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DELIVERING WATER, SANITATION AND HYGIENE SERVICES
IN AN UNCERTAIN ENVIRONMENT

Improving access to safe water for internally displaced persons (IDPs) in a fragile state, Somalia

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Delivering basic social service to most vulnerable people in fragile states is the ultimate challenge for both the international community and government institutions. Water service delivery is an inevitable necessity for human lives. Provision of water supply at Internally Displaced Persons (IDP) settlements has been implemented in several areas of Somalia in order to tackle with mobile populations, which consisted of majority of the population. Findings revealed that potable small scale water treatment systems using surface water were effective in a context of high population mobility. New flocculation technology, Poly-Glu, made by soy-bean in combination with chlorination worked well in the high turbidity water where only turbid surface water is available. Yet to address long-term sustainability, involvement of the private sector and capacity building initiatives are needed to maintain small-scale water treatment systems utilizing this new treatment method without external support.

Introduction

There is a multitude of uncertainty within fragile states. Several factors attribute to the uncertain condition such as prolonged conflict, weak institutional capacity in government structures, natural disasters and dire poverty. Unstable states are very fragile to be back to instable condition the country (UNEP, 2012). Inadequate capacity of government institutions creates a volatile environment and leads little and ineffective delivery of basic social services to the people on the ground. Studies have demonstrated that state fragility and basic social service delivery are inter-correlated with each other (Pavanello and Darcy, 2008).

Provision of water service is one of the crucial components to survive harsh environments. According to the Joint Monitoring Programme (JMP) report (WHO and UNICEF, 2010), the specific water target of the Millennium Development Goals (MDGs), which is achievable, is stated as follows; “Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation compared to 1990”. However, this is not the case within fragile states. Low-income fragile states progressed in rural water supply coverage by only 1%, with a decrease in coverage by 2% within urban water supplies (WSP, 2011). Current facts show that there requires considerable efforts to improve access to safe water in dire crisis areas. This paper presents emergency water provision initiatives in Somalia, where people are highly mobile due to the combination of human conflict and natural disasters, as well as nomadic movements. The paper includes lesson learnt, and suggests future water service delivery models for fragile states in order to transfer from emergency aid to development.

Background

The drought in the Horn of Africa, which has been declared a famine by the UN, has left four million people living in need of assistance (SOMALIA CAP 2012, UNOCHA, December 2011). It is estimated that 1.36 million Somalia’s are Internal Displaced Persons (IDPs) in their own country due to insecurity, fighting and drought (UNHCR, July 2012). According to the Food Security and Nutrition Analysis Unit (FSNAU) report from August 2012, about 800,000 IDP who are mainly living in urban or semi urban areas are within an emergency or crisis, and need humanitarian assistant. Although the Federal government was established in 2012, after a prolonged 21 year civil war, the capacity of the government structure to deliver basic service for its citizens is very limited, and the environment is still volatile within some areas. The climate in Somalia is arid and semi-arid, with estimated annual renewable fresh water resources of less than 1,000 m^3/person/year, it is extremely "water scarce" in Somalia (European Commission, 2007). Existing water sources are inadequate in regards to accessibility, quantity and quality for human and livestock consumption. Less than 20% of the population in rural and pastoralist communities have access to improved drinking water, while 45 % of the urban population has access to improved water sources, which are mainly in the form of piped or potable water. For the past two years, the consecutive lack of rain combined with poor water and available pasture in the rural areas have worsened the humanitarian situation. Along with consistently high temperatures, this has led to dried-up shallow wells and long water-trekking expeditions to reach existing boreholes. Access to and availability of safe water is critical, limited, and is a potential cause for both conflict and internal migration. A combination of reduced community coping mechanisms, and limited social service, causes many to migrate to IDP settlements in Mogadishu and border areas close to Ethiopia and Kenya where access to humanitarian assistance is more readily available. Severe water and pasture shortages in the north and coastal regions in Awdal and Nugaal valley, Bari and central regions of Mudug, Galgaduud and Hiraan have already led to significant migration of livestock and people affecting up to 50% of the pastoral settlements – who are now depending on humanitarian assistance and concentrating around limited water sources...

In the South Central regions, where most of the IDPs are concentrated particularly along the Juba and Shabelle rivers are regular seasonal outbreak of Acute Water Diarrhea (AWD) and is the epicentre of cholera endemic due to use of untreated water from the river and stagnating water after raining seasons.

The International Organization for Migration (IOM) in Somalia has been focused on provision of safe water for mobile populations, especially for Internal Displaced Persons (IDPs). IDPs have been forced to move out of their place of residence to seek accommodation and basic social services within and outside Somalia. The aim of water provision activities is to improve the health conditions of the mobile population (including IDPs), especially those affected by drought and Acute Watery Diarrhea (AWD), with particular focus on the most vulnerable populations, such as women, children, elderly and disabled persons.

Methodology

The IOM WASH strategy in Somalia is based on four action points, as follows:

1) Baseline assessment
2) Water provision
3) Capacity development and
4) Hygiene promotion

*Note: Baseline assessment and water provision activities are underscored in this paper to elaborate the background of target areas, populations and water provision activity.

Baseline assessment

The standpoint of the baseline assessment is pragmatic, and herein, mixing quantitative and qualitative methods was justified in order to source a broad variety of data. . The data was collected through sanitary surveys, water quality testing, household (HH) surveys, focus group discussions and key informant interviews to provide baseline data against current water quality, quantity and hygiene behavior, and to investigate linkage between water quality and risky hygiene practices. Random sampling technique was used to conduct household survey while snow-balling technique was applied in the key informant interview. Table 1 summarizes the information collected through the baseline assessment.

Water provision

Most of the international communities have supported water provision through groundwater development, such as construction and rehabilitation of boreholes and shallow wells. According to SWALIM/GTZ (2011), quality of groundwater, however, is not in compliance with WHO groundwater guidelines in terms of salinity and hardness, due to the fact that since geographically the gypsibs and calcium carbonate are prevailed and dissolve into the aquifer. Development of boreholes requires high technology, maintenance and extensive investment. On the other hand, only two permanent surface waters exist in the south central region, which are the Juba and Shabelle rivers originating from the highlands of Ethiopia. The quality of the

Table 1. Sampling Framework for baseline assessment

Category/ Assessment location	Somaliland, Burao	Puntland Garowe	Mogadish, Hamar Jajab
IDP settlement	Koosar	Shabelle & Jowle	Suwal, Ansaloti
Estimated population (HH)	2,742	2,000	2,833
Questionnaire household survey (HH) to IDPs	437	400	400
Focus Group Discussion (group) to IDPs	4	4	4
Key Informant Interview to local officials and NGOs	5	5	5
Water quality analysis (source)	53	56	66
Sanitary survey (source)	53	56	66

Picture 1. Three tank water treatment sstem in Afgoye, Somalia

water from these rivers is very poor due to high turbidity of more than <200 NTU, and dumping of waste material.

IOM Somalia has piloted to use new flocculation technology, called Poly-Glu (PGα21Ca), in combination with chlorination for high turbid river water. Poly-Glu is a multifunctional high molecule flocculants. Poly-Glu is made of organic cross-linked polyglutamic acid and inorganic substances such as calcium compounds. By using flocculation, it enables the effect of chlorination maximize in turbid water due to the fact that fine particles and suspended solids can impede disinfection. Comparative advantage of the Poly-Glu from the other available flocculants in the market is that the component material does not affect pH, flocculation speed is high, Poly-Glu can remove turbidity, fluoride and waste water contains no harmful substance so that the Poly-Glu can be easily used at household level to small scale community level. In collaboration with the private sector company Poly-Glu in Japan, IOM Somalia designed three water tank systems for simple water treatment in riverine areas to distribute considerable amounts of safe water to IDPs and host communities. This initiative meets Somalia WASH cluster guidelines of 7.5 liters per person per day under the IDPs setting, and is in line with the Sphere standard (UNOCHA, 2012 & Sphere 2011). The picture below shows one of the treatment systems constructed in Afgooye District, South Central region of Somalia.

The water tank system consists of 3 water tanks; first tank of $4m^3$ for flocculation using water flocculants (Poly-Glu), the second tank of $2m^3$ for chlorination, and the third tank of $2m^3$ for the clean and safe water.

River water is pumped to the water tank system via 10-600m pipelines depending on the locations of IDPs settlements. Eight dispensation taps have been connected to the third tank and provide the clean water to the recipient. It takes less than 1.5 hours for the whole process to take place.

Findings and discussions

Demographic characteristics of the IDPs

People who live in the targeted IDP settlements stay in dire conditions, as their personal daily income falls well below the poverty threshold of 1USD per person per day. Due to poverty and the crisis in Somalia, people were forced to move elsewhere and lost the opportunity to go to school, which resulted in very high illiteracy rate and female headed households. Table 2 shows the characteristics of the sampled respondents in the project target areas.

Table 2. Characteristics of the respondents

Characteristic/assessment location	Somaliland, Burao	Puntland Garowe	Mogadish, Hamar Jajab
IDP settlements	Koosar	Shabelle & Jowle	Suwal, Ansaloti
Sex	F:77%, M:23%	F:83%, M:17%	F:83%, M:17%
Average age	41 years old	43 years old	37 years old
Illiterate	87%	78%	76%
Average number of family members	7 persons	7 persons	7 persons
Population comprised of children under 5	29%	15%	29%
Proportion of female-heads	41%	65%	44%
Income per persons per day	USD0.40	USD0.30	USD0.30

Water quality testing

Fig.1 shows the results of bacteriological water quality testing of 167 different water sources where sampled respondents usually collect water for drinking purpose. Berkad is a traditional water storage and reservoir to keep water from water tracking and rain water where there is difficulty to access water. Sampling procedure was administered under WHO water quality guidelines. The samples were stored in cool storage boxes below 4℃, and transported to Nairobi within 5 hours from the sampling in Somalia.

It is notable from the figure that none of the water sources is totally free from fecal contamination. Even though the borehole with hand pump/mechanized pump is categorized as an improved water source in the JMP definition, contaminated boreholes numbered seven out of nine sources. Sanitary observation found that most of the water sources, where people use for domestic consumption and hygiene purpose were shared with livestock, which resulted in an increased exposure to animal excreta.

Although results of water quality analysis for chemical parameters showed that Nitrate, Nitrite, Manganese and Iron contents were within the WHO water quality guideline, the study found that the level of salinity and hardness in the sampled groundwater sources were not appropriate for drinking while high turbidity was found in sampled surface water.

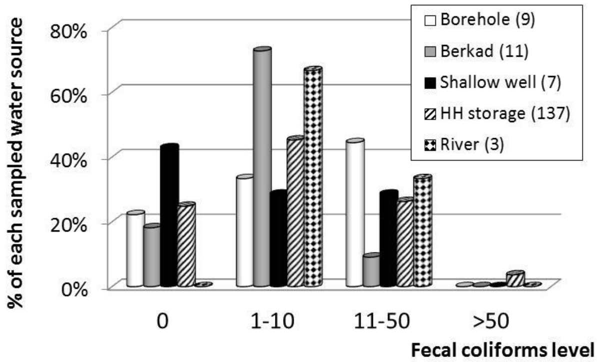

Figure 1. Result of bacteriological water quality

Three water tank water treatment system

In consultation with local governments, several water supply project sites have been identified as huge gaps between water supply and demand from IDPs and host communities. So far twelve three-water tank system was constructed in Mogadish, Afgooye and Dollow areas, and treated significant amount of clean and safe water was distributed to over 50,000 IDPs and the affected host communities every day. In general, raw river water contains over 200NTU, but after using Poly-Glu in the first tank and it disinfecting the water in the second chlorination tank, turbidity was decreased to less than 5NTU, which is in compliance with the WHO drinking water quality guideline (WHO, 2006). This water treatment system changed the lives of IDPs dramatically. Although no statistical data yet exists, the study found no reported diarrhea cases in the target settlements after the project started, where prior, 22% of respondents reported diarrhea in the last two weeks from the time of the baseline assessment in July 2012. This implied that the project contributed to improving the health conditions of IDPs, where people used to rely on untreated contaminated water. As indicated in Table 2, women and children represent the majority of the population within IDP settlements, and would need to fetch water where there is no proper water piping system established. Additionally these individuals would need to seek water at great distances, which has been associated to increased risk of rape on the way. Through the establishment of a static water treatment system, it enables women and children to collect water easily without fearing the risk of assault and attacks by wildlife near the river. The success of this intervention has proven that this potable system suits an environment where the harsh dynamics of population mobility, environmental change and conflict are prevalent.

Challenges and way forward

Some of the challenges were also found through the pilot project. First, design of the three tank system may need further improvement. Poly-Glu is required to be mixed in the tank for an initial 20 minutes so the sediment can become a solid, but the current structure is not feasible for a person to stand and mix the water properly due to the height and instable foothold. Secondly, awareness raising is an important activity for IDPs and host communities to understand the difference between clean water and safe water. Water can look very clean after using Poly-Glu, but it does not guarantee the water contains no germs. Third, the method of pumping should use renewable energy, as emergency aid will cease and such innovative initiatives should be sustained without external support. The modality may be operated and maintained by government institution, private sector or the community themselves. Considering the high costs of a diesel pump to deliver water from the river to the tanks, solar or wind power may be appropriate in the context of Somalia. Also, the supply chain of Poly-Glu needs to be taken into account for transforming from emergency aid to development. This project procured the Poly-Glu from Japan, and utilized by local NGOs in Somalia in partnership with IOM Somalia. One of the potential water service delivery models for development is to sell Poly-Glu at household level by private sector. For instance, a method in Bangladesh was to establish a ‘Poly-Glu lady’, who is a person that promotes using Poly-Glu and sells small packages from house-to-house, along with hygiene promotion If the current context in Somalia improves, water service delivery could be accelerated significantly.

Conclusions

Potable three tank water treatment system in Somalia worked well in terms of delivering quantity and quality water to IDPs and the affected host communities. Poly-Glu flocculation improved turbidity level dramatically without change of pH. Potable water treatment system can fit the environment where dynamics are uncertain and volatile. To be transferred from emergency response to the long-term development, strengthen the capacity of the government institution and private sector involvement could be inevitable steps to take.

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Note/s

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