cuál fue el motivo por el que tuvo que renovar cacao de [material genético] en el lote [nombre]?   | ¿Cuántos árboles de [material genético] en el lote [nombre] renovó por injerto o por semilla ? | ¿Cuántos árboles de [material genético] en el lote [nombre] renovó por injerto en cacao adulto y/o chupón? | ¿Cuántos árboles más de [material genético] en el lote [nombre] considero que necesita ser renovados? | ¿A cuánto de [material genético] en el lote [nombre] les hizo podas?   | ¿Qué tipos de poda hizo?   | ¿Cuál fue la razón principal para las podas ? |
|      |          |   |  |   | Edad de los árboles más jóvenes |  | (metros x metros)   |   | [Leer opciones]<br>[Selección Múltiple]<br>[1] Al azar<br>[2] Planta vigorosa<br>[3] Planta sana<br>[4] Planta con 4-6 pares de hojas verdaderas<br>[99] Otra razón (esp.) _____<br>— | [única respuesta]<br>[1] Inundación<br>[2] Sequía<br>[3] Problemas con plagas/enfermedades<br>[4] Bajo rendimiento<br>[5] Problemas de compactación |  |  |   | [Selección Múltiple]<br>[1] De chupones<br>[2] De tallos falsos<br>[3] De ramas laterales<br>[4] De ramas muertas<br>[5] De ramas mal colocadas<br>[6] De rehabilitación<br>[7] de Altura<br>[99] Otra, ¿Cuál? | [1] De chupones<br>[2] Control de enfermedad<br>[2] Mejorar rendimiento<br>[3] Mantener la plantación sana<br>[4] Mejorar estructura<br>[5] Por diagnóstico productivo<br>[6] Por las necesidades de plantas<br>[7] No tuvo una razón en |   |

|             |              |  |  |  |  |  |  |   |  |                         |  |  |  |  |  |  |
|-------------|--------------|--|--|--|--|--|--|---|--|-------------------------|--|--|--|--|--|--|
|             |              |  |  |  |  |  |  | de mi<br>propia<br>finca==>E5<br>a3<br>[99] Otro,<br>¿Cuál? |  | [99] Otro,<br>¿Cuál? __ |  |  |  |  |  | especific<br>o<br><br>[99] Otra,<br>¿Cuál? |
| [nombre 1]  | [variedad 1] |  |  |  |  |  |  |   |  |                         |  |  |  |  |  |  |
| 0[nombre 2] | ...          |  |  |  |  |  |  |   |  |                         |  |  |  |  |  |  |
| [nombre 3]  |              |  |  |  |  |  |  |   |  |                         |  |  |  |  |  |  |
| ...         |              |  |  |  |  |  |  |   |  |                         |  |  |  |  |  |  |

**E6d. Si No hizo podas de cacao en ningún lote, ¿por qué? [opción múltiple, marque las que aplican]**

[1] No conoce/no sabe hacer la práctica  
necesitaban podas

[2] No le parece relevante hacer podas

[3] Es muy costoso

[4] Sus árboles no

[5] No tuvo tiempo

[6] No tuvo recurso (financieros o humanos)

[99] Otros (especificar)\_\_\_\_\_

**CUADRO E4**

**PROPAGACIÓN DEL CACAO VIVEROS**

| E7j  | E7k                                       | E7m   | E7n | E7p | E7q | E7r | E7s | E7i3a   | E7i3   | E7i4 | E7i5 | E7i6 | E7y  |
|--|---|---|-----|-----|-----|-----|-----|---|--|------|------|------|--|
| En el año agrícola 2021-2022, ¿tuvo usted vivero de cacao? | Aproximadamente, ¿cuántas plántulas tuvo? | Sobre las plántulas de cacao durante el año agrícola 2021 – 2022, por favor dígame... |     |     |     |     |     | ¿Usted preparó el sustrato para su semillero?<br><br>[1] Sí | <i>Las preguntas E7i3-e7i6 solo se hacen si E7i3a=[1]</i><br><br>¿Qué porcentaje de [...] usó para preparar el sustrato para su semillero?<br><br>[Encuestador, la suma de E7i3 - E7i6 debe dar 100] |      |      |      | Si la respuesta a E7j=[1], ¿Qué método de desinfección del |



|   |  |   |   |   |   |  |  |   |                           |                             |                  |                          |   |
|---|--|---|---|---|---|--|--|---|---------------------------|-----------------------------|------------------|--------------------------|---|
| [1] Sí<br>[2] No, no<br>tuve, pero<br>obtuve<br>plántulas=>E7<br>m<br>[3] No, no<br>tuve ni adquirí<br>plántulas<br>=>E8a |  | <b>¿Cómo obtuvo las plántulas de cacao?</b><br><br><b>[Selección múltiple]</b><br><br>[1] De mi propio vivero=>pase a E7P<br>[2] Compré=>pase a E7n<br>[3] Me los regalaron (ONG, familiares, amigos, etc.)=>pase a E7P<br>[99] Otro, ¿Cuál?_____ | <b>Si compró, ¿Dónde los compró?</b><br><br>[1] Vecino=>pase a E7P<br>[2] Vivero certificado=>E7q<br>[3] Vivero no certificado=>pase a E7P<br>[99] Otro, ¿Cuál? | <b>Usted, ¿sabe dónde puede adquirir material verificado o certificado?</b><br><br>[1] Sí<br>[2] No | <b>Si compró, ¿cantidad que compró?</b> | <b>Costo por unidad (Moneda Local)</b> | <b>¿Cómo era la calidad de las plántulas?</b><br><br>[1] Excelente<br>[2] Buena<br>[3] Regular<br>[4] Mala<br>[77] No sé | [2] No<br>=>pase a E7y<br>[3] Lo compré preparado=>pase a E7y | <b>Suelo o tierra (%)</b> | <b>Materia orgánica (%)</b> | <b>Arena (%)</b> | <b>Otro material (%)</b> | <b>sustrato utilizó?</b><br><br>[0] No desinfecté<br>[1] Solarización<br>[2] Agua hirviendo<br>[3] Producto químico<br>[77] No sé<br>[99] Otro, ¿cuál?_____ |
| DE  |  |   |   |   |   |  |  |   |                           |                             |                  |                          |   |

### INJERTO

| E8a   | E8b   | E8c   | E8d   | E8e   | E8e2  | E8e3   | E8f  | E8h   | E8j  | E8k1   E8k2   |
|---|---|---|---|---|---|--|--|---|--|---|
| En el año agrícola 2021- 2022, ¿Realizó injertos en sus plantaciones o vivero de cacao? | <b>¿Dónde realizó el injerto?</b><br><br>[1] En mi vivero<br>[2] En árboles en campo<br>[3] En vivero y en árboles en campo<br>[99] Otra, ¿Cuál?_____ | <b>¿Qué variedad/clon injertó?</b><br><br><b>[Escriba los nombres, separados por comas]</b> | <b>¿Qué variedad o clon tuvo mayor prendimiento?</b><br><br><b>[Escriba UN nombre nada más]</b> | <b>Número de plantas/ árboles injertados (Número)</b> | <b><i>Esta pregunta aparece si E8b=1 o E8b=3</i></b><br><br><b>¿Qué tipo de injerto</b> | <b>¿Cómo hizo la selección de sus varetas para hacer los injertos?</b> | <b>En su experiencia, ¿Qué tan importante ha sido realizar injertos en su finca?</b> | <b>¿Cuál considera que es su nivel de conocimiento en esta práctica?</b><br><br>[1] Alto<br>[2] Medio | <b>¿Paga usted porque alguien llegue a su finca a darle servicio</b> | <b>¿Cuánto pagó por el servicio de injertos? (Moneda local)</b> |

|  |  |  |  |  |  |  |  |                      |   |                 |
|--|--|--|--|--|--|--|--|----------------------|---|-----------------|
| [1] Sí<br>[2] No, las plantas ya venían injertadas=>E10x<br>[3] No, nada se injertó=> E10x |  |  |  |  | realizó en vivero?<br><br>[1] Parche (Centro América)<br>[2] Púa lateral (Sur América)<br>[3] De yema lateral<br>[4] Micro injerto<br>[99] Otro, ¿Cuál? ____ | [1] De árboles élites o madre<br>[2] De vivero/jardín clonal registrado ante autoridad fitosanitaria<br>[3] De vivero/jardín clonal sin registro ante autoridad fitosanitaria<br>[4] De árboles de mi finca, al azar<br>[99] Otra forma, ¿cuál? ____ | [1] Muy importante<br>[2] Importante<br>[3] Neutro<br>[4] Poco importante<br>[5] Nada importante | [3] Bajo<br>[4] Nulo | de injerto?<br><br>[1] Sí<br>[2] No<br>=>E10x | Precio   Unidad |
|  |  |  |  |  |  |  |  |                      |   |                 |

### ANÁLISIS DE SUELOS Y FERTILIZACIÓN

| E10x  | E10y  | E10a   | E10aw  | E10b   | E10cw  |
|---|---|--|--|--|--|
| ¿Aplicó cal a su finca de cacao en el año agrícola 2021 - 2022? | ¿Con base en qué criterios aplicó cal a su finca de cacao?  | ¿Aplicó fertilizantes en los lotes de cacao en el año agrícola 2021 – 2022 ? | ¿Cómo decidió qué tipo de fertilizante y dosis aplicar?  | ¿Tipo de fertilizantes aplicados?  | ¿Aplicó la dosis requerida de fertilizante?                        |
| [1] Sí<br>[2] No=>E10a  | [1] Mapa de suelo<br>[2] Resultados de análisis de suelo<br>[3] Por recomendación de proveedor<br>[4] Por recomendación de otros productores<br>[5] Con mi experiencia<br>[99] Otro, ¿cuál? _____ | [1] Sí<br>[2] No=>E11aw  | [Selección múltiple]<br><br>[1] Con base en un análisis de suelo<br>[2] Con base en síntomas visuales de deficiencias<br>[3] Por recomendaciones de proveedor<br>[4] Por recomendaciones de otros productores<br>[5] Por la experiencia que tengo<br>[6] Siempre aplico lo mismo | [1] Químicos<br>[2] Orgánicos o compost=>E10f<br>[3] Microorganismos de montaña<br>[4] Fertilización diluida | [1] Sí<br>[2] No, aplico menos<br>[3] No, aplico más<br>[77] No sé |

|  |  |  |   |  |  |
|--|--|--|---|--|--|
|  |  |  | [7] Con base en balance de nutrientes en función de cosecha <b>actual</b><br>[8] Con base en balance de nutrientes en función de cosecha <b>esperada</b><br>[99] Otra, ¿cuál? _____ |  |  |
|  |  |  |   |  |  |

| E10f   | E10g  | E10h   | E10j  | E10k   | E10m  | E10n  | E10p  | E10q  | E10r  |
|--|---|--|---|--|---|---|---|---|---|
| <b>¿Cuántas veces en el año agrícola 2021 – 2022 aplicó fertilizantes...</b><br><br>[0] No tiene plantas de cacao en esta etapa=>E10g o E10k<br>[6] No aplicó=> E10g o E10k<br><br>[1] Una<br>[2] Dos<br>[3] Tres<br>[4] Cuatro<br>[5] Cinco o más veces<br>[77] No sé |   | <b>¿En qué meses hizo estas aplicaciones...</b><br><br>[Selección Múltiple]<br><br>[1] Mayo 2021<br>Noviembre 2021<br>[2] Junio 2021<br>Diciembre 2021<br>[3] Julio 2021<br>2022<br>[4] Agosto 2021<br>2022<br>[5] Septiembre 2021<br>2022<br>[6] Octubre 2021<br>2022 | [7]<br>[8]<br>[9] Enero<br>[10] Febrero<br>[11] Marzo<br>[12] Abril | <b>¿Cuál fue el fertilizante más usado (por la cantidad) en su finca en el año agrícola 2021 – 2022 ?</b><br><br><b>(nombre)</b> | <b>El fertilizante [respuesta en e10k], ¿cuántas veces lo aplicó en todo el año agrícola 2021 – 2022?</b> | <b>Para este fertilizante, ¿cuál fue la dosis aplicada?</b> |   |   | <b>Si la respuesta a E10b=[2] o [3],</b><br><br><b>¿Los abonos orgánicos los preparó incluyendo insumos (desechos) de su finca?</b><br><br>[1] Sí<br>[2] No<br>[77] No sé |
| <b>En las plantas de cacao en desarrollo?</b>  | <b>En las plantas de cacao en producción?</b> | <b>En las plantas de cacao en desarrollo?</b>  | <b>En las plantas de cacao en producción?</b>                       |  |   | <b>Dosis</b>  | <b>Unidad peso/volumen</b><br>[1] gramos<br>[2] libras<br>[3] kg<br>[4] Onzas | <b>Unidad de aplicación</b><br>[1] por planta<br>[2] por metro cuadrado |   |

|  |  |  |  |  |  |  |                                       |   |  |
|--|--|--|--|--|--|--|---------------------------------------|---|--|
|  |  |  |  |  |  |  | [5] sacos 100 lb<br>[99] Otro, ¿cuál? | [3] por<br>manzana /<br>cuadra<br>[4] por<br>hectárea<br>[99] Otro,<br>¿cuál?<br>(especifique<br>todos los<br>detalles) |  |
|  |  |  |  |  |  |  |                                       |   |  |

## MANEJO DE ENFERMEDADES Y PLAGAS

**E11aw2.** En general, en su finca, ¿Cómo monitorea las plagas y enfermedades en su finca?

[1] Realiza protocolo de muestreo estandarizado  
[2] Tiene sistema de monitoreo de plagas y/o enfermedades  
[77] No hace monitoreo

**E11a2.** Por favor dígame cuáles son las **dos principales enfermedades o plagas** que afectaron su cacaotal en el año agrícola 2021 - 2022. (dos opciones de respuesta posibles)

[0] Ninguna plaga o enfermedad afectó el cacaotal=>E13a [1] Monilia (Monilia roreri E) [2] Mazorca Negra (Phytophthora) [3] Escoba de Bruja (Crinipellis perniciosa)  
[4] Mazorquero [99] Otra, ¿Cuál? \_\_\_\_\_

|  | E11bw  | E11c2w   | E11dw  | E11ew      | E11fw   |
|--|--|--|--|------------|---|
| Para las siguientes enfermedades/plagas... | En general, ¿realiza una evaluación en campo de la [enfermedad/plaga]?<br><br>[1] Sí<br>[2] No | Aproximadamente, ¿a cuántos árboles afectó el/la [enfermedad/plaga]?<br><br>[1] Muy pocos (<10%)<br>[2] Entre 11% y 30%<br>[3] Entre 31%-50%<br>[4] Mayor al 50% | ¿Qué hizo para prevenir o controlar el/la [enfermedad/plaga]?<br><br>[1] Control cultural<br>[2] Control biológico<br>[3] Control químico<br>[4] Control etológico (comportamiento de plagas)<br>[5] No hizo nada<br>[99] Otro, ¿Cuál? |            | ¿Utiliza productos autorizados por el Servicio Fitosanitario de su país? Opciones de respuesta:<br><br>[1] Sí<br>[2] No<br>[3] No utiliza ningún producto |
|  |  |  | Principal  | Secundario |   |

|         |  |  |  |  |  |
|---------|--|--|--|--|--|
| Plaga 1 |  |  |  |  |  |
| Plaga 2 |  |  |  |  |  |

### RENOVACIÓN

| E13a   | E13c   | E13dw  | E14a  |
|--|--|--|---|
| <p>Entre nuestra <b>última visita</b> (cuando hicimos la entrevista anterior en 2020 o 2021) <b>y hoy</b> ¿ha hecho renovación del cultivo de Cacao?</p> <p>[1] Sí<br/>[2] No=&gt;E14a</p> | <p>¿Cuál considera que es su nivel de conocimiento en esta práctica?</p> <p>[1] Alto<br/>[2] Medio<br/>[3] Bajo<br/>[4] Nulo</p> | <p>¿Qué criterio tiene para realizar la práctica de renovación?</p> <p>[Selección Múltiple]</p> <p>[1] Bajo rendimiento<br/>[2] Salud de la planta muy mala<br/>[3] Plantas muertas<br/>[4] El diagnóstico de mi finca<br/>[99] Otro criterio, ¿Cuál? ____</p> | <p>En general, ¿le parece importante hacer <b>renovación</b> de cacao en su finca?</p> <p>[1] Sí<br/>[2] No<br/>[77] No sé =&gt;K22</p> |
|  |  |  |   |

### REHABILITACIÓN DE CACAO

|   |                  |
|---|------------------|
| <b>K22</b>  |                  |
| En general, ¿le parece importante hacer <b>rehabilitación</b> de cacao en su finca? |                  |
| <p>[1] Sí<br/>[2] No<br/>[77] No sé</p>   | <p>Sí<br/>No</p> |
|   |                  |

## COSECHA

**F19x. En el año agrícola 2021 – 2022 ¿cosechó cacao en alguna de sus parcelas/lotes?** [1] Sí \_\_\_\_\_ [2] No \_\_\_\_\_=>F60

**F19d2. En la cosecha, ¿sólo cosecha las mazorcas maduras?** [1] Sí \_\_\_\_\_ [2] No \_\_\_\_\_ [77] No sé \_\_\_\_\_

**F19d3. En la cosecha, ¿se eliminaron las mazorcas enfermas, dañadas, sobre maduras o verdes?** [1] Sí \_\_\_\_\_ [2] No \_\_\_\_\_ [77] No sé \_\_\_\_\_

| F20a  | F21a  | F21b  | F21c   |
|---|---|---|--|
| Meses en los que cosechó su cacao           | Cantidad total cosechada en el año agrícola 2021 - 2022 |   |  |
| Marcar meses [1] - [12] según sea necesario | <b>Cantidad</b>   | <b>Unidad</b><br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras<br>[4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[6] Baldes (decir peso de la lata en libras)<br>[99] Otra, ¿Cuál? (decir peso en libras) | <b>Presentación o forma en la que reporta esta cosecha</b><br>[1] En baba de frutos verdes o pintones<br>[2] En baba de frutos maduros<br>[3] Baba sin diferenciar<br>[4] Seco<br>[99] Otra, ¿cuál? ____ |
|   |   |   |  |

## COMERCIALIZACIÓN

| F29x  | F29b  | F29c  | F29f   | F29g  | F29k   | F29m  |
|---|---|---|--|---|--|---|
| Ahora dígame, ¿en qué formas vendió su cacao de la cosecha 2021 – 2022 ?                | Ahora dígame, sobre la venta en [primera forma en f29x]...: |   | Ahora dígame, sobre la venta en [segunda forma en f29x]... |   | Ahora dígame, sobre la venta en [tercera forma en f29x]... |   |
| (Seleccione todas las que aplican)<br><br>(Encuestador, leer las opciones al productor) | ¿Qué cantidad vendió en [forma 1 f29x]?                     | <b>Unidad</b><br>[0] Sacos de 60 kg<br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras | ¿Qué cantidad vendió en [forma 2 f29x]?                    | <b>Unidad</b><br>[0] Sacos de 60 kg<br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras | ¿Qué cantidad vendió en [forma 3 f29x]?                    | <b>Unidad</b><br>[0] Sacos de 60 kg<br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos |
| [1] Baba, de frutos verdes o pintones   |   |   |  |   |  |   |

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
| [2] Baba, de frutos maduros<br>[3] Baba (sin diferenciar)<br>[4] Seco<br>[99] Otra ¿Cuál?_____ |  | [4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[6] Baldes (decir peso de la lata en libras)<br>[99] Otra, ¿Cuál? (decir peso en libras) |  | [4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[6] Baldes (decir peso de la lata en libras)<br>[99] Otra, ¿Cuál? (decir peso en libras) |  | [3] Libras<br>[4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[99] Otra, ¿Cuál? (decir peso en libras) |
|  |  |  |  |  |  |  |

| F30a  | F30b   | F30b2   | F30c  | F30d  | F30d2   |   |
|---|--|---|---|---|---|---|
| ¿A qué tipos de compradores les vendió cacao de la forma [Forma de venta 1] en el año agrícola 2021-2022?<br><br>(Seleccione todas las que aplican)<br><br>(Encuestador, leer las opciones al productor)<br><br>[1] Intermediarios<br>[2] Empresa, ¿cuál?_____<br>[3] Plaza de mercado<br>[4] Cooperativa u organización de productores, ¿cuál?_____<br>[5] Intermediario de OLAM<br>[6] Intermediario independiente<br>[99] Otro ¿Cuál?_____ | ¿Qué cantidad del cacao de la forma [Forma de venta 1] vendió a [Opciones de respuesta en F30a]?<br><br>Cantidad | Precio promedio de venta<br>(Moneda Local/[Unidad]) | ¿A qué tipos de comprador le vendió cacao de la forma [Forma de venta 2] en el año agrícola 2021- 2022?<br><br>(Seleccione todas las que aplican)<br><br>(Encuestador, leer las opciones al productor)<br><br>[1] Intermediarios<br>[2] Empresa, ¿cuál?_____<br>[3] Plaza de mercado<br>[4] Cooperativa u organización de productores, ¿cuál?_____<br>[5] Intermediario de *nombre empresa*<br>[6] Intermediario independiente<br>[99] Otro ¿Cuál?_____ | ¿Qué cantidad de todo el cacao vendido de la forma [Forma de venta 2] vendió a [Opciones de respuesta en F30c]?<br><br>(Cantidad) | Precio promedio de venta<br>(Moneda Local/[Unidad]) | ¿A qué tipos de comprador les vendió cacao de la forma [Forma de venta 3] en el año agrícola 2021-2022?<br><br>(Seleccione todas las que aplican)<br><br>(Encuestador, leer las opciones al productor)<br><br>[1] Intermediarios<br>[2] Empresa, ¿cuál?_____<br>[3] Plaza de mercado<br>[4] Cooperativa u organización de productores, ¿cuál?_____<br>[5] Intermediario de *nombre empresa*<br>[6] Intermediario independiente<br>[99] Otro ¿Cuál?_____ |
|   |  |   |   |   |   |   |

## FERMENTACIÓN Y SECADO EN FINCA

| F40x | F40a | F40b | F42a | F42b | F43 | F44 | F45 | F46 | F47 | F48 | F49a | F49b |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|------|------|
|      |      |      |      |      |     |     |     |     |     |     |      |      |

*Estas preguntas aparecen si F40x=1*

|  |  |   |  |  |   |  |  |   |  |   |  |  |
|--|--|---|--|--|---|--|--|---|--|---|--|--|
| <p>¿Realiza usted beneficio de cacao en finca?</p> <p>[1] Sí<br/>[2] No=&gt;F42a</p> | <p>¿Las mazorcas fueron <b>clasificadas</b> según su color, forma y/o tamaño?</p> <p>[1] Sí<br/>[2] No</p> | <p><b>Los granos</b> de las mazorcas cortadas, ¿se <b>sacaron en 3 o menos días</b> de las mazorcas?</p> <p>[1] Sí<br/>[2] No</p> | <p><b>Esta pregunta aparece si F40x=2</b></p> <p><b>Dado que no beneficia, ¿cuánto tiempo</b> transcurre entre la recolección o la cosecha y la entrega al centro de acopio?</p> <p><b>(Horas)</b></p> | <p>¿Cuánto tiempo transcurre entre la recolección o la cosecha y el proceso de fermentación?</p> <p><b>(Horas)</b></p> | <p>¿Cómo realiza la fermentación?</p> <p>[1] En cajillas o bandejas<br/>[2] En cajones en forma de escalera<br/>[99] Otro, ¿Cuál? _____</p> | <p>¿Por cuánto <b>s días fermenta</b> usted el cacao?</p> <p><b>(Días)</b></p> | <p>Durante la fermentación, ¿<b>cubre el cacao</b> (con hojas de plátano o sacos de yute) para mejorar la fermentación?</p> <p>[1] Sí<br/>[2] No</p> | <p>Aproximadamente, ¿<b>cuántas veces voltea</b> el cacao durante la fermentación?</p> <p><b>(escriba 0 si nunca lo voltea)</b></p> | <p>Durante la fermentación, ¿<b>controla la temperatura</b> del cacao de manera <b>diaria</b>?</p> <p>[1] Sí<br/>[2] No, la reviso con menos frecuencia<br/>[3] No, no controlo la temperatura</p> | <p>¿<b>Cómo seco</b> el cacao?</p> <p>[Selección Múltiple]</p> <p>[1] Al sol<br/>[2] En horno<br/>[3] No seco<br/>[99] Otro, esp: _____</p> | <p>¿Verifica Ud. el contenido de <b>humedad</b> del cacao seco?</p> <p>[1] Sí<br/>[2] No=&gt;F62</p> | <p>¿Cómo verifica la humedad?</p> <p>[Selección Múltiple]</p> <p>[1] Pruebas con medidor de grano<br/>[2] Observando color de grano<br/>[3] Prueba quebrando granos<br/>[99] Otra forma (esp.)</p> |
| 5  |  |   |  |  |   |  |  |   |  |   |  |  |



## CALIDAD Y CERTIFICACIONES

| F62   | F63   | F66  | F67  | F80   |
|---|---|--|--|---|
| <p>¿Sabe usted identificar las <b>características físicas</b> que determinan el nivel de <b>calidad</b> en la mazorca y/o grano del cacao?</p> <p>[1] Sí<br/>[2] No=&gt;F66</p> | <p>Si sí, por favor dígame las características físicas que determinan la calidad del cacao</p> <p><i>(NO las lea, sino que seleccione las que reporta el productor)</i></p> <p>[1] Uniformidad del grano<br/>[2] % de material comestible<br/>[3] Contaminación u olores inesperados (gasolina, materiales extraños, etc.)<br/>[5] Tamaño del grano<br/>[8] Presencia de material extraño<br/>[9] % de humedad<br/>[10] Granos quebrados<br/>[6] % de cáscara<br/>[11] Uniformidad de la mazorca<br/>[12] Madurez<br/>[13] %Daño por animales<br/>[14] Otro, ¿cuál?</p> | <p>¿Cuenta con alguna <b>certificación</b>?</p> <p>[1] Sí<br/>[2] No=&gt;F80</p> | <p>¿Con qué certificación cuenta?</p> <p><b>[selección múltiple]</b></p> <p>[1] Orgánico<br/>[2] Fair Trade<br/>[3] FLO<br/>[4] FLO - Orgánico<br/>[5] UTZ / Rainforest<br/>[6] CLAC /Small farmers<br/>[99] Otra, ¿Cuál? ____</p> | <p>¿Usa alguna herramienta para guardar/tomar nota de sus costos de producción e ingresos?</p> <p>[1] Sí<br/>[2] No</p> |
|   |   |  |  |   |

## SECCIÓN X: SOCIODEMOGRÁFICO

### TOMA DE DECISIONES –Usar ID de miembros del hogar-

| X12a   |  |
|--|--|
| <p>En el año agrícola 2021-2022, ¿Quién decidió cómo usar el ingreso por la venta del cacao?</p> <p>[1] Decidió solo/a (mismo productor/a)<br/>[2] Conyugue<br/>[3] Hijo/a<br/>[4] Hermano/a</p> | <p>[0] No consulté con nadie<br/>[1] Otro miembro del hogar hombre<br/>[2] Otro miembro del hogar mujer<br/>[3] Técnico agrícola (gobierno u ONG)<br/>[4] Casa comercial o de venta de insumos<br/>[5] Otros productores/vecinos<br/>[99] Otro (especificar)</p> |

|                                  |  |
|----------------------------------|--|
| [5] Padre                        |  |
| [6] Madre                        |  |
| [99] Otro familiar (especificar) |  |
|                                  |  |

## MIGRACIÓN

| X18  | X19  | X19b   |
|--|--|--|
| <b>¿Cuántos miembros del hogar emigraron</b> (se fueron a vivir fuera del hogar) <b>en los últimos 12 meses?</b><br><br><b>[Si ninguno emigró, coloque 0 y vaya a X20]</b> | <b>Si algún miembro emigró, ¿este miembro se fue fuera del país?</b><br><br>[1]<br>[2] No=>X20 | <b>El o los miembros que emigraron, ¿a qué país o región emigraron?</b><br><br><i>[Leer opciones al productor y escoja todas las que aplican]</i><br><br><b>[Selección múltiple]</b><br>[1] Estados Unidos<br>[2] México<br>[3] Canadá<br>[4] Centroamérica<br>[5] Sudamérica<br>[6] Europa<br>[7] Prefiero no responder<br>[99] Otra región |
|  |  |  |

**SECCIÓN H: INGRESOS ADICIONALES DEL HOGAR DURANTE EL AÑO AGRÍCOLA 2021 – 2022**

| H1   | H2   | H3  | H4  |  |
|--|--|---|---|--|
| De los miembros del hogar, dígame ¿quién recibió ingreso durante el año agrícola 2021 – 2022?<br><br>[0] Ningún miembro del hogar<br>[1] Productor/a<br>[2] Conyugue<br>[3] Hijo/a 1<br>[4] Hijo/a 2<br>[5] Hijo/a 3<br>[6] Hermano/a 1<br>[7] Hermano/a 2<br>[9] Hermano/a 3<br>[10] Padre<br>[11] Madre<br>[99] Otro familiar, (especificar)<br><br>[Agregar opción “ninguno”, con salto a H5] | Tipo de ingreso<br><br>(Encuestador, leer las opciones al productor)<br><br>[1] Pago monetario por trabajo agrícola fuera de la finca<br>[2] Pago monetario por trabajo no agrícola fuera de la finca<br>[99] Otro, ¿Cuál? _____ | Ingreso mensual por otros trabajos (agrícolas o no agrícolas) realizados, por los que recibió un pago<br><br>Moneda Local | Meses en el que recibió este pago<br><div> <div>                         [1] Enero<br/>[2] Febrero<br/>[3] Marzo<br/>[4] Abril<br/>[5] Mayo<br/>[6] Junio                     </div> <div>                         [7] Julio<br/>[8] Agosto<br/>[9] Septiembre<br/>[10] Octubre<br/>[11] Noviembre<br/>[12] Diciembre                     </div> </div> |  |
|  |  |   |   |  |
|  |  |   |   |  |
|  |  |   |   |  |

| H5  | H6a   | H6b   |  | H6c  |
|---|---|---|--|--|
| ¿Recibió algún subsidio de Gobierno u ONG en los últimos 12 meses?<br><br>[1]<br>[2] No | ¿Recibió remesas en los últimos 12 meses?<br><br>[1] Sí<br>[2] No=>Ir a Sección J | Mes en el que recibió remesas<br><div> <div>                         [1] Enero<br/>[2] Febrero<br/>[3] Marzo<br/>[4] Abril<br/>[5] Mayo<br/>[6] Junio                     </div> <div>                         [7] Julio<br/>[8] Agosto<br/>[9] Septiembre<br/>[10] Octubre<br/>[11] Noviembre<br/>[12] Diciembre                     </div> </div> |  | Monto recibido por mes<br><br>Moneda Local |
|   |   |   |  |  |

## SECCIÓN J. ACCESO A CRÉDITO AGRÍCOLA DURANTE EL AÑO AGRÍCOLA 2021-2022

| J20  | J21  | J22x   | J22y   | J22   | J23   | J24   | J25   | J26   | J27a  | J27b   |
|--|--|--|--|---|---|---|---|---|---|--|
| <p><b>Entre mayo de 2021 y abril 2022, ¿de qué tipo de entidad de crédito su hogar obtuvo algún crédito? (incluyendo para el desarrollo de actividades agrícolas y no agrícolas)</b></p> <p><b>[Selección Múltiple]</b></p> <p>[1] No solicitó crédito =&gt;<b>Sección K</b><br/>         [2] Solicitó, pero no obtuvo un crédito=&gt;<b>Responde r J21</b><br/>         [3] Banco<br/>         [4] Caja rural<br/>         [5] Micro-financiera<br/>         [6] Cooperativa de ahorro y crédito<br/>         [7] Cooperativa de cacao<br/>         [8] Prestamista<br/>         [9] Intermediario<br/>         [99] Otro, ¿cuál? _____</p> | <p><b>Si no le aprobaron un crédito, ¿por qué razón se lo rechazaron?</b></p> <p>[1] Por falta de una garantía<br/>         [2] Por sobreendeudamiento<br/>         [3] Por no contar con un título de propiedad de la finca<br/>         [4] Prefiero no responder<br/>         [99] Otra razón, ¿Cuál? _____</p> <p><b>[Ir a Sección K luego de responder]</b></p> | <p><b>Si obtuvo algún crédito, ¿le puedo hacer unas preguntas más detalladas sobre este crédito?</b></p> <p>[1] Sí=&gt;Seguir en J22<br/>         [2] No, prefiero no dar detalles=&gt;Sección K</p> | <p><b>¿Podría por lo menos decirme la tasa de interés pagada?</b></p> <p>[1] Sí=&gt;Seguir en J27a<br/>         [2] No, prefiero no dar detalles=&gt;Sección K</p> | <p><i>De aquí en adelante, si hay más de una fuente de crédito, enfocarse en la que proveyó el monto mayor</i></p> <p><b>¿Quién lo solicitó?</b></p> <p>[1] Productor/a<br/>         [2] Conyugue<br/>         [3] Hijo/a<br/>         [4] Hermano/a<br/>         [5] Padre<br/>         [6] Madre<br/>         [99] Otro familiar (especificar )</p> | <p>Para obtener este crédito, ¿Prendó algún bien de su casa?</p> <p><b>[Selección Múltiple]</b></p> <p>[0] Ninguno<br/>         [1] Hipoteca sobre la finca<br/>         [3] Garantía prendari a sobre el producto<br/>         [99] Otro, ¿Cuál? _____</p> | <p>¿Por <b>cuantos meses</b> fue aprobado o el crédito?</p> <p><b>Meses</b></p> | <p>¿Cómo pagó/est á pagando este crédito?</p> <p><i>(leer opciones)</i><br/> <b>[Selección Múltiple]</b></p> <p>[1] Efectivo<br/>         [2] Se descuenta o descontó del pago de la cosecha<br/>         [99] Otro, ¿cuál? _____</p> | <p>¿En qué actividad invirtió el préstamo obtenido?</p> <p><b>[Selección Múltiple]</b></p> <p>[1] Renovación del cacaotal<br/>         [2] Rehabilitación del cacaotal<br/>         [3] Compra de insumos para el cultivo de cacao<br/>         [4] Compra de equipo o herramientas para el cultivo de cacao<br/>         [5] Inversión en infraestructura (ej. Beneficiadero , patio de secado, etc.) para el cultivo de cacao<br/>         [6] Compra de insumos para otros cultivos<br/>         [7] Compra de animales<br/>         [8] Inversión en negocios no agrícolas<br/>         [9] Para compra de comida</p> | <p><b>¿Cuál fue la tasa de interés que pagó por este crédito?</b></p> <p><b>% (si no sabe, escriba 999)</b></p> | <p><b>Tipo</b></p> <p>[1] Anual<br/>         [2] Mensual<br/>         [3] No sé<br/>         [4] Otra ¿Cuál? _____</p> |

|  |  |  |  |  |  |  |  |   |  |  |
|--|--|--|--|--|--|--|--|---|--|--|
|  |  |  |  |  |  |  |  | [10] Para necesidades de salud o educación<br>[11] Para pagos de arriendo<br>[12] Adecuación de vivienda<br>[99] Otro, ¿Cuál? |  |  |
|  |  |  |  |  |  |  |  |   |  |  |

## SECCIÓN K. ACCESO A INFORMACIÓN

| K1   | K2   | K3  | K4a  | K4b   | K5  | K6a   | K6b   | K7   | K10   |
|--|--|---|--|---|---|---|---|--|---|
| ¿Ha recibido información sobre <b>investigaciones en cacao</b> realizadas por los institutos de investigación nacionales y/o universidades?<br><br>[1] Sí<br>[2] No=>Ir a K5 | ¿De <b>dónde</b> obtuvo esta información?<br><br>[1] La busqué en internet<br>[2] Vecino o familiar<br>[3] ONG<br>[4] Gobierno o extensionistas<br>[99] Otra fuente (esp.) | ¿Está información tuvo <b>algún costo monetario</b> para usted?<br><br>[1] Sí<br>[2] No | ¿Usó <b>esta información para tomar decisiones</b> en su finca?<br><br>[1] Sí=>K5<br>[2] No=>K4b | Si no, ¿por qué no usó la información para tomar decisiones en su finca?<br><br>[1] No me pareció útil<br>[2] Muy complejo de entender<br>[3] No podía implementar las recomendaciones<br>[4] No necesitaba hacer nada en mi finca<br>[99] Otro (esp.)<br><br>[ir a K5] | Cuando requiere asistencia técnica con su cultivo de cacao, ¿a <b>quién acude o contacta Ud.?</b><br><br><b>[Selección múltiple]</b><br>[0] A nadie=>K6b<br>[1] A un familiar=>K7<br>[2] A un vecino con finca de cacao=>K7<br>[3] Técnico de ONG=>K6a<br>[4] Técnico de Gobierno=>K6a<br>[5] Promotor, facilitador, técnico de la organización=>K6a<br>[99] Otra persona, ¿quién? =>K7 | Si sí, ¿cuál es la manera más común de contactar a estos técnicos?<br><br>[1] Los visito en sus oficinas<br>[2] Los llamo por celular<br>[3] Envío un correo electrónico<br>[4] Espero que me visiten para aclarar mis dudas<br>[99] Otra manera (esp.)<br><br><b>[Ir a K7]</b> | Si no, ¿cómo resuelve sus dudas sobre su cultivo?<br><br>[1] No resuelvo mis dudas o no pregunto a nadie<br>[2] Pregunto a familiares o vecinos/amigos<br>[3] Voy a la tienda de agro-insumos<br>[4] Organización de productores<br>[99] Otra manera (esp.)<br><br><b>[Ir a K7]</b> | ¿Cómo accede a los información de precios y mercados de cacao?<br><br><b>[Selección múltiple]</b><br>[0] No tengo acceso a esa información<br>[1] Por la organización de productores a la que pertenezco<br>[2] Por técnicos de ONGs<br>[3] Por el gobierno<br>[4] Familiar/amigo<br>[99] Otra fuente, ¿cuál? ____ | ¿Considera que los entrenamientos de MOCCA han sido?:<br><br>[1] Muy utiles<br>[2] Utiles<br>[3] Poco utiles<br>[4] Nada utiles |

AHORA DIGA AL PRODUCTOR QUE, PARA FINALIZAR LA ENTREVISTA, QUISIERAN VISITAR EL LOTE PRINCIPAL (QUE ESTÁ EN PRODUCCIÓN O EL QUE MÁS PRODUCE) DE CACAO PARA HACER UN DIAGNÓSTICO CORTO DE DICHO LOTE

VAYA CON EL PRODUCTOR AL LOTE PRINCIPAL Y REALICE EL DIAGNÓSTICO SIGUIENDO ESTAS INSTRUCCIONES:

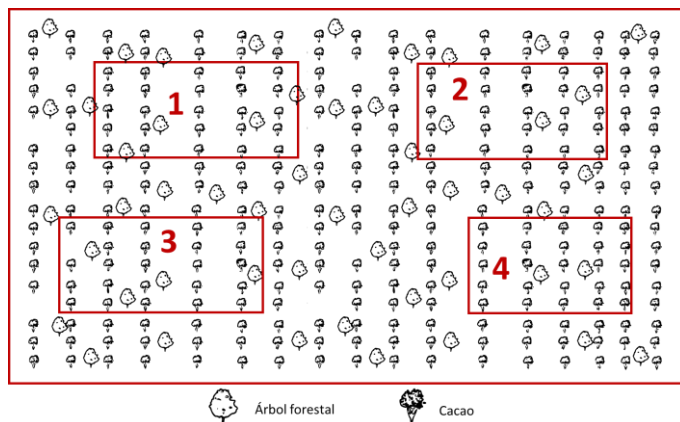
1. Mida el área con CACAO del lote principal.
2. Anote la población de plantas de cacao del lote (todo el lote principal).
3. Seleccione 4 puntos en la plantación de cacao, trate de que estén bien distribuido en toda el área para que sea más preciso el diagnóstico (ver ilustración).
4. Cada punto será un cuadro de 5 plantas por 5 surcos, identifique también arboles acompañantes. Por esta razón, cada punto tendrá alrededor de 25 plantas de cacao (o un poco más, o un poco menos).
5. Para cada punto, mida la distancia (metros) entre las 5 plantas de cacao y entre árboles acompañantes y los 5 surcos y multiplique estos valores. Esta es el área del punto (metros cuadrados).
6. En cada punto, examine las plantas y registre la información en su dispositivo y en el formato impreso (deje el formato impreso al productor).
7. Si el lote principal es muy pequeño y no puede medir 4 puntos, mida los que puede y en el resto, cuando le pregunte el área del punto, colocar 0 para avanzar.

YX. ¿Cuál es el lote principal con cacao de su finca? [se selecciona de la lista de nombres de lotes que dieron en la tabla de lotes de cacao]: \_\_\_\_\_

Y1. Área del lote principal con cacao: \_\_\_\_\_

Y1b. Unidad \_\_\_\_\_

[1] Manzanas [2] Tareas [3] Hectáreas [4] Cuerdas [5] Caballerías [99] Otra, ¿Cuál? \_\_\_\_\_



Y2. Población de plantas de cacao en el lote (# plantas): \_\_\_\_\_

| Y3    | Y4                                    | Y4b  | Y5                    | Y6                           | Y7   | Y8                                    | Y9a                         | Y9b                        | Y10                                     |
|-------|---------------------------------------|--|-----------------------|------------------------------|--|---------------------------------------|-----------------------------|----------------------------|---|
| Punto | Área de este punto (metros cuadrados) | En este punto muestral, ¿Cuántos arboles de cacao debieron haber habido? | # plantas productivas | # plantas que requieren poda | # plantas que requieren renovación (injerto) | # plantas que necesitan ser removidas | # plantas recién injertadas | # plantas recién renovadas | # fallas físicas (espacios sin plantas) |
| 1     |                                       |  |                       |                              |  |                                       |                             |                            |   |
| 2     |                                       |  |                       |                              |  |                                       |                             |                            |   |
| 3     |                                       |  |                       |                              |  |                                       |                             |                            |   |
| 4     |                                       |  |                       |                              |  |                                       |                             |                            |   |
| Suma  |                                       |  |                       |                              |  |                                       |                             |                            |   |

A18. Hora de finalización de la encuesta (24 hrs) (hh:mm) \_\_\_\_\_:

AGRADEZCA AL PRODUCTOR POR SU TIEMPO Y TERMINE LA ENTREVISTA

**Cuestionario de línea intermedia, CAFÉ CENTROAMERICA**  
**Proyecto “Maximizando Oportunidades de Café y Cacao en las Américas (MOCCA)”**

Versión: Feb/15/2022

**PERIODO DE REFERENCIA DE LA ENCUESTA: Mayo 2021 – Abril 2022**

**INSTRUCCIONES:**

**Encuestador:** En esta entrevista considere que:

**1) Un hogar** se define como la unidad familiar compuesta por miembros de su familia inmediata quienes normalmente **viven y comen sus comidas juntas**.

**2) El (la) jefe de hogar** es la persona responsable de **tomar la mayoría de decisiones** relacionadas a los gastos del hogar y/o cultivos a sembrar.

**SECCIÓN A. CONTROL**

| A1.             | A2.           | A3.          | A5.                        | A6.                       | A7.                  | A8a.  | A10.                            |
|-----------------|---------------|--------------|----------------------------|---------------------------|----------------------|---|---------------------------------|
| País            | Encuestador/a | Supervisor/a | Departamento/<br>Provincia | Municipio/Distrito/Cantón | Comunidad/<br>vereda | Código del/la<br>productor/a (de la<br>lista) | Nombre del/la<br>entrevistado/a |
| [2] El Salvador | [1]...        | [1]...       | [1]...                     | [1]...                    | [1]...               | (copie el código arriba de<br>cada página)    |                                 |
| [3] Guatemala   | [2]...        | [2]...       | [2]...                     | [2]...                    | [2]...               |   |                                 |
| [4] Honduras    |               |              |                            |                           |                      |   |                                 |
| [5] Nicaragua   |               |              |                            |                           |                      |   |                                 |
| [6] Perú        |               |              |                            |                           |                      |   |                                 |
|                 |               |              |                            |                           |                      |   |                                 |

|                                      |
|--------------------------------------|
| <b>AXX. Contacto con productor</b>   |
| [1] Es la primer visita => ir a A11  |
| [2] Es la segunda visita => ir a A14 |



**ENCUESTADOR: Lea la declaración de consentimiento**

**A16.** Doy fe de que la declaración de consentimiento verbal fue leída y el/la productor/a sigue dispuesto/a participar en esta entrevista

[1]

**SI** (continúe con la entrevista): \_\_\_\_\_ [2] **NO** (reemplace el hogar):

**A17.** Hora de inicio de la encuesta (24 hrs) (hh:mm) \_\_\_\_\_: \_\_\_\_\_

| A19                             | A20. Latitud |            |             | A21. Longitud |            |             | A22                       | A23  |
|---------------------------------|--------------|------------|-------------|---------------|------------|-------------|---------------------------|--|
| Dato del GPS corresponde a:     |              |            |             |               |            |             | Error del GPS<br>(metros) | Elevación<br>(metros sobre el nivel del mar) |
| [1] Casa y finca (están juntas) |              |            |             |               |            |             |                           |  |
| [2] La casa                     | a. Grados    | b. Minutos | c. Segundos | a. Grados     | b. Minutos | c. Segundos |                           |  |
| [3] La finca                    |              |            |             |               |            |             |                           |  |
| [99] Otro lugar, especifique.   |              |            |             |               |            |             |                           |  |
|                                 |              |            |             |               |            |             |                           |  |

**SECCIÓN D: CARACTERIZACION DE LA FINCA MANEJADA EN EL AÑO AGRÍCOLA 2021 – 2022**

**Encuestador: dibuje un mapa de todos los lotes o parcelas de café manejados en su finca o fincas durante el año agrícola 2021-2022 en una página en blanco (coloque el Código del productor). Recuerde que el mapa debe tener la información mínima detallada en el protocolo de “instrucciones para dibujar el mapa” impartido durante el entrenamiento. Arranque la página y úsela durante la entrevista.**

**Ahora tome la foto de este mapa para seguir**

**[TOMAR FOTO PARA PODER SEGUIR]**

**Encuestador, explique a la persona entrevistada que un lote o parcela es “todo terreno de la Explotación Agropecuaria, separado por ríos o quebradas, carreteras, caminos públicos y terrenos de terceros. Si hay un río separando el café, se debe registrar como dos lotes/parcelas**

*diferentes. Por favor registre TODOS los lotes/parcelas agrícolas de café PROPIOS, ALQUILADOS Y/O PRESTADOS usados durante el año agrícola 2021-2022. Un lote es lo mismo que una parcela.*

| NÚMERO DE PARCELAS/LOTES MANEJADAS (PROPIOS Y ALQUILADOS) |  | Número |
|---|--|--------|
| D2.1  | Encuestador: Por favor escriba el número de parcelas/lotes de café por el hogar en el año agrícola 2021-2022 |        |

| D10        | D10x   | D10x2   |
|------------|--|---|
| ID de lote | Nombre con el que identifica este parcela o lote | ¿Esta parcela/lote se sembró o se estableció después de la última entrevista realizada? |
| L1         |  | [1] Sí<br>[2] No  |
| L2         |  | [1] Sí<br>[2] No  |
| L3         |  | [1] Sí<br>[2] No  |
| L4         |  | [1] Sí<br>[2] No  |
| L5         |  | [1] Sí  |

|       |  |                  |
|-------|--|------------------|
|       |  | [2] No           |
| [...] |  | [1] Sí<br>[2] No |

**Para cada lote o parcela, por favor dígame...**

| D10x                | D1y1  | D1y2   | D13  |
|---------------------|---|--|--|
| <b>Lote/parcela</b> | <b>Área total de la parcela/lote [nombre]</b> | <b>Unidad de área de la parcela [nombre]</b> | <b>[Esta pregunta NO aparece si D1y=6]</b><br><b>¿Cuál es la tenencia de la parcela/lote [nombre]?</b><br><br>[1] Propia con título inscrito<br>[2] Propia sin título<br>[3] Alquilada a otros<br>[4] Alquilada de otros<br>[5] Prestada o a medias<br>[66] Prefiere no contestar<br>[77] No sé<br>[99] Otro, ¿Cuál? _____ |
| [nombre 1]          | 2   | 3  |  |
| [nombre 2]          | 1   | 30   |  |
| [nombre 3]          |   |  |  |
| ...                 |   |  |  |

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

**Ahora le voy a hacer unas preguntas para cada una de las parcelas con cultivos...**

| D10x        | D17b   | D17c  | D17d  | D17e  |
|-------------|--|---|---|---|
| <b>Lote</b> | De las <b>[área en D1y1] [unidad en D1y2]</b> que reportó tener en la parcela/lote <b>[nombre]</b> , ¿cuántas <b>[unidad en D1y2]</b> se sembraron con Café? | ¿Este CAFÉ que sembró en la parcela/lote <b>[nombre]</b> , está en <b>ASOCIO</b> (incluyendo la sombra, si la sombra genera ingresos o café con otro cultivo que no es sombra)?<br><br>[1] Sí<br>[2] No=>Siguiente lote o siguiente tabla | ¿Qué cultivos se sembraron en ASOCIO en la parcela <b>[nombre]</b> durante este período?<br><br>(mirar códigos de cultivos abajo)<br><br>[Selección Múltiple] | De las <b>[área en D17b] [unidad en D1y2]</b> que reportó tener la parcela <b>[nombre]</b> , ¿cuántas <b>[unidad en D1y2]</b> se sembraron en <b>ASOCIO</b> con <b>[cultivos en d17d]</b> ? |
| [nombre 1]  |  |   |   |   |
| [nombre 2]  |  |   |   |   |
| [nombre 3]  |  |   |   |   |
| ...         |  |   |   |   |
|             |  |   |   |   |

Códigos para cultivos:

|            |               |                |                           |                                 |
|------------|---------------|----------------|---------------------------|---------------------------------|
| [1] Arroz  | [6] Lechuga   | [11] Naranja   | [16] Limón                | [21] Otros cultivos permanentes |
| [2] Frijol | [7] Tomate    | [12] Aguacate  | [17] Cacao                | [22] Otro cultivo               |
| [3] Maíz   | [8] Zanahoria | [13] Mandarina | [18] Otros vegetales      |                                 |
| [4] Yuca   | [9] Pepino    | [14] Plátano   | [19] Otras hortalizas     |                                 |
| [5] Papa   | [10] Repollo  | [15] Mango     | [20] Otros granos básicos |                                 |

## SECCIÓN E. MANEJO DEL CULTIVO DEL CAFÉ Y LA SOMBRA DEL CAFÉ EN EL AÑO AGRÍCOLA 2021-2022

Para los lotes/parcelas en los que reportó tener sembrado CAFÉ, por favor dígame...

| D10x                 | E1cw  | E1dw  | E1e   | E3aw  | E3bw  |
|----------------------|---|---|---|---|---|
| <b>Lote/parcelas</b> | <p>¿Qué nivel de sombra está presente en promedio en la parcela/lote [nombre]?</p> <p>[Leer opciones]</p> <p>[0] No hay sombra</p> <p>[1] Muy poca sombra (menos del 5%)</p> <p>[2] Poca sombra (5% a 24%)</p> <p>[3] Sombra mediana (25% a 39%)</p> <p>[4] Bastante sombra (40% o más)</p> | <p>¿Ha plantado nuevos árboles de sombra en los últimos 2 años en la parcela/lote [nombre]?</p> <p>[1] Sí</p> <p>[2] No</p> | <p>¿Podó los árboles de sombra en la parcela/lote [nombre] en el año agrícola 2021-2022</p> <p>[1] Sí</p> <p>[2] No</p> | <p>En la parcela/lote [nombre], tiene</p> <p>[1] Sí      [2] No      [3] No, el cafetal está muy establecido (adulto)</p> |   |
|                      |   |   |   | <p>Coberturas muertas<br/>(<i>mulch o rastrojo</i>)</p>   | <p>Coberturas verdes o cultivo de cobertura</p> |
| [nombre 1]           |   |   |   |   |   |
| [nombre 2]           |   |   |   |   |   |
| [nombre 3]           |   |   |   |   |   |
| ...                  |   |   |   |   |   |
|                      |   |   |   |   |   |

Sobre las prácticas de conservación de suelo y manejo de arvenses/malezas en sus cafetales:

| E1f   | E1g  | Eg2   | E3j   | E3k   | E3m                                 | E3n  | E3p                | E3q   | E3r  |
|---|--|---|---|---|-------------------------------------|--|--------------------|---|--|
| Si la respuesta a "E1e = Sí" en por lo menos una parcela/lote:  |  |   | Si la respuesta a "E3bw=Sí" en por lo menos una parcela/lote,   | Para el manejo de maleza...                       |                                     |  |                    |   |  |
|   |  |   |   | [1] Sí [2] No [77] No sé                          |                                     |  |                    |   |  |
| En general, ¿en qué etapa(s) del cultivo de café hace las podas de los árboles de sombra?   | En general, ¿toma en cuenta la ubicación de la finca y/o la temperatura para hacer las podas a la sombra del café? | ¿Realizó limpieza de canales de drenaje o gavetas?  | ¿Qué tipos de cultivos cobertura sembró?  | ¿Usa chaleadora, chapiadora, guadaña o shindaiwa? | ¿Calendariza las chapias/deshierbo? | ¿Hace manejo diferenciado de arvenses nobles vs. agresivas (o sea, hace chapias selectivas)? | ¿Aplicó herbicida? | [Esta pregunta aparece si E3p=Sí]<br><br>¿El herbicida lo aplicó de una manera focalizada (usando ecoweed o boquillas adecuadas)? | ¿Cubre el área entre surcos de café con restos del material producto de las limpiezas? |
| [Selección Múltiple]<br><br>[1] Después de la cosecha<br><br>[2] Antes de las lluvias<br><br>[3] En cualquier momento<br><br>[4] Después de la cosecha y antes del invierno<br><br>[77] No sé | [1] Sí<br><br>[2] No   | [1] Sí, una vez al año<br><br>[2] Sí, dos veces al año<br><br>[3] No realizó limpieza de canales de drenaje | [Leer opciones]<br><br>[Selección Múltiple]<br><br>[1] Leguminosas<br><br>[2] Gramíneas<br><br>[3] Otro tipo de cultivo<br><br>[77] No sé |   |                                     |  |                    |   |  |
|   |  |   |   |   |                                     |  |                    |   |  |

**E4a.** Usted, ¿tiene un diagnóstico productivo de su cafetal o finca?

[1] Sí \_\_\_\_\_

[2] No \_\_\_\_\_

[77] No sé \_\_\_\_\_

**AHORA VAMOS A HABLAR SOBRE LAS VARIEDADES DE CAFÉ QUE SE MANEJARON EN EL AÑO AGRÍCOLA 2021 – 2022**

| D10x                | D15   | E4b1   | E4b2   | E4b3   | ...   | Códigos de variedades:                    |
|---------------------|---|--|--|--|---|---|
| <b>Lote/parcela</b> | ¿Cuántas variedades de café hay sembradas en la parcela [nombre]? | Dígame el <b>nombre de la variedad 1</b> sembrada en la parcela [nombre] | Dígame el <b>nombre de la variedad 2</b> sembrada en la parcela [nombre] | Dígame el <b>nombre de la variedad 3</b> sembrada en la parcela [nombre] | <b>[Repetir preguntas según el # de variedades reportadas en D15 para cada parcela]</b> |   |
| [nombre 1]          |   |  |  |  |   | [1] Catuaí<br>[13] Anacafe 14             |
| [nombre 2]          |   |  |  |  |   | [2] Caturra<br>[14] Marsellesa            |
| [nombre 3]          |   |  |  |  |   | [3] Catimor<br>[15] FT2                   |
| ...                 |   |  |  |  |   | [4] Lempira<br>[16] Salvadoreño           |
|                     |   |  |  |  |   | [5] Parainema<br>[17] Arabico             |
|                     |   |  |  |  |   | [6] Bourbon<br>[18] H1<br>Centroamericano |
|                     |   |  |  |  |   | [7] Sarchimor<br>[19] H común             |
|                     |   |  |  |  |   | [8] Típica<br>[20] Pacamara               |
|                     |   |  |  |  |   | [9] IHCAFE 90<br>[77] No sé               |
|                     |   |  |  |  |   | [10] Obata<br>[99] Otra (esp.)            |
|                     |   |  |  |  |   | [11] Gueisha                              |
|                     |   |  |  |  |   | [12] Castillo Colombia                    |



| D10x                | E4bx            | E4d1  | E4d2   | E4e1  | E4e2                            | E4f  | E5a1w   | E5a2  | E5a3   | E5b  | E5c  | E5f   | E6a  | E6b   | E6c  |
|---------------------|-----------------|---|--|---|---------------------------------|--|---|---|--|--|--|---|--|---|--|
| <b>Lote/parcela</b> | <b>Variedad</b> | <b>¿Cuántos</b> árboles de café de la variedad <b>[variedad]</b> tiene sembrados en la parcela/lote <b>[nombre]</b> ? | Del total de árboles de la variedad <b>[variedad]</b> en el parcela/lote <b>[nombre]</b> , ¿cuántos son productivos? | ¿Cuál es la edad de los árboles de la variedad <b>[variedad]</b> en el parcela/lote <b>[nombre]</b> ? | (Años)                          | ¿A qué distancia están sembrados los árboles de la variedad <b>[variedad]</b> en la parcela/lote <b>[nombre]</b> ? | ¿Re-sembró (o sembró nuevos) árboles de la variedad <b>[variedad]</b> en la parcela/lote <b>[nombre]</b> en el ciclo 2021 – 2022? | ¿Dónde obtuvo las plantas nuevas que sembró de la variedad <b>[variedad]</b> en la parcela/lote <b>[nombre]</b> ? | Si <b>E5a2=[5]</b> , ¿cómo seleccionó las plántulas a transplantar?<br><br>[Leer opciones]<br><br>[Selección Múltiple] | ¿Cuál fue el motivo por el que tuvo que renovar café de la variedad <b>[variedad]</b> en la parcela/lote <b>[nombre]</b> ? | ¿Cuántos árboles de la variedad <b>[variedad]</b> en el parcela/lote <b>[nombre]</b> renovó? | ¿Cuántos árboles más de la variedad <b>[variedad]</b> en la parcela/lote <b>[nombre]</b> considera usted que necesitan ser renovados? | ¿A cuántos árboles de la variedad <b>[variedad]</b> en la parcela/lote <b>[nombre]</b> les hizo podas?                   | ¿Qué tipos de poda hizo?<br><br>[Selección Múltiple]                                      | ¿Cuál fue la razón principal para las podas?<br><br>[1] Control de enfermedad<br>[2] Mejorar rendimiento<br>[3] Mantener la plantación sana<br>[4] Mejorar estructura<br>[5] Por diagnostico |
|                     |                 |   |  |   | Edad de los árboles más jóvenes | (metros x metros)  | [1] Sí<br>[2] No=>E5f   | [Fuente Principal]<br><br>[1] Las compré en vivero certificado<br>[2] Las compré en vivero NO certificado         | [1] Al azar<br>[2] Planta vigorosa<br>[3] Planta sana<br>[4] Planta con 4-6 pares de hojas verdaderas                  | [1] Inundación<br>[2] Sequía<br>[3] Problemas con plagas/enfermedades  |  |   | [0] Ninguno=> Siguierte variedad<br>[1] Muy pocos (<25%)<br>[2] Entre 25% y 50%<br>[3] Entre 51%-75%<br>[4] Mayor al 75% | [1] Recepa<br>[2] Deshije<br>[3] Descopie<br>[4] Poda selectiva<br>[5] Poda de bandoleras |  |

|            |              |  |  |  |  |  |  |  |                              |                         |  |  |  |                                 |                                     |
|------------|--------------|--|--|--|--|--|--|--|------------------------------|-------------------------|--|--|--|---------------------------------|-------------------------------------|
|            |              |  |  |  |  |  |  | [3] Me las regalaron en un programa del gobierno | [99] Otra razón (esp.) _____ | [4] Bajo rendimiento    |  |  |  | [6] Poda de formación de agobio | ico productivo                      |
|            |              |  |  |  |  |  |  | [4] Me las regalaron en una ONG                  |                              | [99] Otro, ¿Cuál? _____ |  |  |  | [7] No hizo podas               | [6] Por las necesidades de plantas  |
|            |              |  |  |  |  |  |  | [5] Obtuve plántulas de mi propia finca          |                              |                         |  |  |  | [99] Otra, ¿Cuál? _____         | [7] No tuvo una razón en específico |
|            |              |  |  |  |  |  |  | [99] Otro, ¿Cuál?                                |                              |                         |  |  |  |                                 | [99] Otra ¿Cuál?...                 |
| [nombre 1] | [variedad 1] |  |  |  |  |  |  |  |                              |                         |  |  |  |                                 |                                     |
| [nombre 2] | ...          |  |  |  |  |  |  |  |                              |                         |  |  |  |                                 |                                     |
| [nombre 3] |              |  |  |  |  |  |  |  |                              |                         |  |  |  |                                 |                                     |
| ...        |              |  |  |  |  |  |  |  |                              |                         |  |  |  |                                 |                                     |

**E6d. Si No hizo podas de café en ninguna parcela/lote, ¿por qué? [opción múltiple, marque las que aplican]**

[1] No conoce/no sabe hacer la práctica  
árboles no necesitaban podas

[2] No le parece relevante hacer podas

[3] Es muy costoso

[4] Sus

[5] No tuvo tiempo

[6] No tuvo recurso (financieros o humanos)

[99] Otros (especificar \_\_\_\_\_)

**PROPAGACIÓN DEL CAFÉ: SEMILLEROS Y VIVEROS**

| E7a  | E7b   | E7cw  | E7d  | E7e  | E7f                             | E7g  | E7h                                    | E7i   | E7i3a   | E7i3   | E7i4                 | E7i5      | E7i7              | E7i8                     | E7i6              | E7i2  |
|--|---|---|--|--|---------------------------------|--|--|---|---|--|----------------------|-----------|-------------------|--------------------------|-------------------|---|
| En el período de referencia, ¿tuvo usted <b>semillero</b> ?<br><br>[1] Sí<br>[2] No tuve pero obtuve semilla=>E7cw<br>[3] No, no tuve ni adquiriré semilla=>E7i2 | Si sí, aproxi- mada- mente ¿cuánt as <b>kilos de semilla sembró</b> ? | <b>Sobre la adquisición de semilla para la siembra de su semillero/vivero, por favor dígame...</b>  |  |  |                                 |  |  |   | <b>¿Usted preparó el sustrato para su semillero?</b><br><br>[1] Sí, si preparé<br>[2] No =>pase a E7y<br>[3] Lo compré preparado =>pase a E7y | <b>Las preguntas E7i3-e7i6 solo se hacen si E7i3a==1</b><br><br><b>¿Qué porcentaje de [...] usó para preparar el sustrato para su semillero?</b><br><br>[Encuestador, la suma de E7i3 - E7i6 debe dar 100] |                      |           |                   |                          |                   | Al decidir sobre qué variedad sembrar, ¿toma en <b>consideración</b> las condiciones en su finca (clima, enfermedades) y si tiene buen mercado?<br><br>[1] Sí<br>[2] No |
|  |   | <b>¿Cómo obtuvo la semilla?</b><br><br><b>[Selección múltiple]</b><br><br>[1] Compró<br>[2] Me la regalaron<br>[3] De mi finca, seleccionando plantas sobresalientes<br>[4] De mi finca, sin seleccionar plantas<br>[5] De una ONG/programa de gobierno<br>[99] Otra fuente, ¿Cuál? _____ | Si compró la semilla, ¿era <b>certificada o verificada</b> ?<br><br>[1] Sí<br>[2] No<br>[77] No sé | Usted, ¿sabe dónde puede adquirir material verificado o certificado?<br><br>[1] Sí<br>[2] No | ¿Cuánta semilla <b>compró</b> ? | <b>Unidad</b><br>[1] Libras<br>[2] Kg<br>[99] Otra, ¿Cuál? _____ | <b>Costo por unidad (Moneda Local)</b> | <b>¿Cómo era la calidad de esta semilla?</b><br><br>[1] Excelente<br>[2] Buena<br>[3] Regular<br>[4] Mala<br>[77] No sé |   | Suelo o tierra (%)   | Materia orgánica (%) | Arena (%) | Pulpa de café (%) | Cascari-lla de arroz (%) | Otro material (%) |   |
|  |   |   |  |  |                                 |  |  |   |   |  |                      |           |                   |                          |                   |   |

| E7j | E7k | E7m | E7n | E7p | E7q | E7r | E7s | E7x | E7y |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |

|  |   |   |                               |  |                                  |   |  |  |   |
|--|---|---|-------------------------------|--|----------------------------------|---|--|--|---|
| En el período de referencia, ¿tuvo usted vivero con plántulas?   | Aproximadamente, ¿cuántas plántulas tuvo?   | Sobre las plántulas de café durante el año agrícola 2021-2022, por favor dígame...                      |                               |  |                                  |   |  | Si la respuesta a E7cw= [1] o E7m= [2], ¿Estaría dispuesto a pagar más dinero por un material genético verificado o certificado?                 | Si la respuesta a E7a= [1 o 2] o E7j=[1], Ya que mencionó haber tenido semillero y/o plántulas, ¿qué método de desinfección del sustrato utilizó? |
|  |   | ¿Cómo obtuvo los colinos/ plántulas de café?  | Si compró, ¿Dónde los compró? | Usted, ¿sabe dónde puede adquirir material verificado o certificado? | Si compró, ¿cantidad que compró? | Costo por unidad (Moneda Local)   | ¿Cómo era la calidad de las plántulas? |  |   |
| [1] Sí<br>[2] No, no tuve pero obtuve plántulas=>E7m<br><br>[3] No, no tuve ni adquirí plántulas=>E10a | [Selección múltiple]<br><br>[1] De mi propio semillero<br><br>[2] Compré<br><br>[3] Me los regalaron (ONG, familiares, amigos, etc.)<br><br>[99] Otro, ¿Cuál? _____ | [1] Vecino<br><br>[2] Vivero certificado=>E7q<br><br>[3] Vivero no certificado<br><br>[99] Otro, ¿Cuál? | [1] Sí<br><br>[2] No          |  |                                  | [1] Excelente<br><br>[2] Buena<br><br>[3] Regular<br><br>[4] Mala<br><br>[77] No sé | [1] Sí<br><br>[2] No                   | [0] No desinfecté<br><br>[1] Solarización<br><br>[2] Agua hirviendo<br><br>[3] Producto químico<br><br>[77] No sé<br><br>[99] Otro, ¿cuál? _____ |   |
|  |   |   |                               |  |                                  |   |  |  |   |

## ANÁLISIS DE SUELOS Y FERTILIZACIÓN

| E10a  | E10aw  | E10b   | E10cw  | E10dw  | E10e   |
|---|--|--|--|--|--|
| ¿Aplicó <b>fertilizantes</b> en los parcelas/lotos de café en el año agrícola 2021-2022 | ¿Cómo decidió qué tipo de fertilizante y dosis aplicar?  | ¿Qué tipos de fertilizantes aplicó?  | ¿Aplicó la dosis requerida de fertilizante?  | <b>Lugar de aplicación:</b><br>¿el fertilizante lo aplicó...   | <b>Forma de aplicación:</b><br>¿los fertilizantes granulares los aplicó...   |
| [1]<br>[2] No=>E11aw  | Sí<br><br><b>[Selección múltiple]</b><br><br>[1] Con base en un análisis de suelo<br>[2] Con base en síntomas visuales de deficiencias<br>[3] Por recomendaciones de proveedor<br>[4] Por recomendaciones de otros productores<br>[5] Por la experiencia que tengo<br>[6] Siempre aplico lo mismo<br>[99] Otra, ¿cuál? _____ | <b>[Selección Múltiple]</b><br><br>[1] Químicos<br>[2] Orgánicos o compost=>E10f<br>[3] Microorganismos de montaña<br>[4] pulpa de cafe<br>[5] Fertilización diluida | [1] Sí<br>[2] No, aplico menos<br>[77] No sé | <b>[Leer opciones]</b><br><b>[Selección Múltiple]</b><br><br>[1] Al voleo (lugar cerca de raíces)<br>[2] Debajo de la copa del árbol<br>[3] Zona de banda de abonamiento<br>[77] No sé | <b>[Leer opciones]</b><br><b>[Selección Múltiple]</b><br><br>[1] En la presentación comercial<br>[2] Disuelto en agua (drench)<br>[3] No apliqué ningún fertilizante granular<br>[4] Sembrado<br>[5] Riego por goteo<br>[77] No sé |
|   |  |  |  |  |  |

| E10f  | E10g | E10h   | E10j | E10k  | E10m   | E10n   | E10p | E10q | E10r   |
|---|------|--|------|---|--|--|------|------|--|
| ¿Cuántas veces en el año agrícola 2021 - 2022 aplicó fertilizantes...   |      | ¿En qué meses hizo estas aplicaciones...   |      | ¿Cuál fue el fertilizante más usado (por la cantidad) en su finca en el año agrícola 2021-2022? | El fertilizante [respuesta en e10k], ¿cuántas veces lo aplicó en todo el año agrícola 2021-2022? | Para este fertilizante, ¿cuál fue la dosis aplicada? |      |      | Si la respuesta a E10b=[2] o [3],  |
| [0] No tiene plantas de café en esta etapa=>E10g o E10k<br><br>[6] No aplicó= E10g o E10k<br><br>[1] Una<br>[2] Dos |      | <b>[Selección Múltiple]</b><br><br>[1] Mayo 2021<br>Noviembre 2021<br><br>[2] Junio 2021<br>Diciembre 2021 |      | [7]<br><br>[8] <b>(nombre)</b>  |  |  |      |      | ¿Los abonos orgánicos los preparó incluyendo insumos (desechos) de su finca? |

|   |  |  |  |   |  |              |                            |                             |  |  |  |  |  |  |  |  |  |  |                                |  |
|---|--|--|--|---|--|--------------|----------------------------|-----------------------------|--|--|--|--|--|--|--|--|--|--|--------------------------------|--|
| [3] Tres<br>[4] Cuatro<br>[5] Cinco o más veces<br>[77] No sé |  | [3] Julio 2021<br>2022<br>[4] Agosto 2021<br>2022<br>[5] Septiembre 2021<br>2022<br>[6] Octubre 2021<br>2022 |  | [9] Enero<br>[10] Febrero<br>[11] Marzo<br>[12] Abril |  |              |                            |                             |  |  |  |  |  |  |  |  |  |  | [1] Sí<br>[2] No<br>[77] No sé |  |
| <b>¿En las plantas de café en desarrollo?</b>                 | <b>En las plantas de café en producción?</b>       | <b>En las plantas de café en desarrollo?</b>   | <b>En las plantas de café en producción?</b> |   |  | <b>Dosis</b> | <b>Unidad peso/volumen</b> | <b>Unidad de aplicación</b> |  |  |  |  |  |  |  |  |  |  |                                |  |
|   |  |  |  |   |  |              | [1] gramos                 |                             |  |  |  |  |  |  |  |  |  |  |                                |  |
|   |  |  |  |   |  |              | [2] libras                 | [1] por planta              |  |  |  |  |  |  |  |  |  |  |                                |  |
|   |  |  |  |   |  |              | [3] kg                     | [2] por metro cuadrado      |  |  |  |  |  |  |  |  |  |  |                                |  |
|   |  |  |  |   |  |              | [4] Onzas                  | [3] por manzana             |  |  |  |  |  |  |  |  |  |  |                                |  |
|   |  |  |  |   |  |              | [5] sacos 100 lb           | [4] por hectárea            |  |  |  |  |  |  |  |  |  |  |                                |  |
| [99] Otro, ¿cuál?   | [99] Otro, ¿cuál? (especifique todos los detalles) |  |  |   |  |              |                            |                             |  |  |  |  |  |  |  |  |  |  |                                |  |
|   |  |  |  |   |  |              |                            |                             |  |  |  |  |  |  |  |  |  |  |                                |  |

## MANEJO DE ENFERMEDADES Y PLAGAS

**E11aw.** En general, en su finca, ¿implementa un sistema de monitoreo de plagas y enfermedades con base en un muestreo de plagas y enfermedades? [1] Sí \_\_\_\_\_ [2] No \_\_\_\_\_ [77] No sé \_\_\_\_\_

**E11aw2.** En general, en su finca, ¿Cómo monitorea las plagas y enfermedades en su finca? [1] Realiza protocolo de muestreo estandarizado [2] Tiene sistema de monitoreo de plagas y/o enfermedades [77] No hace monitoreo

**E11a2.** Por favor dígame cuáles son las dos principales enfermedades o plagas que afectaron su cafetal en el año agrícola 2021 - 2022. (dos opciones de respuesta posibles)

[0] Ninguna plaga o enfermedad afectó el cafetal=>E13a [1] Broca [2] Roya [3] Antracnosis [4] Mancha de Hierro [5] Muerte descendente  
[6] Gotera [7] Hormiga (Fumagina) [99] Otra, Cuál.

|  | E11bw  | E11c2w   | E11dw   | E11ew      | E11fw  |
|--|--|--|---|------------|--|
| Para las siguientes enfermedades/plagas... | En general, ¿realiza una evaluación en campo de esta [enfermedad/plaga]?<br><br>[1] Sí<br>[2] No | Aproximadamente, ¿a cuántos árboles afectó el/la [enfermedad/plaga]?<br><br>[1] Muy pocos (<10%)<br>[2] Entre 11% y 30%<br>[3] Entre 31%-50%<br>[4] Mayor al 50% | ¿Qué hizo para prevenir o controlar el/la [enfermedad/plaga]?<br><br>[1] Control cultural<br>[2] Control biológico<br>[3] Control químico<br>[4] Control etológico (comportamiento de plagas)<br>[5] Repela y pepena<br>[6] No hace nada<br>[99] Otro, ¿Cuál? |            | ¿Utiliza productos autorizados por el Servicio Fitosanitario de su país?<br><br>Opciones de respuesta:<br><br>[1] Sí<br>[2] No<br>[3] No utiliza ningún producto |
|  |  |  | Principal   | Secundario |  |
| Plaga1                                     |  |  |   |            |  |
| Plaga2                                     |  |  |   |            |  |

## RENOVACIÓN

| E13a  | E13c   | E13dw  | E14a  |
|---|--|--|---|
| <p>Entre nuestra última visita (cuando hicimos la entrevista anterior en 2020 o 2021) y hoy ¿ha hecho renovación del cultivo de Café?</p> <p>[1]<br/>[2] No =&gt;E14a</p> | <p>¿Cuál considera que es su nivel de conocimiento en esta práctica?</p> <p>[1] Alto<br/>[2] Medio<br/>[3] Bajo<br/>[4] Nulo</p> <p>Sí</p> | <p>¿Qué criterio tiene para realizar la práctica de renovación?</p> <p>[Selección Múltiple]</p> <p>[1] Bajo rendimiento<br/>[2] Salud de la planta muy mala<br/>[3] Plantas muertas<br/>[4] El diagnóstico de mi finca<br/>[99] Otro criterio, ¿Cuál? ____</p> | <p>En general, ¿le parece importante hacer <b>renovación</b> de café en su finca?</p> <p>[1] Sí<br/>[2] No<br/>[77] No sé=&gt;E15</p> |
|   |  |  |   |

## REHABILITACIÓN DE CAFÉ

|   |
|---|
| <b>K22</b>  |
| <p>En general, ¿le parece importante hacer <b>rehabilitación</b> de café en su finca?</p> <p>[1] Sí<br/>[2] No<br/>[77] No sé</p> |
|   |



## COSECHA

**F19x.** En el año agrícola 2021 – 2022, ¿cosechó café en alguna de sus parcelas/lotés? [1] Sí \_\_\_\_\_ [2] No \_\_\_\_\_=>**F60a**

**F19f1.** ¿Implementó práctica de repela y pepena? [1] Sí \_\_\_\_\_ [2] No=>**F19f4** \_\_\_\_\_ [3] No sé =>**F19f4** \_\_\_\_\_

**F19f2.** El café de la repela y pepena ¿Fue separado de frutos vanos, granos maduros, flores en su finca, antes de entregar al comprador? [1] Sí \_\_\_\_\_ [2] No \_\_\_\_\_ [3] No sé \_\_\_\_\_

**F19f3.** El café de la repela y pepena ¿Utilizó algún método para facilitar el control de calidad? [1] Usó cerezometro \_\_\_\_\_ [2] Usó refractómetro o brazalet \_\_\_\_\_ [3] No usó ningún metodo \_\_\_\_\_  
[4] Otra, ¿Cuál?: \_\_\_\_\_

**F19f4.** ¿Cómo hizo la estimación de su cosecha? [1] Con base en protocolo de medición de granos por nudos [2] Realizó plan de fertilización con base en estimación de cosecha  
[3] No hizo estimación de cosecha [4] Otra, ¿Cuál?: \_\_\_\_\_

**F19d2.** Para iniciar su cosecha, ¿hace muestreo en campo de fruta madura (granos rojos)? [1] Sí \_\_\_\_\_ [2] No \_\_\_\_\_=>**F19e**

**F19d3.** Si Sí, ¿aproximadamente a partir de qué porcentaje de granos maduros (rojos) inicia la cosecha? (0-100%) \_\_\_\_\_

**F19e.** La cosecha 2021-2022 correspondió a un año de (marque una): [1] Alta producción \_\_\_\_\_ [2] Baja producción \_\_\_\_\_  
[3] No sé \_\_\_\_\_

| F20a   | F21a  | F21b   | F21c  | F21P   | F21Q   | F21R   | F21S  |
|--|---|--|---|--|--|--|---|
| Meses en los que cosechó café                              | Cantidad total cosechada en el año agrícola 2021 - 2022 |  |   | Cantidad total cosechada en repela/pepena en el año agrícola 2021 - 2022 |  |  |   |
| [0] Plantas en crecimiento o parcelas/lotés no productivos | <b>Cantidad</b>   | <b>Unidad</b><br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras<br>[4] Quintales (sacos de 100 lb) | <b>Presentación o forma en la que reporta esta cosecha</b><br>[1] Uva/cereza, | La cantidad cosechada reportada anteriormente, ¿Incluye la cantidad de   | <b>Cantidad cosechada en repela y/o pepena</b> | <b>Unidad</b><br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras<br>[4] Quintales (sacos de 100 lb) | <b>Presentación o forma en la que reporta esta cosecha</b><br>[1] Uva/cereza, |

|   |  |   |   |  |  |   |   |
|---|--|---|---|--|--|---|---|
| Marcar mes [1] - [12] según sea necesario |  | [5] Latas (decir peso de la lata en libras)<br>[6] Quintal oreado<br>[99] Otra, ¿Cuál? (decir peso en libras) | [2] Pergamino húmedo<br>[3] Pergamino seco<br>[4] Oro<br>[99] Otra, ¿Cuál?<br>_____ | repela y/o pepena?<br><br>[1] Sí<br>[2] No |  | [5] Latas (decir peso de la lata en libras)<br>[6] Quintal oreado<br>[99] Otra, ¿Cuál? (decir peso en libras) | [2] Pergamino húmedo<br>[3] Pergamino seco<br>[4] Oro<br>[5] Pergamino oreado<br>[99] Otra, ¿Cuál?<br>_____ |
|   |  |   |   |  |  |   |   |

## COMERCIALIZACIÓN

| F29x   | F29b   | F29c   | F29f  | F29g   | F29k  | F29m   |
|--|--|--|---|--|---|--|
| Ahora dígame ¿en qué formas vendió su café de la cosecha 2021-2022?<br><br>(Seleccione todas las que aplican)<br>(Encuestador, leer las opciones al productor)<br><br>[1] Uva/cereza,<br>[2] Pergamino húmedo<br>[3] Pergamino seco<br>[4] Oro<br>[99] Otra ¿Cuál? _____ | Ahora dígame, sobre la venta en [primera forma en f29x]...:<br><br>¿Qué cantidad vendió en [forma 1 f29x]? | Unidad<br><br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras<br>[4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[6] Quintal oreado<br>[99] Otra, ¿Cuál? (decir peso en libras) | Ahora dígame, sobre la venta en [segunda forma en f29x]...<br><br>¿Qué cantidad vendió en [forma 2 f29x]? | Unidad<br><br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras<br>[4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[6] Quintal oreado<br>[99] Otra, ¿Cuál? (decir peso en libras) | Ahora dígame, sobre la venta en [tercera forma en f29x]...<br><br>¿Qué cantidad vendió en [forma 3 f29x]? | Unidad<br><br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras<br>[4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[6] Quintal oreado<br>[99] Otra, ¿Cuál? (decir peso en libras) |
|  |  |  |   |  |   |  |

| F29r   | F29s   | F29t  | F29u   |
|--|--|---|--|
| La cantidad <b>comercializada</b> reportada anteriormente, ¿Incluye el café de calidad baja proveniente de la repela y/o pepena? | <b>Cantidad</b> comercializada del repela y/o pepena | <b>Unidad</b><br><br>[1] Sacos (decir peso del saco en libras)<br>[2] Kilos<br>[3] Libras<br>[4] Quintales (sacos de 100 lb)<br>[5] Latas (decir peso de la lata en libras)<br>[6] Quintal oreado<br>[99] Otra, ¿Cuál? (decir peso en libras) | <b>Forma en la que vendió café</b> del repela y/o pepena<br><br>[1] Uva/cereza,<br>[2] Pergamino húmedo<br>[3] Pergamino seco<br>[4] Oro |
| [1] Si<br>[2] No   |  |   |  |
|  |  |   |  |

| F30a   | F30b  | F30b2  | F30c   | F30d  | F30d2  |  |
|--|---|--|--|---|--|--|
| ¿A qué tipos de compradores les vendió café de la forma [Forma de venta 1]en el año agrícola2021-2022?   | ¿Qué Cantidad del café de la forma [Forma de venta 1] vendió a [Opciones de respuesta en F30a]? | <b>Precio promedio de venta</b><br><br>(Moneda Local/[Unidad]) | ¿A qué tipos de comprador le vendió café de la forma [Forma de venta 2]en el año agrícola 2021- 2022?  | ¿Qué Cantidad de todo el café vendido de la forma [Forma de venta 2]vendió a [Opciones de respuesta en F30c]? | <b>Precio promedio de venta</b><br><br>(Moneda Local/[Unidad]) | ¿A qué tipos de comprador les vendió café de la forma [Forma de venta 3]en el año agrícola2021-2022?   |
| (Seleccione todas las que aplican)   | <b>Cantidad</b>   |  | (Seleccione todas las que aplican)   | (%)   |  | (Seleccione todas las que aplican)   |
| (Encuestador, leer las opciones al productor)  |   |  | (Encuestador, leer las opciones al productor)  |   |  | (Encuestador, leer las opciones al productor)  |
| [1] Intermediarios<br>[2] Empresa, ¿cuál? _____<br>[3] Plaza de mercado<br>[4] Cooperativa u organización de productores, ¿cuál? _____<br>[5] Intermediario de OLAM<br>[6] Intermediario independiente<br>[99] Otro ¿Cuál? _____ |   |  | [1] Intermediarios<br>[2] Empresa, ¿cuál? _____<br>[3] Plaza de mercado<br>[4] Cooperativa u organización de productores, ¿cuál? _____<br>[5] Intermediario de OLAM<br>[6] Intermediario independiente<br>[99] Otro ¿Cuál? _____ |   |  | [1] Intermediarios<br>[2] Empresa, ¿cuál? _____<br>[3] Plaza de mercado<br>[4] Cooperativa u organización de productores, ¿cuál? _____<br>[5] Intermediario de OLAM<br>[6] Intermediario independiente<br>[99] Otro ¿Cuál? _____ |
|  |   |  |  |   |  |  |

# BENEFICIO Y SECADO EN FINCA

| F24c   | F24x                                       | F24d1   | F24d2  | F24d3   | F24e   | F24e2   | F24e3   | F24f   | F24g   | F24h  | F24j   |
|--|--|---|--|---|--|---|---|--|--|---|--|
| ¿Dónde realiza usted la selección del grano?   | ¿Realiza usted beneficio de café en finca? | <i>Esta pregunta aparece si F10=2</i><br><br><b>Dado que no beneficia, ¿cuánto tiempo transcurre entre la recolección o la cosecha y el despulpado?</b><br><br><b>(Horas)</b><br><br><b>Ir a F29a</b> | <i>Estas preguntas aparecen si F10=1</i>   |   |  |   |   |  |  |   |  |
| <b>[Selección múltiple]</b><br><br>[1] Durante la cosecha, en campo<br>[2] En la tolva<br>[3] Después del despulpado<br>[4] No realiza selección | [1] Sí<br>[2] No=>F60a                     |   | ¿Cuánto tiempo transcurre entre la recolección o la cosecha y el despulpado?<br><br><b>(Horas)</b> | ¿Qué tipo de beneficio hace?<br><br><b>[Leer opciones, selección múltiple]</b><br><br>[1] Seco (café lavado)<br>[2] Semi-seco (honey)<br>[3] Húmedo (naturales) | ¿De dónde proviene el agua que utiliza para lavar el café?<br><br>[1] Acueducto<br>[2] Nacimiento<br>[3] Quebrada/río<br>[99] Otro, ¿cuál? _____ | ¿Cómo trata las aguas mieles (principal manera)?<br><br>[0] No las trato<br>[1] Sistema de tratamiento<br>[2] Tengo varias pilas de agua<br>[99] Otro, ¿cuál? _____ | ¿Cómo trata las aguas residuales?<br><br><b>[Selección Múltiple]</b><br><br>[0] No las trato<br>[1] Separo los sólidos<br>[2] Pilas de sedimentación o reguladoras de pH<br>[3] Sistema de filtrado<br>[4] Biojardinería<br>[77] No sé<br>[99] Otro, ¿cuál? _____ | ¿Por cuánto tiempo fermenta usted el café?<br><br><b>(Horas)</b> | ¿Qué hace usted para aprovechar la pulpa del café?<br><br>[0] Nada<br>[1] Composta orgánica<br>[2] Lombricomposta<br>[3] Aplicación directa al cafeto<br>[4] Descarto en fuente de agua<br>[99] Otro, ¿Cuál? _____ | ¿Cómo seca su café?<br><br><b>(forma principal)</b><br>[0] No seco=>F29a<br>[1] En el piso (cemento)<br>[2] En el piso (tierra, sin lona)<br>[3] Sobre carpas (mantas)<br>[4] En camas africanas<br>[5] En secadores solares<br>[6] Terrado<br>[99] Otro (¿cuál?) _____ | Si seca su café, ¿con qué porcentaje de humedad lleva su café al centro de acopio?<br><br>[1] 12% medido con equipo<br>[2] 12% sin medir (al tacto)<br>[3] No mido la humedad<br>[77] No sé<br>[99] Otro, ¿cuál? _____ |
|  |  |   |  |   |  |   |   |  |  |   |  |

# CALIDAD, CERTIFICACIONES Y OTRAS PRÁCTICAS

| F60a   | F60b   | F60c   | F60d  |
|--|--|--|---|
| ¿Sabe usted qué significa <b>factor de rendimiento físico para el pago del café?</b><br><br>[1] Sí | ¿Cuál es el factor de rendimiento físico con el que se pagó su café? | ¿Le pagaron algún <b>premio</b> por el factor de rendimiento físico?<br><br>[1] Sí | ¿De <b>cuánto</b> fue el premio?<br><br><b>(Moneda local/quintal (saco 100 lb))</b> |

|             |                  |                                |  |
|-------------|------------------|--------------------------------|--|
| [2] No=>F62 | (101 si no sabe) | [2] No=>F62<br>[77] No sé=>F62 |  |
|             |                  |                                |  |

| F62   | F64  | F65                                    | F65b   | F65c  | F66  | F67   | F80   |
|---|--|--|--|---|--|---|---|
| <p>¿Puede decirme 3 <b>características físicas</b> que determinan la <b>calidad del grano</b> de café?</p> <p>[Selección Múltiple, 3 opciones máximo]</p> <p>[0] No sabe ninguna</p> <p>[1] Olor del café</p> <p>[2] Porcentaje de humedad</p> <p>[3] Porcentaje de merma</p> <p>[4] Tamaño del grano</p> <p>[5] Porcentaje de defectos del grano</p> <p>[99] Otra (¿cuál?)</p> | <p>¿Conoce la calidad de la taza de su café?</p> <p>[1] Sí</p> <p>[2] No=&gt;F66</p> | <p>¿Cuál es la calidad en su taza?</p> | <p>¿Le han dado algún premio por el puntaje de su taza?</p> <p>[1] Sí</p> <p>[2] No=&gt;F66</p> <p>[3] No sé=&gt;F66</p> | <p>¿De cuánto fue el premio?</p> <p>(Moneda local/quintal(saco 100 lb))</p> | <p>¿Cuenta con alguna certificación?</p> <p>[1] Sí</p> <p>[2] No=&gt;F80</p> | <p>¿Con qué certificación cuenta?</p> <p>[Selección Múltiple]</p> <p>[1] Orgánico</p> <p>[2] Fair Trade</p> <p>[3] FLO</p> <p>[4] FLO - Orgánico</p> <p>[5] UTZ/Rainforest Alliance</p> <p>[6] CLAC</p> <p>[99] Otra, ¿Cuál?</p> <p>_____</p> | <p>¿Tienen un plan de inversión con base en el uso de registros?</p> <p>[1] Sí</p> <p>[2] No</p> <p>[3] No sé</p> |
|   |  |  |  |   |  |   |   |

## SECCIÓN X: SOCIODEMOGRÁFICO

### TOMA DE DECISIONES –Usar ID de miembros del hogar-

| X12a   | X12b  |
|--|---|
| En el año agrícola 2020-2021, ¿Quién decidió cómo usar el ingreso por la venta del café? | ¿Con quién en su hogar habló o conversó para tomar esta decisión? |

|   |   |
|---|---|
| [1] Decidió solo/a (mismo productor/a)<br>[2] Conyugue<br>[3] Hijo/a<br>[4] Hermano/a<br>[5] Padre<br>[6] Madre<br>[99] Otro familiar (especificar) | [0] No consulté con nadie<br>[1] Otro miembro del hogar hombre<br>[2] Otro miembro del hogar mujer<br>[3] Técnico agrícola (gobierno u ONG)<br>[4] Casa comercial o de venta de insumos<br>[5] Otros productores/vecinos<br>[99] Otro (especificar) |
|   |   |

## MIGRACIÓN

| X18  | X19   | X19b   |
|--|---|--|
| <b>¿Cuántos miembros del hogar emigraron</b> (se fueron a vivir fuera del hogar) <b>en los últimos 12 meses?</b><br><br><b>[Si ninguno emigró, coloque 0 y vaya a X20]</b> | Si algún miembro emigró, <b>¿este miembro se fue fuera del país?</b><br><br>[1] Sí<br>[2] No=>X20 | El o los miembros que emigraron, <b>¿a qué país o región emigraron?</b><br><br><i>[Leer opciones al productor y escoja todas las que aplican]</i><br><br><b>[Selección múltiple]</b><br>[1] Estados Unidos<br>[2] México<br>[3] Canadá<br>[4] Centroamérica<br>[5] Sudamérica<br>[6] Europa<br>[7] Prefiero no responder<br>[99] Otra región |
|  |   |  |

## SECCIÓN H: INGRESOS ADICIONALES DEL HOGAR DURANTE EL AÑO AGRÍCOLA 2021-2022

| H1   | H2  | H3  | H4   |  |
|--|---|---|--|--|
| De los siguientes miembros del hogar, dígame ¿quién recibió ingreso durante el año agrícola 2021-2022?   | <p>Tipo de ingreso</p> <p>(Encuestador, leer las opciones al productor)</p> <p>[1] Pago monetario por trabajo agrícola fuera de la finca</p> <p>[2] Pago monetario por trabajo no agrícola fuera de la finca</p> <p>[99] Otro, ¿Cuál? _____</p> | <p>Ingreso mensual por otros trabajos (agrícolas o no agrícolas) realizados, por los que recibió un pago</p> <p><b>Moneda Local</b></p> | <p>Meses en el que recibió este pago</p>   |  |
| <p>[0] Ningún miembro del hogar</p> <p>[1] Productor/a</p> <p>[2] Conyugue</p> <p>[3] Hijo/a 1</p> <p>[4] Hijo/a 2</p> <p>[5] Hijo/a 3</p> <p>[6] Hermano/a 1</p> <p>[7] Hermano/a 2</p> <p>[9] Hermano/a 3</p> <p>[10] Padre</p> <p>[11] Madre</p> <p>[99] Otro familiar, (especificar)</p> <p>[Agregar opción “ninguno”, con salto a H5]</p> |   |   | <p>[1] Enero</p> <p>[2] Febrero</p> <p>[3] Marzo</p> <p>[4] Abril</p> <p>[5] Mayo</p> <p>[6] Junio</p> | <p>[7] Julio</p> <p>[8] Agosto</p> <p>[9] Septiembre</p> <p>[10] Octubre</p> <p>[11] Noviembre</p> <p>[12] Diciembre</p> |
|  |   |   |  |  |

| H5   | H6a  | H6b   |   | H6c                    |
|--|--|---|---|------------------------|
| ¿Recibió algún subsidio de Gobierno u ONG en los últimos 12 meses? | ¿Recibió remesas/giros/transferencias en los últimos 12 meses? | Mes en el que recibió remesas   |   | Monto recibido por mes |
| [1] Sí<br>[2] No   | [1] Sí<br>[2] No=>Ir a Sección J                               | [1] Enero<br>[2] Febrero<br>[3] Marzo<br>[4] Abril<br>[5] Mayo<br>[6] Junio | [7] Julio<br>[8] Agosto<br>[9] Septiembre<br>[10] Octubre<br>[11] Noviembre<br>[12] Diciembre | Moneda Local           |

**SECCIÓN J. ACCESO A CRÉDITO AGRÍCOLA DURANTE EL AÑO AGRÍCOLA 2021- 2022**

| J20   | J21  | J22x   | J22y  | J22   | J23  | J24  | J25  | J26   | J27a  | J27b  |
|---|--|--|---|---|--|--|--|---|---|---|
| <b>Entre Mayo 2021 y Abril 2022, ¿de qué tipo de entidad de crédito su hogar obtuvo algún crédito? (incluyendo para el desarrollo de actividades agrícolas y no agrícolas)</b><br><br><b>[Selección Múltiple]</b><br><br>[1] No solicitó crédito => <b>Sección K</b><br>[2] Solicitó pero no obtuvo un crédito => <b>Responder J21</b><br>[3] Banco<br>[4] Caja rural<br>[5] Micro-financiera | <b>Si no le aprobaron un crédito,</b><br>¿por qué razón se lo rechazaron?<br><br>[1] Por falta de una garantía<br>[2] Por sobreendeudamiento<br>[3] Por no contar con un título de propiedad de la finca<br>[4] Prefiero no responder<br>[99] Otra razón, ¿Cuál? _____<br><br><b>[Ir a Sección K luego de responder]</b> | <b>Dado que obtuvo algún crédito,</b><br>¿le puedo hacer unas preguntas más detalladas sobre este crédito?<br><br>[1] Sí=>Seguir en J22<br>[2] No, prefiero no dar detalles=>J22 y | ¿Podría por lo menos decirme la <b>tasa de interés</b> pagada?<br><br>[1] Sí=>Seguir en J27a<br>[2] No, prefiero no dar detalles=>Sección K | <i>De aquí en adelante, si hay más de una fuente de crédito, enfocar e en la que proveyó el monto mayor</i><br><br><b>¿Quién lo solicitó?</b><br><br>[1] Productor/a<br>[2] Conyugue<br>[3] Hijo/a<br>[4] Hermano/a<br>[5] Padre<br>[6] Madre | Para obtener este crédito, ¿Prendó algún bien de su casa?<br><br><b>[Selección Múltiple]</b><br>[0] Ninguno<br>[1] Hipoteca sobre la finca<br>[3] Garantía prendari a sobre el producto<br>[99] Otro, ¿Cuál? _____ | ¿Por <b>cuantos meses</b> fue aprobado o el crédito?<br><br><b>Meses</b> | ¿Cómo pagó/est á pagando este crédito?<br><br><i>(leer opciones)</i><br><b>[Selección Múltiple]</b><br>[1] Efectivo<br>[2] Se descuenta o descontó del pago de la cosecha<br>[99] Otro, ¿cuál? _____ | ¿En qué actividad invirtió el préstamo obtenido?<br><br><b>[Selección Múltiple]</b><br>[1] Renovación del cafetal<br>[2] Rehabilitación del cafetal<br>[3] Compra de insumos para el cultivo de café<br>[4] Compra de equipo o herramientas para el cultivo de café<br>[5] Inversión en infraestructura (ej. Beneficiadero, patio de secado, etc.) para el cultivo de café<br>[6] Compra de insumos para otros cultivos | ¿Cuál fue la <b>tasa de interés</b> que pagó por este crédito?<br><br>%<br><br><b>(si no sabe, escriba 999)</b> | <b>Tipo</b><br>[1] Anual<br>[2] Mensual<br>[3] No sé<br>[4] Otra ¿Cuál? _____ |



|  |  |  |  |                                  |  |  |  |   |  |  |
|--|--|--|--|----------------------------------|--|--|--|---|--|--|
| [6] Cooperativa de ahorro y crédito<br>[7] Cooperativa de café<br>[8] Prestamista<br>[9] Intermediario<br><br>[99] Otro, ¿cuál?<br>_____ |  |  |  | [99] Otro familiar (especificar) |  |  |  | [7] Compra de animales<br>[8] Inversión en negocios no agrícolas<br>[9] Para compra de comida<br>[10] Para necesidades de salud o educación<br>[11] Para pagos de arriendo<br>[12] Adecuación de vivienda<br>[99] Otro, ¿Cuál?<br>_____ |  |  |
|  |  |  |  |                                  |  |  |  |   |  |  |

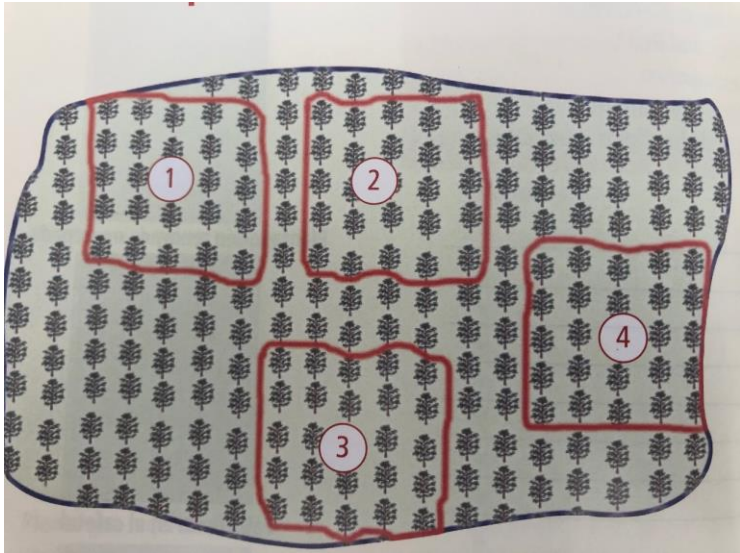
## SECCIÓN K. ACCESO A INFORMACIÓN

| K1   | K2  | K3  | K4a  | K4b   | K5   | K6a   | K6b  | K10   |
|--|---|---|--|---|--|---|--|---|
| <p>¿Ha recibido información sobre <b>investigaciones en café</b> realizadas por los institutos de investigación nacionales y/o universidades?</p> <p>[1] Sí<br/>[2] No=&gt;Ir a K5</p> | <p>¿De <b>dónde</b> obtuvo esta información?</p> <p>[1] La busqué en internet<br/>[2] Vecino o familiar<br/>[3] ONG<br/>[4] Gobierno o extensionistas<br/>[99] Otra fuente (esp.)</p> | <p>¿Está información tuvo <b>algún costo monetario</b> para usted?</p> <p>[1] Sí<br/>[2] No</p> | <p>¿Usó esta <b>información para tomar decisiones</b> en su finca?</p> <p>[1] Sí=&gt;K5<br/>[2] No</p> | <p>Si no, ¿por qué no usó la información para tomar decisiones en su finca?</p> <p>[1] No me pareció útil<br/>[2] Muy complejo de entender<br/>[3] No podía implementar las recomendaciones<br/>[4] No necesitaba hacer nada en mi finca<br/>[99] Otro (esp.)</p> | <p>Cuando requiere asistencia técnica con su cultivo de café, ¿a <b>quién acude o contacta Ud?</b></p> <p><b>[Selección múltiple]</b></p> <p>[0] A nadie=&gt;K6b<br/>[1] A un familiar=&gt;YX<br/>[2] A un vecino con finca de café=&gt;YX<br/>[3] Técnico de ONG=&gt;K6a<br/>[4] Técnico de Gobierno=&gt;K6a<br/>[99] Otra persona, ¿quién? =&gt;YX</p> | <p>Si sí, ¿cuál es la manera más común de <b>contactar a estos técnicos?</b></p> <p>[1] Los visito en sus oficinas<br/>[2] Los llamo por celular<br/>[3] Envío un correo electrónico<br/>[4] Espero que me visiten para aclarar mis dudas<br/>[99] Otra manera (esp.)</p> <p><b>[Ir a YX]</b></p> | <p>Si no, ¿cómo resuelve sus dudas sobre su cultivo?</p> <p>[1] No resuelvo mis dudas o no pregunto a nadie<br/>[2] Pregunto a familiares o vecinos/amigos<br/>[3] Voy a la tienda de agro-insumos<br/>[99] Otra manera (esp.)</p> <p><b>[Ir a YX]</b></p> | <p>¿Considera que los entrenamientos de MOCCA han sido:?</p> <p>[1] Muy utiles<br/>[2] Utiles<br/>[3] Poco utiles<br/>[4] Nada utiles</p> |
|  |   |   |  |   |  |   |  |   |

AHORA DIGA AL PRODUCTOR QUE, PARA FINALIZAR LA ENTREVISTA, QUISIERAN VISITAR LA PARCELA/LOTE PRINCIPAL (DEDICA MÁS TIEMPO PARA HACER PRÁCTICAS AGRONÓMICAS) DE CAFÉ PARA HACER UN DIAGNÓSTICO CORTO DE DICHA PARCELA/LOTE

VAYA CON EL PRODUCTOR A LA PARCELA PRINCIPAL Y REALICE EL DIAGNÓSTICO SIGUIENDO ESTAS INSTRUCCIONES:

1. Mida el área con CAFÉ de la parcela principal.
2. Anote la población de plantas de café de la parcela/lote (todo la parcela/lote principal).
3. Seleccione 4 puntos en el plantío, siguiendo la ilustración [Insertar Ilustración].
4. Cada punto será un cuadro de 5 plantas por 5 surcos. Por esta razón, cada punto tendrá alrededor de 25 plantas de café (o un poco más, o un poco menos).
5. Para cada punto, mida la distancia (metros) entre las 5 plantas y los 5 surcos y multiplique estos valores. Esta es el área del punto (metros cuadrados).
6. En cada punto, examine las plantas y registre la información en su dispositivo y en el formato impreso (deje el formato impreso al productor).
7. Si el lote/parcela principal es muy pequeño y no puede medir 4 puntos, mida los que puede y en el resto, cuando le pregunte el área del punto, colocar 0 para avanzar.



AGRADEZCA AL PRODUCTOR POR SU TIEMPO Y TERMINE LA ENTREVISTA

YX. ¿Cuál es la parcela/lote principal con café de su finca? [se selecciona de la lista de nombres de las parcelas que dieron en la tabla de las parcelas de café]: \_\_\_\_\_

Y1. Área de la parcela/lote principal con café: \_\_\_\_\_ Y1b. Unidad \_\_\_\_\_  
 [1] Manzanas [2] Tareas [3] Hectáreas [4] Cuerdas [5] Caballerías [99] Otra, ¿Cuál? \_\_\_\_

Y2. Población de plantas de café en la parcela/lote (# plantas): \_\_\_\_\_

| Y3    | Y4                                    | Y4b  | Y5                    | Y6                           | Y7  | Y8                                    | Y9a                        | Y9b                        | Y10                                     |
|-------|---------------------------------------|--|-----------------------|------------------------------|---|---------------------------------------|----------------------------|----------------------------|---|
| Punto | Área de este punto (metros cuadrados) | En este punto muestral, ¿Cuántos árboles de café debió haber habido? | # plantas productivas | # plantas que requieren poda | # plantas que requieren recepo/soca/corte | # plantas que necesitan ser removidas | # plantas recién recepadas | # plantas recién renovadas | # fallas físicas (espacios sin plantas) |
| 1     |                                       |  |                       |                              |   |                                       |                            |                            |   |
| 2     |                                       |  |                       |                              |   |                                       |                            |                            |   |
| 3     |                                       |  |                       |                              |   |                                       |                            |                            |   |
| 4     |                                       |  |                       |                              |   |                                       |                            |                            |   |
| Suma  |                                       |  |                       |                              |   |                                       |                            |                            |   |