USAID/Ethiopia's Responses to Questions on Funding Opportunity Announcement Number RFA- 663-11-000007- Pastoralist Areas Water, Sanitation and Hygiene Project

1. The RFA lists a prescribed minimum number of new and rehabilitated boreholes in each of three regions to address water supply issues. Is USAID willing to consider additional types of appropriate water schemes such as sand dams or are the water schemes limited to borehole drilling only?

   USAID/E Response: See attached document for further guidance; USAID will accept sand dams subject to the availability of existing feasibility studies and cost benefit analysis.

2. Does USAID have any evaluations or other materials on the condition of non-functioning wells in the pastoralist areas? Such information, if available, would be useful to formulate borehole rehabilitation strategies.

   USAID/E Response: See attached document.

3. It is possible that newly drilled deep boreholes will unexpectedly encounter water that is contaminated with heavy metals or for other reasons is deemed unfit for human consumption. Will the cooperative agreement address additional implementation costs that could be associated with this issue?

   USAID/E Response: USAID recommends the implementing partner works with the Regional Bureaus of Water in site selection and feasibilities studies as well as accessing useful data and information. Cost overruns should be the responsibility of the implementing agency and no additional funds will be provided.

4. Can you please confirm that deep well and motorized schemes are possible through this project?

   USAID/E Response: Yes; as long as the proposed targets outlined are met.

5. Can latrine construction be supported and/or financed through the project?

   USAID/E Response: Yes, but for public latrines only.

6. On page 7, under 1.5.1.7 Annex: Resumes and Letters of Commitment, it states that the applicants are required to include in the Annex Section the resumes and letters of commitment for each individual who will work at least 75% of his/her time on the program. Can you please confirm that this is for all staff or only Key Personnel?

   USAID/E Response: This requirement is for Key personnel only.

7. For new borehole drilling and rehabilitating the existing non-functional boreholes, can the amount for each region be changed based on our on-the-ground knowledge of the situation or must we keep the current numbers proposed in the RFA?

USAID/E Response: The proposed minimum number of boreholes should remain the same for each region; however, costs can be shifted if necessary and justified.

8. Can we interpret the Goal as the Strategic Objective of the project? If not, can you please provide the Strategic Objective?

   USAID/E Response: Yes, you can interpret the goal as the strategic objective.

9. On page 8, under Section 1.5.2 Cost Application Instructions, d. "**Equipment:** it states, Estimated types of equipment (i.e., model #, cost per unit, quantity)". While we are able to produce the model and make of equipment it is not possible to produce the model number until we have actually made the purchase. We ask that we do not have to include the model number at this point.

   USAID/E Response: In case identifying model number of the proposed equipment is difficult, the applicant can leave out that specific information.

10. On page 12, under Program Goals and Objectives we feel the goal only covers achievements under IR1 and would like to request to be able to suggest a change of the Goal in our proposal. Would that be acceptable to the Mission?

    USAID/E Response: Yes; as long as it does not change the project activities and set targets.

11. On page 13: under Key Interventions Areas and Activities, number 5 Community and household latrine and sanitation facility construction is mention as a priority activity. We appreciate that this RFA considered the issue of supporting for construction of communal and public latrines (like in schools and health facilities). However, according to the Ethiopian government's health policy, subsidy to the construction of household latrines is not allowed for different reasons of ownership and sustainability issues. With this in mind, can we support household latrine construction by directly covering construction expenditures? If not, can you please explain the intention of this activity?

    USAID/E Response: Yes; it should be rehabilitation or construction of public latrines in schools or health facilities. At household level the focus will be awareness creation on sanitation and hygiene.

12. Please confirm that email submission of the technical and cost applications is acceptable and there is no need to submit hard copies.
USAID/E Response: Email submission is acceptable. If you submit electronic copy, there is no need to submit hard copies. Please see section I.2.1 of the RFA.

13. Will the Mission accept other attachments to the technical and cost applications, aside from Resumes and Letters of Commitment?
USAID/E Response: Unnecessarily elaborated brochures or other presentations beyond those sufficient to present a complete and effective application in response to the RFA are not desired. Please see section I.5.3 of the RFA.

14. Can the past performance references of the applicant and partners be included as an attachment to the technical application and not be counted against the page limit?
USAID/E Response: Institutional Capacity to Implement and Past Performance information can be considered as an attachment to the Technical Application which should be limited to 20 pages or less. However, Institutional Capacity to Implement and Past Performance information should be limited to five (5) pages. Please see Section I.5.1.4 of the RFA.

15. Can you clarify if USAID expects CVs and letters of commitment for all personnel (regardless of management level and including all implementing field staff) budgeted at 75% or more, or if the CVs and letters of commitment that need to be included are only for key managing and technical staff budgeted at 75% or more?

USAID/E Response: This requirement should be for Key personnel only because the instrument we are planning to use is Cooperative Agreement.

16. With regards to Key Personnel, will either the Water Engineer or Pastoral Community Development Specialist be expected to act as Project Director or can the applicant propose the best structure?

USAID/E Response: USAID will evaluate the proposals based on the "two key personnel" identified in the RFA. For project management and coordination, potential bidders can propose one of the key personnel as a Project Director or reasonable time (up to 20%) of an existing senior staff.

17. Can the Performance Monitoring Plan (PMP) be included as an attachment to the technical application and not be counted against the page limit?
USAID/E Response: Performance Monitoring Plan (PMP) can be considered as an attachment to the Technical Application which should be limited to 20 pages or less. However, Performance Monitoring Plan (PMP) information should be limited to three (3) pages. Please see Section I.5.1.5 of the RFA

18. Page 4, Section I.2 Submission – Please clarify if USAID requires only <u>one of the four</u> methods for submission: electronic, courier/hand delivery, via regular mail to US Postal Address, or Via Regular Mail to Local Postal Address?
USAID/E Response: The four methods for submission listed under Section I.2 of the RFA are list of alternatives. Please use one of the four methods.
19. Page 7, Section I.5.1.3. Technical Approach – Please clarify if biographical data sheets are required for Key Personnel as part of the proposal submission. If so, would they be submitted as annexes to the technical proposal?
USAID/E Response: Please submit resumes/biographical data sheets for Key Personnel as an attachment to the technical application. Please see Section I.5.1.7 of the RFA.
20. Page 7, Section I.5.1.3 Technical Approach – The RFA states that the technical approach must address personnel capabilities. However, the Evaluation/Selection

Criteria separates the Technical Approach from the Personnel section. Please clarify if personnel, including the Management and Staffing Plan, shall be addressed within the 20 pages of the Technical Approach or if they can be addressed in a separate section labeled Personnel?

USAID/E Response: Please address personnel experience and capabilities as well as management and staffing plan within the technical applications 20 pages limit.

21. Page 7, Section I.5.1.4 Institutional Capacity to Implement and Past Performance – Please clarify if there is a maximum number of Past Performance References preferred for the Applicant and partners? Will programs that have been completed in the past four years be considered?

    USAID/E Response: Please limit the maximum number of past performance to references to five (5) and these references should be for similar or related programs implemented over the past four years. See Section I.5.1.4 of the RFA.

22. Page 7 – There is no Section I.5.1.6. Please confirm if this was a technical error or if there is a missing section.

    USAID/E Response: There is no missing section. This was a technical error in numbering.

23. Page 7, Section I.5.1.7 Annexes: Resumes and Letters of Commitment – Will USAID accept annexes in addition to Resumes and Letters of Commitment (i.e. Partner Letters of Commitment, Letters of Support, etc.)?

    USAID/E Response: Partners letter of commitment and letters of support are acceptable.

24. Page 18, Section III.4. Personnel – The RFA states that "this will be evaluated through demonstrated capacity for technical leadership of the Project Director," however, this position is not listed as one of the Key Personnel in the preceding paragraph. Please clarify which positions will be considered Key.

    USAID/E Response: Refer response under Q 16.

ATTACHMENT: WASH Development Strategy Considerations for Somali Region

WASH Development Strategy Considerations
Somali Region
USAID Ethiopia Mission

December 16, 2009

WASH Development Strategy Considerations
Somali Region
USAID Ethiopia Mission

1. <u>Current status of water supply, sanitation and hygiene in the Somali Region:</u>

The Somali Regional State is about the size of Kenya and makes up nearly one-third of the total area of the Ethiopia. The population of the Somali Region is 4.4 million, with a very high percentage of the population engaging in a pastoralist lifestyle. Approximately 85% of the population lives in rural areas and 15% in cities and towns. Development in the Somali Region has lagged behind the rest of Ethiopia primarily due to it's relative ethnic isolation that effectively separates the Region's way of life from that of the rest of the country. Coupled with this isolation, insecurity has existed in the Region for many years as a result of civil war and related conflict. This insecurity has contributed further to the relative lack of development compared with highland regions of the country.

UNICEF statistics indicate that Ethiopia has extremely low water supply and sanitation coverages, definitely among the lowest coverages in the world. Statistics vary considerably depending on the source, but it's safe to say that access to safe water supply in Ethiopia as a whole is available to no more than 25% of the population, and adequate sanitation facilities are available to perhaps 10% of the population. (Access to water supply is defined by the World Health Organization as 20 liters per capita per day [Sphere 15 liters per capita per day] at a distance of 1-2 kilometers. Access to sanitation is defined in Sphere as a sanitary latrine within 50 meters of a dwelling and serving no more than 20 people.) The situation in the Somali Region is much worse than in Ethiopia as a whole – water supply and sanitation coverages are considerably lower than the overall coverages in the country. Also, the situation regarding water supply, sanitation and hygiene in urban areas is generally better than in rural areas, so even the above figures are optimistic for rural areas. In addition, the effective coverages are even lower because a substantial percentage of WASH facilities, probably 25%-33% are not functioning at any given time due to lack of proper operation and maintenance. (The Ethiopian government's Plan for Accelerated and Sustained Development to End Poverty [PASDEP] suggests a goal of reducing the number of non-functional systems from 30% to 10%. A UNICEF Fact Sheet indicates that 30-60% of existing water supply schemes are not functioning and many latrines are not in use.)

Drought seriously impacts the Somali Region nearly every year. Rainfall is erratic and unreliable. The rainy seasons in the southern portion of the region are from March to April (the Gu rains) and from September to November (the

Deyr rains). More northerly parts of the region such as Jijiga and Shinelle experience essentially the same rainfall regime as the highland areas of the country, i.e. Belg rains from February to May and Kirempt rains from June to September. Jijiga often benefits from the Deyr rains as well as the Belg and Kirempt rains. During the long dry seasons traditional sources of water supply in seasonal watercourses often disappear, and surface impoundments such as birkats become dry as well. In 2009 the international community spent upwards of $1.5 million on trucking water to drought impacted areas of the Somali Region, particularly areas dependent on birkats due to lack of groundwater availability or lack of groundwater development. Where adequate borehole supplies are available water trucking does not typically occur, in fact water is often trucked to dry areas from boreholes located at distances of 50 to 150 kilometers from the area in need of water. As discussed in the section on hydrogeology below as well as in the recommendations, in order to make a significant impact on water trucking in the Somali Region it is recommended that additional boreholes be drilled in strategic locations, and existing non-functional boreholes be repaired where feasible and the original cause of inoperability can be determined and corrected. There are significant untapped groundwater resources in the area, both in proven aquifers as well as in deeper aquifers that have not been adequately explored.

Water, sanitation and hygiene is also inadequate in schools and clinics. There is a tremendous need to improve this situation, and this report includes a recommendation to focus on twenty (20) alternative schools for the provision of WASH facilities with the idea of making a strong effort to work with school communities from the earliest stages of a project to ensure that operation and maintenance issues are properly addressed. If successful with program can be replicated in additional schools. Addressing clinic water supply, sanitation and hygiene is not recommended within the first year of development funding for the Somali Region, but may be considered for funding in future years.

Although adequate WASH facilities are more available in urban areas of the region than in rural areas, there is a tremendous need for improved facilities as well as hygiene promotion in cities and towns. The Ethiopian government has plans to address many of the deficiencies in larger cities and towns such as Jijiga and Gode. However, there are significant deficiencies in WASH facilities in these towns and work is proceeding at a relatively slow pace. Although funding for urban areas is not specifically recommended in this report, there may be opportunities for USAID to help address gaps in urban WASH development in the future.

Figure 1 below is a political map of the Somali Regional State.

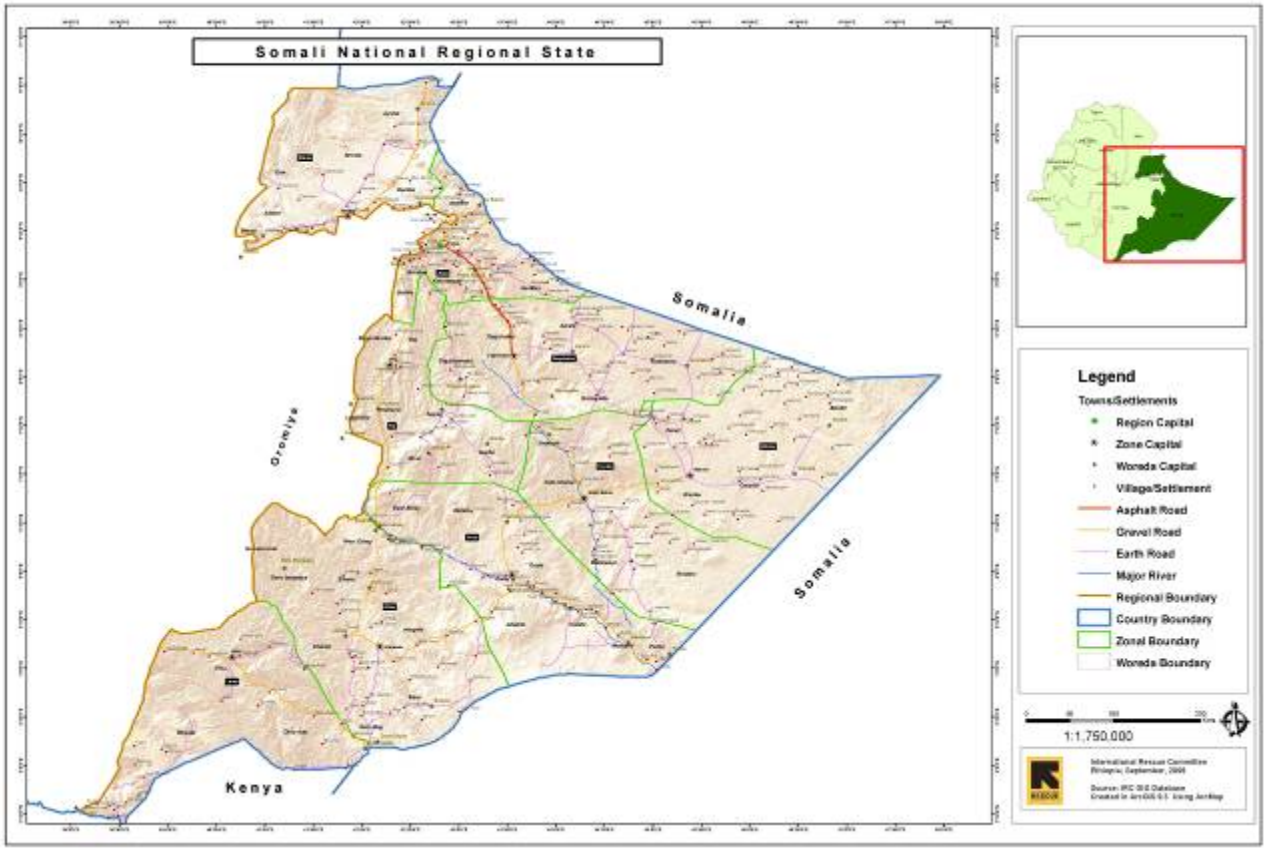

Figure 1

2. SPHERE considerations:

(See Figures 2, 3, and 4.)

The key issue to note here is that in Ethiopia families rarely use the Sphere Guideline of 15 liters per person per day. Even when more water is easily available such as at community tap stands from productive boreholes families typically take 2-3 twenty liter jerry cans per day. This amounts to up to 60 liters per family per day or about 7-10 liters per person per day. In the Somali Region this consumption is typically on the low side because of the even further distances women and girls usually have to travel to find water.

This distance to travel for water in Ethiopia of several hours a day or more – or even overnight in some extreme situations, is also outside of the Sphere guideline of water being 500 meters from home. This 500 meter guideline is also the distance allowed for travel in order for people to have access to an

improved water supply when considering the Millennium Development Goal of halving the number of people without access to safe water by the year 2015.

Therefore, in Ethiopia, even under normal conditions, the Sphere Guidelines for humanitarian water supply are not even close to being met. As mentioned in item 1 above, sanitation coverage is much lower than water coverage in the country, and both water and sanitation coverage are undoubtedly much lower in the Somali Region than in the rest of the country.

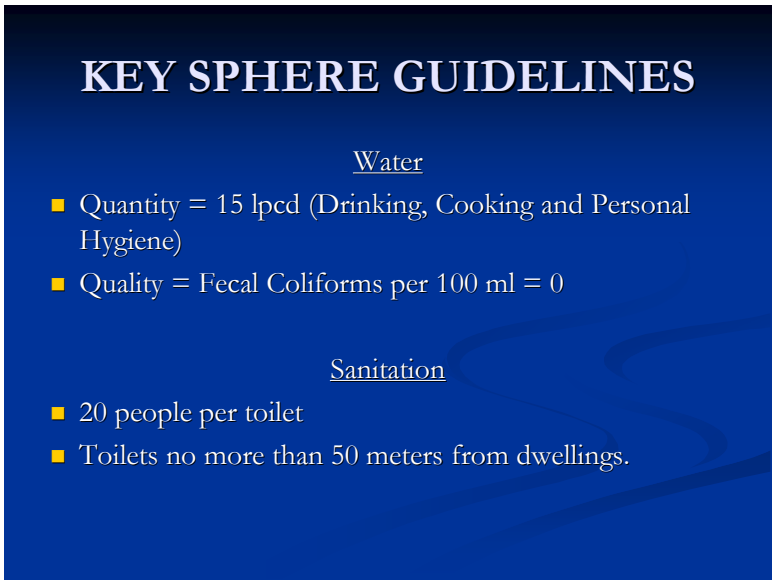

Figure 2

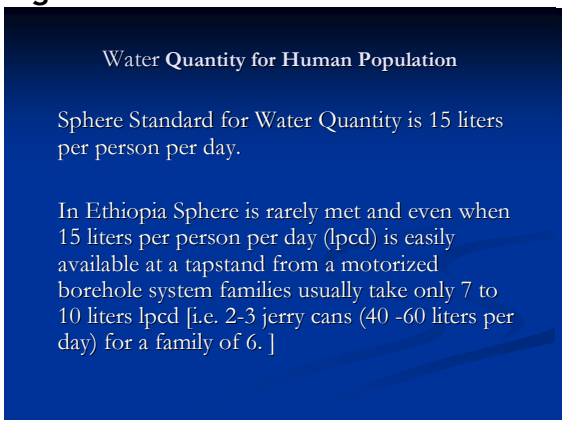

Figure 3

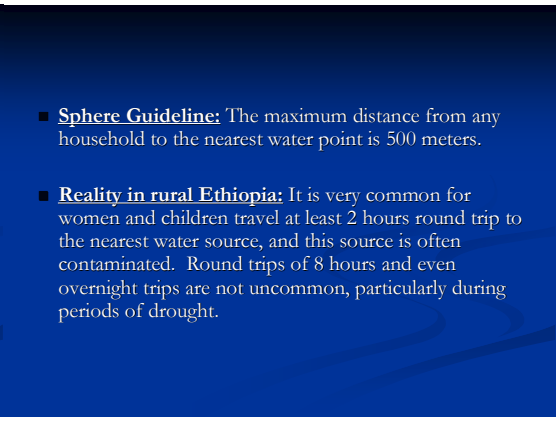

Figure 4

3. Current water supply practices:

Water supply in the Somali Region involves several prominent technologies: Traditional hand dug shallow wells, improved hand dug shallow wells, birkats, haffir dams and boreholes. In addition, rainwater harvesting is often employed for institutional water supply – i.e. schools and clinics.

Traditional hand dug shallow wells: (Photos 1 and 2)

This type of water sources is located in a streambed. A hole is dug in the streambed during the dry season and water is taken from the dry season base flow of the stream. The water is usually quite muddy and not safe to drink. Animals also have access to these water sources. Many development projects improve on these traditional sources by constructing a hand dug well with a hand pump just outside of the flow area of the stream.

Photo 1

Photo 2

Photos and 1 and 2. Women gathering water from unsafe traditional shallow wells -- Kebrabeyah. Traditional hand dug wells in the Jerer Valley of Kebrebeya Woreda. This water is found by digging down in stream beds during the dry season and taking water from the base flow beneath the streambed. This water source is unreliable throughout the dry season, and not safe from a public health standpoint.

Improved hand dug shallow wells: (Photos 3 and 4)

These sources provide a protected source through the installation of a hand pump. However, in the Somali Region evidence indicates that communities do not typically organize sufficiently or raise any funds to operate and maintain these relatively simple systems. When the hand pumps breakdown they are often not repaired. Many broken hand pumps were observed during field visits. Also, people of the Somali Region like to extract water at a faster rate than is possible with a hand pump, especially when transferring water to a trough for livestock watering. Some NGOs have decided to move away from hand pumps and leave the hand dug wells open so more people can take water simultaneous

and raise containers in and out of the open well at a faster rate than can be accomplished with a hand pump. Consequently, any advantage gained in providing safer water through the protection of a hand pump is compromised.

Photo 3 **Photo 4**

<u>Birkats:</u> (Photos 5, 6, 7 and 8)

Birkats are relatively small surface impoundments varying in capacity from 200 to 1500 cubic meters. They are normally concrete lined. Many birkats are privately owned and some are managed by water committees. Birkats have an interesting history of use in the Somali Region. Birkats were introduced in the 1950s. Formerly natural ponds had been in wide use, but birkats were a marked improvement which to some extent alleviated the constant scarcity of water and necessity of traveling long distances for water. They have been extremely useful in providing water during dry seasons, however they are often dry well before the dry season ends. The biggest drawback to birkats is that they are not providing a microbiologically safe water supply from a public health standpoint. Animals usually share the source with humans and there is not often any effort made to separate the water consumed by animals from the water consumed by humans. Some recent construction has included a cover for the birkat, however covers are primarily reducing evaporation of the water rather than providing any sort of protection against contamination. Birkats may also provide habitat for mosquito breeding. They have and will continue to provide substantial quantities of water for livestock. If humans are consuming water from birkats it is important that a very strong hygiene promotion program be conducted in the communities. Emphasis needs to be given to handling water safely in the home and treating water in the home. Birkats to not appear to be a solution to the serious concern with water trucking in the Somali Region during dry season. It is often in the areas dependent on birkats where water trucking operations must be targeted.

Photo 5

Photo 6

Photos 5 and 6. Goats gather at birkat near Kebrabeyah while woman collects water from the same unprotected birkat. This is not a safe water supply for human consumption.

Photos 7 and 8. Covered birkat with hand pump. Women collecting water with traditional goatskin bags of approximately 30 liter capacity. Covered birkat protects against evaporation of water, but is not totally protected from microbiological contamination.

Photo 7

Photo 8

Haffir dams: (Photos 9, 10 and 11)

Haffir dams are designed to impound large volumes of rainwater runoff from significantly large watersheds. Their capacities vary from 20,000 cubic meters up to 60,000 cubic meters. They can often be depended on to provide water through the dry seasons. They involve significant operation and maintenance costs, especially when employing features such a silt traps (which are a necessity) and transfer pipelines to isolate water for human consumption from locations where animals drink. They do not cost as much to operate and maintain as boreholes because the same fuel costs do not apply. It is slightly less expensive to build a haffir dam than it is to drill a deep borehole in the Somali Region, but their construction involves substantial complex earthwork so they are by no means simple to develop. They have been used to provide water for small scale irrigation needs which is potentially a very positive feature.

Haffir dams cannot be considered a source of safe water for human consumption, and in order for the water to be safe for drinking it should be treated. Home based water treatment solutions should be employed if families are drinking water from haffir dams. Although theoretically quite workable to separate livestock watering from locations where the human population collects their drinking water, in practice these activities are not separate in many situations. (See photos 10 and 11 below where women are collecting drinking water in the siltation basins of a haffir dam in the same location where animals are given water.) Haffir dams pose the potential problem of spreading livestock diseases and they provide potential mosquito breeding habitat. They also pose similar environmental concerns as have been noted for boreholes in pastoralist areas – i.e., the potential for increasing settlement and sedentary lifestyles with resultant degradation of pasture, and the potential for conflict. As in the case of borehole development these environmental concerns can be addressed through proper planning and consultation with clans and local communities -- success stories have been demonstrated in the Somali Region and haffir dams definitely have a positive role to play in the region. However, haffir dam construction is not recommended at this time for USAID Ethiopia's development funding.

Boreholes are a more attractive option to make a significant impact in the area, and are safer, more dependable water sources for human consumption. There are potentially untapped groundwater resources available in strategic locations within the region as discussed below.

Photos 9, 10 and 11. Haffir dam south of Jijiga constructed by Hope for the Horn. Although there is a design feature to allow water to be transferred from the main impoundment to a protected area for human consumption, this feature is not being used at present. Animals and humans are getting water from the same location – the siltation basin at the head of the main impoundment.

Photo 9

Photo 10

Photo 11

Rainwater harvesting:

(See photo of Roof Water collection system under School WASH Section).

Rainwater harvesting is used successfully in the region as water supply for institutions such as school and health facilities. This technology is recommended for water supply for alternative schools in the first phase of USAID's development program in the Somali Region. Many designers of these facilities have been providing standard sizing, and this is not appropriate. Each system needs to be designed based on the number of students in the school, or in the case of health facilities based on the staffing and patient load of the facility.

Boreholes: (Photos 12, 13 and 14)

Boreholes are discussed in greater detail in items 6-9 below and in the cover letter to this report. Repairing existing nonfunctional boreholes and drilling new boreholes in strategic locations are the primary recommendations of this consultancy. Development of community water systems with boreholes, community water storage and tap stand construction at key locations within a community has been quite successful in other regions of Ethiopia. There are also many successful boreholes currently operating in the Somali Region, however the high percentage of inoperable borehole systems is of concern. Sustainability issues must be adequately addressed before boreholes are developed. In order to have the greatest possible impact on the current reliance on water trucking in the Somali Region to many areas during the dry season, the development of productive boreholes appears to be the best available technology. There are areas within the region where the potential exists to develop boreholes at greater depth in previously untapped aquifers. Borehole development in pastoralist areas is considered to be a risky proposition with many potential problems and reasons for concern. Nevertheless, as discussed in item 10 below, these difficulties can be addressed with proper planning, environmental review and close consultation with the communities involved.

Photo 12 (Drilling Rig operating in West Hararghe).
Photo 13 (Generator House recently constructed by OXFAM in Shinelle Zone of Somali Region)

Photo 14 (Community tap stand) **(Photo by Jay Graham, USAID)**

Discussion of Water Supply Technologies:

Of the above technologies only improved hand dug shallow wells and boreholes provide what can be considered safe water supply from a public health standpoint. All of the other approaches involve open systems that are typically shared between humans and animals. Improved shallow hand dug wells involve the use of a hand pump which provides protection for the water source. Unfortunately, in the Somali Region it is difficult to keep hand pumps working. Communities do not seem to value hand pumps and once they malfunction and they are not usually repaired. In addition, in order to provide water for animals, Somali people prefer to take water from a source at a much faster rate than is available from a hand pump. Boreholes provide a substantial quantity of water, in a safe manner. They can also provide livestock water through troughs hygienically separated from tap stands where humans obtain their water. Borehole development in pastoralist areas must be very carefully planned, and boreholes should only be drilled when issues of environmental degradation, safe yield from the aquifer, potential conflict, and sustainability are adequately addressed. This is a challenge that must be met if water of sufficient quantity is to be provided to the people of the Somali Region, and if inroads are to be made in reducing the dependence of the population on water trucking during the dry season.

4. Water "earmark" funding issues:

Water "earmark" funding is to be used for water for human consumption. It should not be used for irrigation. There is no way around the fact that water supplies in the Somali Region will be shared to some extent by humans and animals. The Mission has been advised that this should not be an issue with the water "earmark", as long as the sources developed are envisioned primarily for human water supply. At tap stands constructed as part of motorized borehole systems, water troughs for animals are typically included as part of the design. There will be some use by animals with these systems and a charge will be levied on the water consumed by animals. Although many people will bring there animals to water at these troughs, especially during the dry season, the charge for animal watering naturally encourages herders to take their animals to other sources if available, even if at a considerable distance. These sources are typically surface sources and not suitable for human consumption.

5. Importance of animal herds to Somali livelihoods and animal water use:

As noted above, water sources in the Somali Region will be shared between humans and animals. This is a given considering the importance of animal husbandry to the livelihoods of the Somali people. Water consumption by animals exceeds consumption by humans in the Somali Region by a considerable margin. Typical water consumption for animals is shown in Figure 5. Figure 6 shows number of livestock in the Somali Region. These are "official" numbers and may not be entirely accurate. For example, a recent Household Economy study indicated that the number of camels may be 3 to 4 million, rather than 1 million as shown in the official numbers (Personal communication, John Graham, Program Advisor, USAID). Figure 7 shows numbers of livestock per family based on "Wealth Group". In the example shown in Figure 8, for a typical family, animals may consume four times as much water as humans.

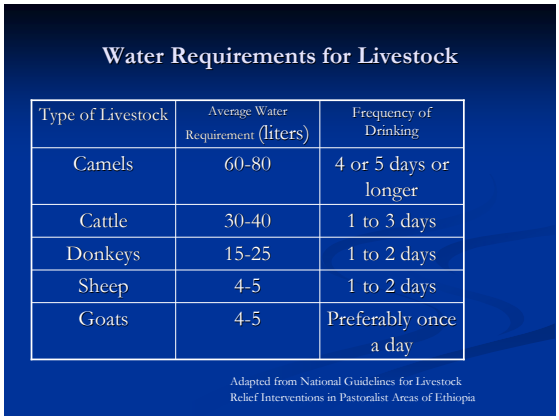

Figure 5

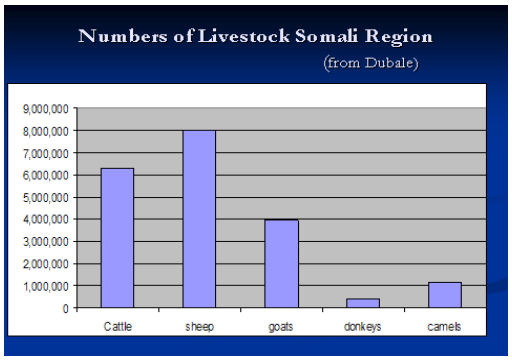

Figure 6

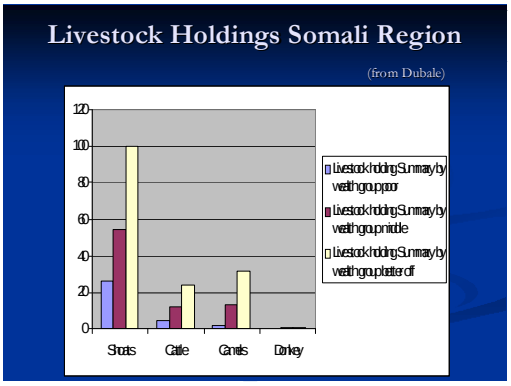

Figure 7

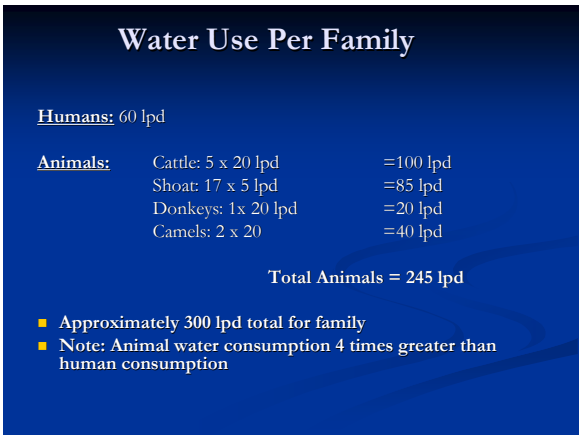

Figure 8

6. Water trucking in the Somali Region:

Each year a substantial amount of money is spent by the international community trucking water to areas where surface water sources and shallow wells become dry. In 2009, eighty water trucks with an average capacity of 10,000 liters were deployed by the Ethiopian government, UNICEF and various NGOs. This amounted to approximately 800,000 liters of water per day, and served approximately 160,000 people with a minimal 5 liters per person per day. (See Figure 9). The estimated cost of these trucking operations over a 60 day period is $1.3 million US Dollars, or approximately 0.027 USD per liter. For comparison, most borehole water supply systems in Ethiopia charge customers 0.25 Ethiopian Birr per 20 liters. This cost typically covers the cost of operation and maintenance, but not capital replacement costs. Nevertheless, for the purposes of a rough comparison, the approximate cost per liter for water from boreholes is 0.001 USD per liter. Thus, in this illustration the cost of trucked water is 27 times greater than the cost of borehole water. (See Figure 11). It should be noted that 4-5 good producing boreholes can produce the quantity of water trucked to the Somali Region in 2009. Not to imply that only 4-5 boreholes can eliminate all water trucking of course, because the areas where trucking is needed are widely separated throughout the region. However, for illustrative purposes it is clear that the actual amount of water needed to at least improve the trucking situation is not out of reach if strategic boreholes can be developed.

It should also be noted that the water trucking phenomenon in the Somali Region involves complex political and financial implications. There is a lot of money to be made by contractors and others involved in water trucking. So this must be taken into consideration when embarking on any program to reduce water trucking. Water trucking has become institutionalized in the region, and even where it proves feasible to improve the situation a certain amount of resistance to reducing trucking may be encountered from various elements.

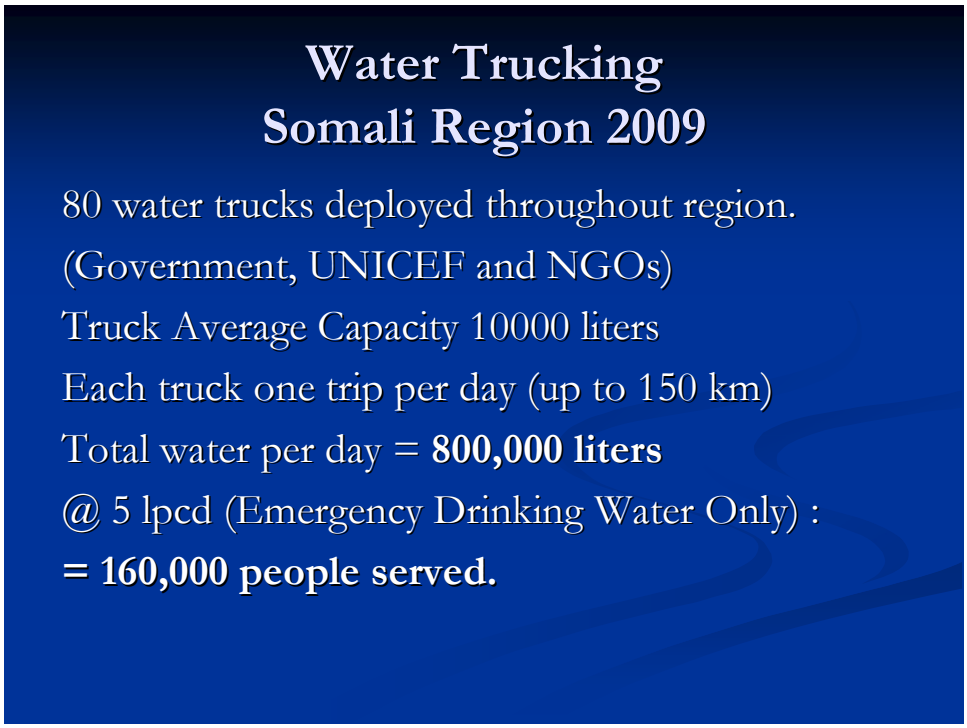

Figure 9

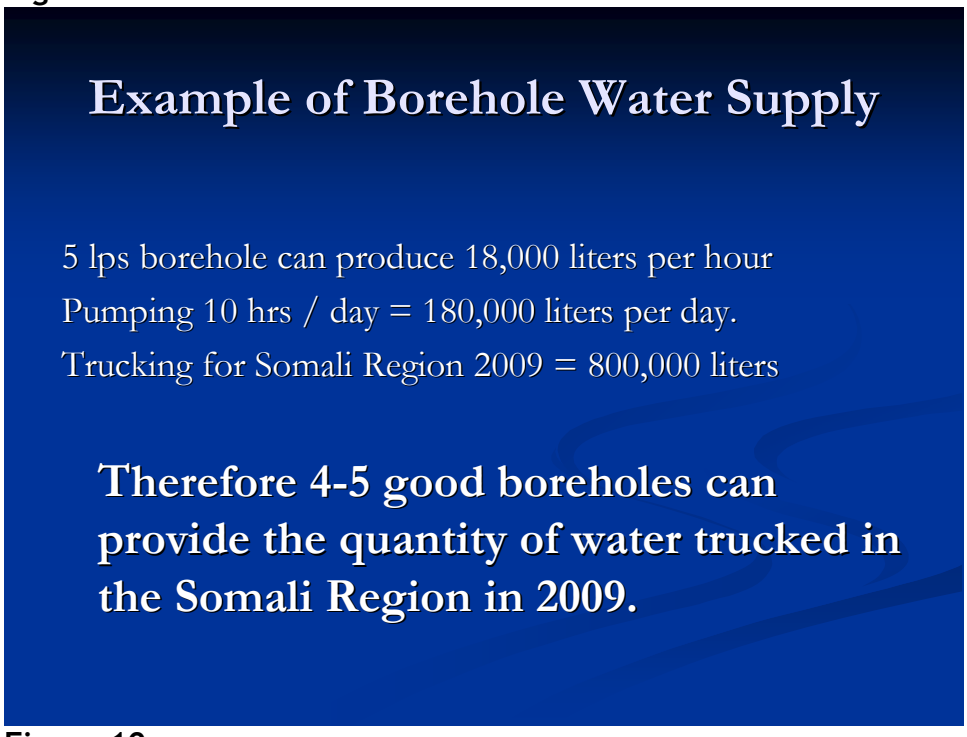

Figure 10

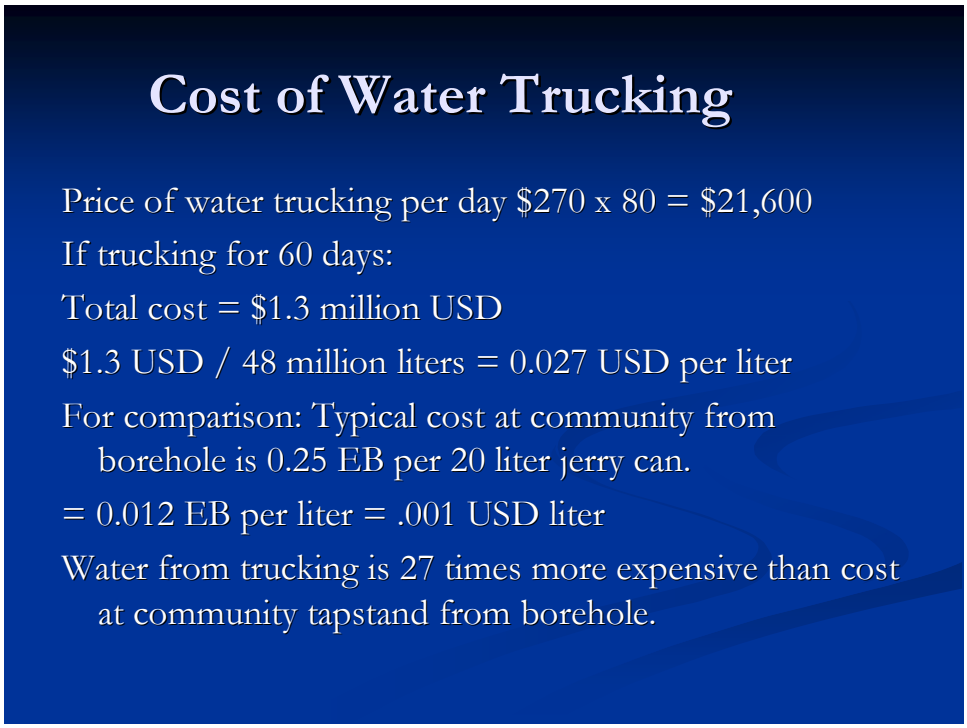

Figure 11

7. <u>Geohydrology of the Somali Region and Borehole Considerations:</u>

A complete discussion of the geohydrology of the Somali region is beyond the scope of this report, however for a thorough discussion of the subject refer to SHAAC Engineering and Consulting (2009), Hydrogeological Mapping Report, funded by UNICEF. The Ministry of Water Resources also has geohydrologists on staff, both in Addis Ababa and at the regional level who are knowledgeable regarding the hydrogeology of the Somali Region. The map shown in Figure 12 below as well as many other relevant maps are available in the above noted SHAAC report and should be consulted for detailed information on existing functional wells, inoperable wells, and groundwater potential in various areas of the region. Having studied SHAAC's comprehensive report and related material, I believe that there is excellent potential for drilling new wells in the region that will be of great benefit for drinking water supply, both in areas where existing wells have been successful as well as in areas where borehole development has not been successful to date because available drilling equipment has not allowed for development of deep aquifers in excess of 500 meters.

Of particular interest is the far eastern area along the Somali Border running from near Warder up towards Jijiga. There has been essentially no groundwater development in this area because the productive portion of the Jessoma Sandstone aquifer is quite deep, from 300 meters to perhaps more than 500 meters. This is a highly permeable sandstone formation and therefore groundwater percolates to the deeper portions of the formation. There are also

problems in drilling associated with collapsing sandstone that need be addressed using telescoping well casing. Up until now, well drilling rigs capable of drilling to sufficient depth have not been available in the region, but the government is in the process of purchasing several new rigs and they will have this capability. Drilling several test wells in this area with the guidance of a professional hydrogeologist will be very important to fully understanding the geology. If production wells can be successfully completed this will be a great achievement because this area is one of the areas most subject to drought where water trucking is needed on an annual basis.

There is also potential to drill some beneficial wells at much shallower depths running along the Jerer Valley south from Jijiga towards Degahabur. There are numerous successful boreholes in this area but there is still room to drill more wells without having any adverse impact on the aquifer. There are opportunities for additional borehole development in the Shinelle Zone as well. The density of wells in the Somali Region is not such that I would be concerned about aquifer depletion. The existing wells are not high production agricultural wells, but are only wells of modest capacity used for drinking water. Only in the area immediately north of Jijiga where a large well field supplies the city is there evidence of a potential adverse impact on the aquifer.

Borehole development in the southern portion of the Somali Region is problematic in some locations because of high salinity.

The above examples are only representative of the potential for groundwater development in the region. As the Mission moves forward with a borehole drilling program, site selection will need to be accomplished with direct input from a professional hydrogeologist. Communities will need to be involved from the outset and environmental issues will need to be thoroughly considered. Final site selection and drilling should only begin after all of the groundwork is laid so that potential for conflict and environmental degradation is minimized and sustainability issues have been addressed to the maximum extent possible.

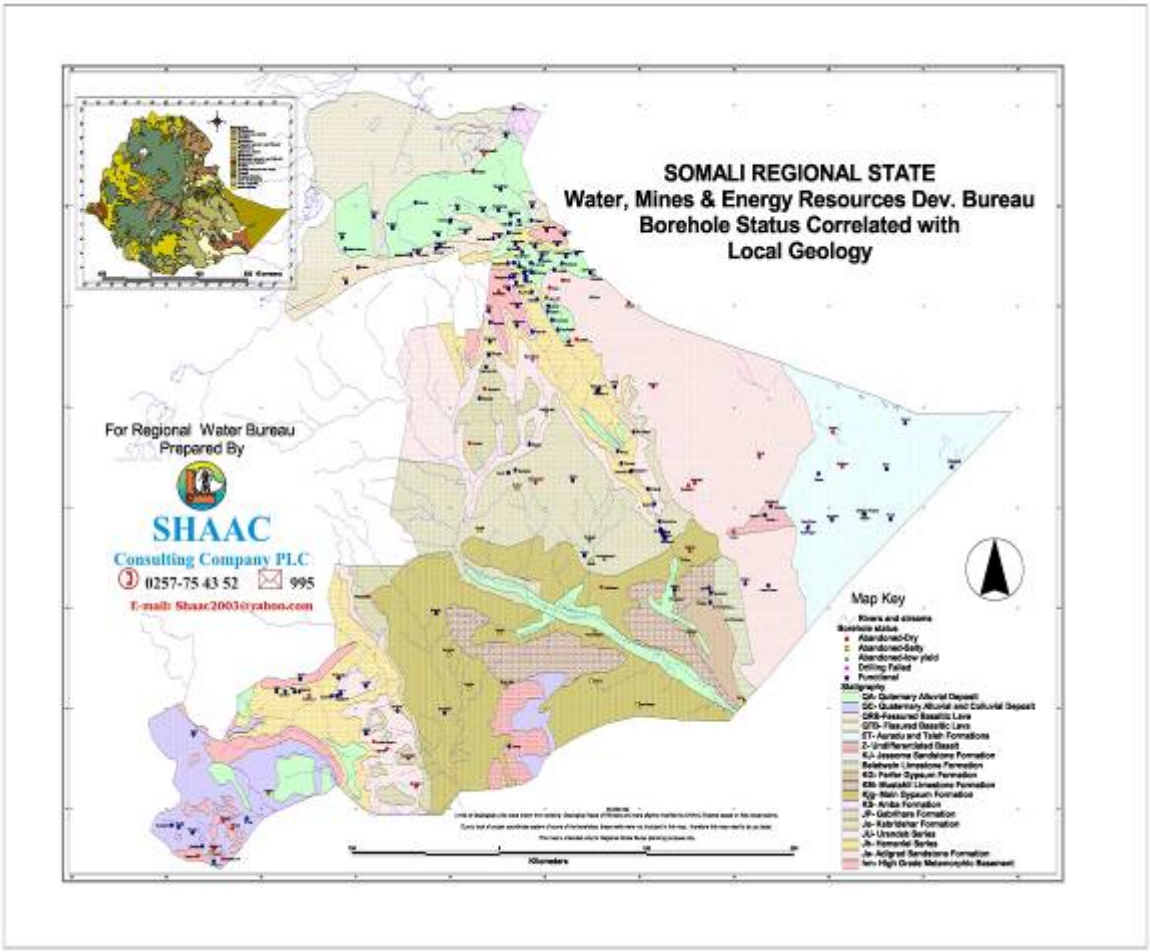

Figure 12

8. <u>Sustainability of boreholes and motorized community water supply</u>:

Regarding sustainability, this issue is of critical importance to the development of a borehole drilling and renovation program in the Somali Region. Although there is strong evidence that existing borehole supported water systems in Ethiopia are able to raise sufficient funds from user fees to purchase diesel fuel, pay operators, and make minor system repairs, they do not appear to be equipped at present to finance longer term capital costs. This has not been a serious issue during the early life of existing water systems, but will undoubtedly manifest itself later in the life cycle of more expensive components such as generators and pumps. Clearly, this needs to be addressed with communities in setting their user fees, as well as with the Ethiopian Government through capacity building and in determining the level of commitment they are willing to make to assist communities with larger capital expenditures. Nevertheless, the water supply needs are so critical in the Somali Region that development of new boreholes and renovation of existing boreholes

should move forward while issues related to financing longer term capital costs are addressed. See Parker J. and Birhane P. (2009) for an in depth discussion of sustainability of International Rescue Committee constructed borehole water supply systems. Although this paper does not ignore significant problems that have been encountered in promoting strong community water committees with successful operation and maintenance of water supply systems, the overall discussion in this report is encouraging.

In the context of rehabilitating existing boreholes it will be important to understand the cause of the borehole not being functional to begin with before undertaking a rehabilitation or renovation effort. It most cases it will be necessary to undertake a similar effort in working with the community in the management and operation/maintenance of the borehole to be renovated, as it does when a new borehole is being considered. Merely repairing an existing borehole that is not being properly managed by the community will not solve the problem.

9. Difficulties of borehole development in pastoralist areas:

In making the recommendation for drilling boreholes in the Somali Region careful consideration has been given to the well known concerns regarding this type of water development in pastoralist areas. The literature on the subject is very strong in its condemnation of such interventions because of the possibility of creating conflict among clans over resources, as well as the natural tendency for populations to become more settled around boreholes, ultimately degrading their grazing land. The most dire warnings suggest that such development may ultimately lead to collapse of the pastoralist lifestyle.

These warnings about water supply development in pastoralist areas need to be taken very seriously. However, in analyzing the impacts of borehole development in pastoralist areas, a great many researchers sound the warning but propose few if any solutions to the problem of water scarcity for large numbers of pastoralists. It makes sense not to consider the issue as an "either-or" proposition, where pastoralists are faced with either not enough water and consequent dependence on water trucking on an annual basis or a complete degradation of their resources and lifestyle. Preferably, a strong attempt can be made to approach the problem as a "both-and" proposition, in which communities can both be assisted in meeting their water needs, and at the same time efforts can be made to work closely with the communities within the framework of established environmental parameters to minimize conflict and potential impact on their land and lifestyles. Pastoralist communities have strong traditional systems governing land use and conflict resolution, and these communities should be challenged to bring these systems to bear on the issue of water scarcity and water supply development in the Somali Region. It must also be recognized that pastoralist populations in the Somali Region are undergoing changes to a certain extent due to increased population pressure

and an apparently changing moisture regime. There is some indication that certain pastoralist elements are becoming more settled, and in assisting these portions of the population the typical concerns regarding pastoralist borehole development must perhaps be viewed through a slightly different lens.

10. Sanitation and hygiene promotion:

As noted in item 1 above, sanitation and hygiene in the Somali Region are lagging behind the rest Ethiopia. Because of the severe need for water supply development in the region the only sanitation facilities recommended for construction at present are in schools. However, hygiene promotion should be conducted in all communities where project activities occur. Particular attention should be given to public health issues related to birkats and haffir dams located within these communities.

11. WASH in cities and towns: (See Photos 15-18)

I was able to make a fairly comprehensive tour of Jijiga, looking at the current water supply situation. Suffice to say that urban water supply, as exemplified by Jijiga town, needs a great deal of improvement. Gode, Degahabur and other towns have similar deficiencies. However, the government is addressing some of these needs at present. For example, in Jijiga some deteriorated pipelines have been replaced and new 200,000 cubic meter and 300,000 cubic meter water storage reservoirs are being constructed. Additional boreholes are also planned around the periphery of the town which is already dependent on 24 boreholes that must run 24 hours a day to pressurize the water system because at present there are essentially no water storage reservoirs to provide pressure. It is estimated that approximately 25% of the water pumped for Jijiga is lost to leakage. The piped water supply only cover 5,300 connections or approximately 40,000 population out of the total population of 250,000. Most of the town's population is dependent on water trucked to cisterns or purchased from water vendors using donkeys. This water is brought from boreholes or surface sources located outside the city. Gode's surface water treatment facility on the Wabe Shebele River is in need of an major upgrade. The city of Harar, though not in the Somali Region needs to connect several new boreholes to the city water supply. These boreholes were drilled by the U.S. military with the assistance of SHAAC consulting, but have not as yet been connected to the water system. These wells are only a few kilometers from Harar, much closer than the current water supply that is coming all the way from Dire Dawa, a distance of some 30 kilometers. There is also much to be done to improve urban sanitation and hygiene in the region.

Although urban water supply and sanitation is not recommended for action in the first phase of the USAID Ethiopia WASH development program, the Mission should strive to learn more about the needs and be prepared to fills gaps in the future.

Photo 15 (top left) – Water storage tank, 3000 cubic meters under construction, Jijiga.

Photo 16 (top right) – One of 24 boreholes located on the periphery of the town of Jijiga that provide the town's water supply.

Photo 17 (bottom left) – Existing water storage tank in Jijiga, constructed during the Derg regime for use at a military base. Drastically undersized for the town. The town is essentially without any water storage at present.

Photo 18 (bottom right) – Children collecting water at a Jijiga town well on the outskirts of town for sale in the city. Water purchase for 0.25 EB for 20 liters and sold in town for 1 EB for 20 liters.

12. <u>WASH in schools:</u> (Photos 19, 20 and 21)

According to UNICEF less than 10% of the schools in the Somali Region have adequate WASH facilities. UNICEF has decided to stop constructing school WASH facilities until a new program of proper preconstruction community mobilization, and a commitment to operation and maintenance of the facilities is ensured. For the first year USAID Ethiopia development program, water supply and sanitation facilities as well as hygiene promotion in 20 Alternative to Basic Education Schools linking with USAID's TEACH program are recommended. There needs to be a major change in how WASH is initiated in the schools. Early involvement of teachers, students and parents with a strong software package must be undertaken before any WASH facilities are constructed.

Photo 19 (left). School latrine facility - Legadini.
Photo 20 (top right). Rainwater harvesting water supply - Legadini
Photo 21. (bottom right). School at Legadini.

13. Alternative energy research:

Although the use of solar power for pumping at the depths of the deeper boreholes is not feasible, there is definitely a possibility that solar power can be used for more moderate pumping depths in Ethiopia. Ethiopia has excellent solar radiation nearly the year round and is well suited for use of solar technology. A solar industry exists in Ethiopia, but thus far has not been used to any significant degree in water pumping. Solar technology has been used very effectively in other countries – e.g. in the Internally Displaced Person (IDP) camps in Northern Uganda. Wind energy for pumping may be quite suitable for pumping from shallow wells to livestock ponds. Detailed research beyond the scope of this consultancy is needed on all aspects of alternative energy use for water pumping in Ethiopia.

References Consulted:

Andrew M. (1988) Grazing Impact in Relation to Livestock Watering Points. Trends in Ecology and Evolution Volume 3. No. 12.

Dubale A. (2006). Literature Review. The Contribution of Livestock Drinking Water Provision to Rangeland Degradation in Dry Lands. School of Agriculture and Forestry, UWB, Bangor.

ELMT/ELSE Newsletter, Volume No. 2, February 2009.

Federal Democratic Republic of Ethiopia (2001).
Ethiopia Water Sector Strategy. Ministry of Water Resources.

Federal Democratic Republic of Ethiopia (2004). National Sanitation Strategy.

Graham, Jay. (2009). Proposed Water, Sanitation and Hygiene (WaSH) Strategy for USAID Ethiopia. Office of Global Health, USAID Washington, D.C.

International Rescue Committee, Geographic Information System and Mapping Department. Various Maps of Somali Region.

James C., Landsberg J. and Morton S. (1999). Provision of Watering Points in the Australian Arid Zone: A Review of Effects on Biota. Journal of Arid Environments 41: pp. 87-121.

Ketema, A. (2009). Hydrogeological and Geophysical Studies for Water Development Gerbilla and Higlalye. Kebribeyah & Degahabur Districts of Somali Regional State. International Rescue Committee, Addis Ababa, Ethiopia.

Lautze, S., Aklilu, Y., Raven-Roberts, A., Young, H., Kebede, G. and Leaning, J. (2003). Risk and Vulnerability in Ethiopia: Learning from the Past, Responding to the Present, Preparing for the Future. A Report of the U.S. Agency for International Development. Feinstein International Famine Center and Inter-University Initiative on Humanitarian Studies & Field Practice.

Marieke A., Martine J., Belayneh B., Chaka S., Lema Z., Tamiru D. and Abebe, Z. (2008). RiPPLE Working Paper Number 7: The Costs and Benefits of Multiple Uses of Water. Research-inspired Policy and Practice Learning in Ethiopia and the Nile region, Addis Ababa, Ethiopia.

Michael, Y. (2002). An Impact Evaluation of Rain Harvesting and Sanitation Project in the Gashamo District of Somali Region, Ethiopia. International Rescue Committee, Addis Ababa, Ethiopia.

Michael, Y. Water Harvesting Technologies in Assuring Food Security.

Somaliland Cyberspace Website: http://inco-aida.cirad.fr

Ministry of Agriculture and Rural Development (2008). National Guidelines for Livestock Relief Interventions in Pastoralist Areas of Ethiopia, Federal Democratic Republic of Ethiopia, Addis Ababa.

Parker J. and Birhane P. (2009). Study of the Sustainability of Water Supply Systems in West Hararghe. International Rescue Committee, Addis Ababa, Ethiopia.

Sadler, K., Kerven, C., Calo, M., Manske, M. and Catley, A. (2009). Milk Matters: A literature review of pastoralist nutrition and programming responses. Feinstein International Center, Tufts University and Save the Children, Addis Ababa.

Sewell L. (2007). Water: A Participatory Assessment of IRC Ethiopia Water Projects in West Hararghe, Ethiopia. International Rescue Committee, Addis Ababa, Ethiopia.

SHAAC Engineering and Consulting, PLC (2009). Hydrogeological Mapping Report, Final Draft. Funded by UNICEF for Somali Regional State Water, Mines and Energy Resources Development Bureau.

UNICEF Ethiopia (2007). UNICEF Ethiopia's Water and Sanitation (WES) Programme. UNICEF Ethiopia Background Brief.

UNICEF Ethiopia (August 2009). WASH Report Cards: Babile, Awbare and Gursum Districts, Somali Region.

UNICEF Ethiopia, Somali Region (September 2009). Water Intervention Required, Available, Operational and Gaps by Zones and Woredas.

USAID Ethiopia Mission, BEAT Office. Livestock Holdings by Wealth Group: Provided by Dubale A.

Warner D., Abate, C. (2003). Guidelines for the Development of Small Scale Rural Water Supply and Sanitation Projects in Ethiopia. USAID Ethiopia Mission and Catholic Relief Services.