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ABSTRACT:

In general, the Horn of Africa countries (Djibouti , Eritrea , Ethiopia & Somalia) are arid or semi-arid with limited precipitation. Rainfall is extremely erratic and occurs in a few months of the year and within those months, it usually occurs in days causing devastating floods that are usually followed by drought (abundance versus scarcity).

For the rest of the year, the Region is dry and there are few perennial rivers when evapotranspiration is 2000 mm/year...annual rainfall ranges from 220mm in Djibouti to 848mm in Ethiopian highlands.

Additionally, available surveys show that the Region's water quality is poor due to human misuse and animal wastes. Conductivity, fluorides, salinity, dissolved solids etc. are high (conductivity upto 11,000 μ S/cm) and the few bacteriological total coliform screens available are >200/100ml mostly due to animal pollution (world standard zero) making present drinking water from lakes, wells, man-made catchments and springs unfit for direct human consumption.

Today, access to clean water in the Region is one of the lowest in the world, below 30% for urban areas and for rural communities which make over 60%, access spirals to fractions when access to sanitation is extremely low.

Consequently, many waterborne diseases are rife, endemic and epidemic in the Region raising the morbidity/mortality of the people and hundreds of thousands mostly children die yearly.

*Water scarcity therefore, is a major deterrent to sustainable socio-economic development; and meeting the **Millennium Development Goals**, (MDGs, whether on poverty, health, environment or hunger require action on water! **WorldWater Magazine** Feb. 2005), expressed in the International campaign, will certainly remain elusive unless "**a benevolent world community**" comes to the rescue!*

INTRODUCTION

The Horn of Africa countries of Djibouti , Eritrea , Ethiopia and Somalia are arid or semi-arid with limited rainfall, yet large amounts of water annually flood out to the sea. While some of this floodwater is necessary to flush salt and other harmful products out of the system, in many cases, floodwater is not fully utilized. This phenomenon is characterized in the Region where annual precipitation occurs only in few months of the year and within those months, it occurs in no more than an aggregate of few weeks. For the rest of the year, the Region is dry and there are few perennial rivers while evapotranspiration is estimated at 2000 mm per year.

Despite the sporadic and temporal distribution of precipitation of the Region, one way water supply can be controlled to match demand is through storage. This is true whether the demand is for natural processes or human need. In natural systems, precipitation may be intercepted by vegetation and temporarily stored on plant surfaces and on the soil surface....aridity of the Region does not favor this...when water infiltrates the ground, it is stored in the soil and may percolate to groundwater storage. On land, surface water is stored in watercourses and other water bodies.

However, with present technology, today man can create and enhance water storage by such activities as water conservation, tillage, constructing of dams and dikes to impound water and artificially recharge groundwater. And regardless of method or type of storage, the purpose is to capture excess rainwater and avail it at times of need.

And considering the large amounts of rainstorm runoff that flood out to the sea yearly, utilizing simple water storage technologies alone could significantly reduce water scarcity in the Region. And doing that could at least partially help the Region meet the Millennium Development Goals (MDGs), the target set by the UN, that call among other things, halving the number of people without safe water and halving those without sanitation by 2015.

WATER RESOURCES AVAILABILITY IN THE REGION

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In general, the Horn is considered freshwater scarce (<1000M³ per person per year FAO) with few perennial rivers, though available information is limited. And when it is available, it is scattered and needs enormous energy to gather. It is estimated that annual average rainfall of the Region is very low (except in the Ethiopian Highlands 884mm), while potential evapotranspiration is estimated to be 2000 mm/year.

According to EarthTrends Environmental Information/World Resources Institute, Djibouti's per capita (IRWR, 2001) is 460 M³, Eritrea's per capita (IRWR, 2001) is 701M³, Ethiopia's per capita (IRWR, 2001) is 1,666M³ and Somalia's per capita is (IRWR, 2001) 628 M³.

And according to FAO Water Report 23..."Review Of World Water Resources By Country", Horn of Africa 's Renewable Water Resources) can be roughly summarized as follows:

Country	Ethiopia	Djibouti	Eritrea	Somalia
Total Annual Renewable Freshwater (Km ³) Source: Population Action International Total 1995	110	2.3	8.8	13.5
FAO/AGLW model to assess IRWR ...(Km ³ /Y)	108.7	0.05	1.6	0.7
Source: FAO/AGLW model to assess IRWR (based on rainfall, evapotranspiration and calibration on flow measurement); Revision is by Jean Margat in 2001 & 2005; by IWMI 2000; and by FAO/AQUASTAT1995 and 1997. (With the exception of Ethiopia , national figures are much higher than those of the model). NB: Figures in FAO/AGLW model are oversimplified. Reported National Figures are much higher in most cases. Improving the model by nationals or experts is highly encouraged. Please send information to: Aquastat@fao.org				

The Region is prone to devastating droughts, followed by floods (the September 2006 Ethiopian floods a case in point) which often flush out junks of productive lands to the sea. Recurrent droughts often severely affect human and animal life that any sign of them are generally, received with fear and worry. In fact, the Region experiences different types of scarcities namely: (A) Natural water scarcity due to its unfavorable climate...the Region is generally arid or semi-arid; (B) Demographic scarcity because of its huge livestock populations which often pollute available resources (dirty water is similar to one that is not available) exacerbating scarcity and (C) Technical scarcity because of its low level of development. These problems are further compounded by the lack of financial resources, political turmoil and lack of trained manpower resources (the brain-drain problem). Consequently, water scarcity is a major deterrent to sustainable economic development in the whole Region

Because of lack of development, in the Horn where the majority of the people are agro-pastoralists or live in rural areas, access to water is limited to rainfall for both human and animal use and in most cases people have no access to safe water especially in dry seasons. When available, access is limited to only a small percent of the population mostly in urban areas. And for rural community, it is extremely low and non-existent. Access to sanitation is even worse.

In addition, due to the arid climatic condition, the Region is often hit by droughts and famine that are usually followed by torrential rain floods that devastate the Region. These problems are exacerbated by overgrazing, salinization and waterlogging all of which cause extensive soil damage. In addition, human activities have a damaging effect on the environment often worsening the situation exacerbating droughts and natural disasters.

In Somalia for instance, uncontrolled cutting of Acacia forest for the export of charcoal and firewood are badly damaging the rangelands...From 1997 to 2003, it is estimated that charcoal production has increased by 70%. Like in many parts of the Region, in the fertile lands of the south, soil erosion is extensive and has devastating impact on agricultural land. Erosion has also been accelerated due to land that has been left fallow. Persistent crop pests are common,

affecting quantity and quality of the harvest. High incidence of malaria and tuberculosis, which are the two main human diseases.... occur during the wet season.

In rural Horn of Africa, domestic water supply is derived from surface dams, shallow wells and springs. However, to meet the demands, the Region needs to utilize water-harvesting technologies. This can be done by capturing more water above the ground during the wet season and allowing it to percolate down into aquifers or store in dams and reservoirs and then pump it out to provide water in the dry season. Seasonal torrential rainfall, in catchments, which are often filled by one run off, could further water availability.

In urban areas water availability is occasionally enhanced by rainwater collection from house roofs made of tiles, slates, corrugated/galvanized iron and aluminum sheeting. So, it may be helpful to arrange down-pipes that would flush foul which can be diverted from the clear water container and collected to run waste.

In addition, fortunately, UN studies on groundwater show that there is sufficient quantity of water to cover the domestic needs of the whole population.... but governments must establish strong water management and conservation practices to further water availability while avoiding misuse of water sources that are heavily devastated by human and animal pollution. So, rural Horn of Africa's community mostly depends on four sources of water. The shallow wells, the open water holes, pools that hold rainwater, ...man-made water catchments and boreholes that serve most towns people. Most villages depend on rainwater storage tanks, sub-surface dams.

Today, livestock and agriculture, are the two major traditional socio-economic activities of the Region. In this Region where water is of vital importance, communities fight over access to land and water resources. However, development of water wells, dams and catchments is becoming increasingly common though provision of water sources must be carefully controlled because doing that may cause immense environmental degradation due to the potential influx of huge livestock that may expose topsoil making it susceptible to erosion after heavy rainfalls.

DROUGHT, WATER QUALITY AND THE HEALTH DIMENSION:

- Cloudless skies over the Horn of Africa are always a threat to the health and well-being of millions of people in the Region.
- Severe drought conditions plague the Horn: Eritrea, Ethiopia, Somalia and Djibouti ... where the difference between life and death can be decided by the weather.
- Widespread crop failures and political instability disrupt life, making a difficult situation worse. With no place to graze or water their livestock, farming families are forced to migrate in search of better land.
- As livestock perish, families are robbed of their primary source of food and income.

- Many are reduced to eating once a day and malnutrition reaches dangerous proportions, especially among children, the elderly, pregnant and nursing women....
- In rural Horn areas, women and children walk hours just to collect water.
- When available, people collect water from shallow, unprotected ponds which they share with animals or collect water from shallow wells. Both of these sources are subject to contamination as rain water washes waste from surrounding areas into the source.
- Women and girls carry large clay jugs of water back to their villages. These jugs can weigh up to 40 pounds!
- Often young children are left home by themselves while their mothers and older siblings collect water when their fathers tend to animals or try to earn money in jobs outside (19).

The causes of this gloomy scenario of the Horn of Africa are multiple: (A) Natural water scarcity due to its unfavorable climate of the Region; (B) Demographic scarcity because of its huge livestock populations which often pollute available resources, (dirty water is similar to one that is not available), and hence this exacerbates natural scarcity (C) Technical scarcity because of the Region's low level of development. These problems are further compounded by the lack of financial resources, political turmoil and lack of trained manpower.

In fact, available water sources are often polluted mostly due to misuse and discharge of wastes into waterways. Where proper sanitation facilities are lacking, water borne diseases are rampant, endemic and epidemic and often spread rapidly. This is because untreated excreta carries disease organisms wash or leach into freshwater resources contaminating drinking water and food....according to well-documented reports, one gram of feces of a healthy person is estimated to contain no less than 10,000,000 viruses, 1,000,000 bacteria, 1,000 parasitic cysts and 100 parasitic eggs.

For instance, it is unfortunate but common that, in the Region, sewage generated by houses and runoffs from pit latrines or septic tanks often wash into water sources reducing available water quality. This is because water, like blood, is subject to degradation and when we drink polluted water, we are building, over a period of time, the basis for sickness or diminished health. In fact, use of contaminated water gives rise to a myriad of waterborne diseases, creating epidemics. So, in the Region, diarrhea alone claims hundreds of thousands of deaths per year, mostly children as water quality and health go hand in hand. In fact, scientific studies show that water has a profound effect on our health because there is a relationship between the quantity and quality of water supplied and sanitation and human health. And according to a recent BBC report, "for many third people, water is still a deadly drink..." this Region's being first while according to Karin Strohecker of Reuters, worldwide, an estimated 4,000 children will die from unsafe drinking water and poor sanitation a day!

Today, according to UNDP Human Resources Development Report 2005, Horn of Africa water quality versus child mortality is as follows:

ACCESS TO CLEAN WATER VERSUS CHILD MORTALITY IN THE HORN OF AFRICA

Country	Latest Year On Record	Child Mortality before 5 th birth day
Ethiopia	2003	169 per 1,000
Eritrea	2003	85 per 1,000
Somalia	2003	225 per 1,000
Djibouti	2003	138 per 1,000

Source: UNDP Human Resources Development Report 2005

Moreover, according to EarthTrends International, the need for water and sanitation in is severe in the Horn of Africa. Only a tinny fraction of the population has access to an improved water supply and an even tinnier fraction of the population has access to adequate sanitation services. This fact is especially more pronounced in rural areas and there have been recurring droughts for the last 20 years which are often followed by food shortages.

Along with limited food supply, during times of drought water-related diseases are rampant. Surface water sources such as springs and ponds dry up. What limited water sources remain become are heavily contaminated by environmental waste, such as human and animal excreta which is washed in when the limited rains do come....stagnant water serves as a breeding place for mosquitoes.

In this Region, addition in to being at risk for people contracting diseases through drinking dirty water, there is another risk at times of drought. It is common that people do not get enough water to bathe regularly. As a result, people especially children, suffer from scabies and eye infections (trachoma) as hygienic practices dwindle simply because there is no water to combat.

MDG's CAMPAIGN TO IMPROVED WATER AND SANITATION COVERAGE OF THE HORN

Despite the 1980s International Decade of "providing safe drinking water and sanitation services for all mankind", the Horn of Africa, today has one of the lowest coverage in safe water and sanitation services and though it has made impressive achievements, provision of enough safe water for most of the people of the Horn of Africa remains elusive.

Today, few international projects in the Horn of Africa address water shortage problems or control of waterborne diseases. Improved, inexpensive and simple drinking water technologies must therefore, be made available if safe water and sanitation coverage for the Region is to improve and if the MDGs promises are to be at least partially met. Present safe water and sanitation coverage of the Region is as follows:

Improved Water & Sanitation Coverage for Horn of Africa Countries (WHO/UNICEF 2002)

Country	Improved Water Coverage				Sanitation Coverage	
	Live urban	Live rural	Urban covered	Rural covered	Urban covered	Rural covered

Djibouti	83%	17%	82%	67%	55%	27%
Eritrea	20%	80%	72%	54%	34%	3%
Ethiopia	15%	85%	81%	11%	19%	4%
Somalia	34%	66%	29%	27%	47%	14%

Source: WHO/UNICEF August 2004

According to UNICEF, access to safe drinking water is estimated by the percentage of the population using improved drinking water sources. Similarly, access to sanitary means of excreta disposal is estimated by the percentage of the population using improved sanitation facilities both of which have direct effect on human health.

So, in the Region, today, there is a high need: to build sustainable water supply systems in the urban and as well as in rural areas; to ensure access to both services for most vulnerable and poor members of communities; to carry out specific social mobilization campaigns such as hygiene education; to introduce hand-washing practices in schools and to train people learn how to safely store household water.

Additionally, there is need to support governments and local administrations in formulating policy on all domestic and related water supply sources; help improve the quality of planning, implementation and supervision of water and sanitation projects. There is need to help in all activities that should focus on rehabilitation and/or construction of water supply services, hygiene and sanitation services promotion.

Private sector investment and management of the water and sanitation sector must be encouraged; advocacy efforts and extensive community and local government levels must be further enhanced. On-site training on pump and generator maintenance must take place in all zones in conjunction with construction of new water sources and rehabilitation of old facilities. Likewise, there is a high need to provide latrine facilities for the communities in the Region and create technical teams who devise cost-effective ways of promoting behavior change. People must be trained on ways to improve personal hygiene, and environmental sanitation at the household and community level.

Training in the operation and maintenance of existing water sources and sanitation facilities can best be achieved by training school teachers in hygiene education by including sanitation and hygiene programs in the school curriculums. In other words, the Region's overall environmental sanitation and hygiene program must be given a priority.

In urban and peri-urban centers, sanitation tools (shovels, wheelbarrows, rakes and brooms) must be distributed to assist communities in cleaning up their environments. During the cholera 'season' (cholera outbreaks normally occur from December to June annually), there is need to provide disinfectants like chlorine to susceptible areas and train communities on how to prevent outbreaks....training school children would help spread the know-how of combating waterborne diseases.

In short, there is an absolute need to realize that international organizations provide resources and training programs and delegate indigenous community professionals to carry out projects themselves. ***This is because one major problem in most internationally financed projects is that a major part of project costs are consultation fees, expertise salaries and when, applicable financing services charges by the financing organizations.*** The international community should realize that Africa in general and the Horn of Africa in particular, are in no need of more loans simply because financial debts are already a major burden to the continent and Region causing devastatingly untold financial pains and suffering!

In conclusion, today, despite some encouraging signs, the Region is far from meeting the international humanitarian organizations' goal of delivering the promises of the Millennium Development Goals. Therefore, a far more ***Benevolent World Community***... a world community who should fund local projects by closely working with the private sector; community-based organizations and non-governmental organizations (NGOs), needs to come to the rescue. And only doing that could lift the Region from its current debilitating poverty; rampant water sanitation and water-related diseases and help achieve the provisions promulgated in the MDGs program.

SUMMARY

- Water is plenty in nature as the hydrosphere covers over 71% of the earth, less than 1% of freshwater is accessible for direct use.
- Unfortunately, the natural uneven distribution of water worldwide places the Horn of Africa at a disadvantage as its average annual rainfall is low with few perennial rivers.
- Horn of Africa is water scarce as the Region experiences different types of scarcities: (a) Natural water scarcity due to its unfavorable climate (b) Demographic scarcity because of its huge livestock populations (c) Technical scarcity because of its low level of development.
- Fortunately, according to UN studies, there is sufficient quantity of groundwater in most of the Region. With simple technologies, this can be exploited.
- In addition, the Region can establish rainwater harvesting techniques by catching more rainwater to replenish the ground...capture more water above the ground during the wet season and allowing it to percolate down into aquifers or store in dams and reservoirs and pump it out to provide water during the dry season.
- But safe water and sanitation services are lacking in the Region due to inadequate assessment and underdevelopment of water resources, lack of technical and institutional infrastructure as well as lack of investment in water resource development ...(UNEP).
- In any country or Region, though provision of safe water and sanitation services are among the most important determinants of public health, records show that few percentage in the Horn of Africa Region have access to clean water and almost none have access to sanitation.
- Today, use of contaminated water gives rise to waterborne diseases, creating epidemics. And diarrhea alone claims about 100,000...210,000 people mostly children....in 1998, 308,000 people died from wars in Africa; but more than 2 million died of diarrhea disease alone (a water-related disease).
- Lack of basic health services education, food supplies, shelter, water and sanitation services are leading to prevalence of preventable infectious diseases in the Region.
- Therefore, there is dire need to improve water quality, sanitation and personal hygiene which significantly can reduce the spread of many diseases.

- And finally, even though provision of good human health, safe water, sanitation, hygiene and education must be considered as basic human right.... achieving such rights remain elusive for those at the Horn of Africa!

SUGGESTIONS ON HOW TO OVERCOME WATER SCARCITY IN THE HORN

Water Scarcity In The Horn Of Africa Can Be Overcome By:

1. Developing comprehensive Regional master plans for sustainable water strategies for all basic human and livestock requirements
2. Exploring ways to acquire simple, inexpensive and effective technologies for the exploitation of groundwater
3. Establishing rainstorm runoff storage facilities such as dams, water catchments, reservoirs, while at the same time carefully preserving, national watersheds and the environment.
4. Promoting self-help reliance schemes in water development and water conservation programs at local and national levels
5. Protecting available water resources from animal and human pollution that wreak havoc to public health by polluting available supplies...20% of the children in the Region die before their 5th birthday and people suffer from parasitic infections from human and animal excreta wastes.
6. Fully utilizing urban water-harvesting techniques
7. Acquiring modern techniques to control livestock overpopulation
8. Prioritizing formulation policies and measures to insure adequate and clean water sanitation practices including the safe disposal of wastes and garbage are achieved in the Region.
9. Supplying good quality water to public and ward off waterborne diseases
10. Establishing massive, national training programs for both rural and urban communities and educate people on water conservation techniques
11. Raising community awareness of the role human, animal wastes and water scarcity play in the propagation of poor health. according to WHO, 80% of death and disease in Africa can be linked to water-related diseases.

12. Encouraging gender participation in community leadership especially in the communal water and sanitation sectors
13. Educating the public about the advantage of sound hygienic and sanitation practices so that they break away from their traditional habits.

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