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TOWARDS THE MILLENNIUM DEVELOPMENT GOALS

Innovative solutions for Watsan projects in conflict zones: Sudan

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THE SUDAN IS the largest country in Africa with total area of approximately 2,505,810 square kilometers and an estimated human population of 34,475,600.

The nearly 20 years of war in this country has had and will continue to have negative effects such as displacement of human population, destruction of infrastructure, retardation of natural resources development and undermining of the local production and coping mechanisms. Sudan is considered to be one of the poorest countries today. The main causes of mortality and morbidity in South Sudan are diarrhoeal and malarial diseases. Children under 5 years of age are particularly vulnerable.

Several assessment missions have shown that the main humanitarian needs of displaced people are access to potable water, improved sanitation/hygiene conditions and malaria control. (UN-WFP Annual needs assessment report Nov. 2002). The conflict has had major consequence on the provision of basic services to the Sudanese population. It is estimated that 5%-30%, and as low as 8% of the population (depending on the areas) has access to safe drinking water, and sanitation respectively. Limited access to clean water, coupled with poor hygiene and sanitation practices are a major cause of public health related diseases.

Most areas in South Sudan can only be accessed by air, in the absence of roads. Subsequently construction materials like cement, gravel and even sand have to be ferried in by air, (in most areas where they are not locally available) at very high costs. The other problem with air transport is that most of the airstrips are small and not accessible all year, whilst some are not big enough to land aircrafts that could carry bulk materials. Insecurity means that drilling rigs cannot remain on the ground for long periods, which substantially increases the cost of drilling each new borehole.

Solutions and Innovative Technological Developments

- **Hand Dug well construction** – In many regions of the world local communities have, since time immemorial, relied on shallow wells for their water needs. They are dug by hand, using only the simplest tools. Well liners (casings) are used to line walls of wells to prevent their caving in. Until recently two types of liners have been used. The quicker solution involved the use of galvanised corrugated iron sheets bolted together at the site. However, in the wet environment in wells, these sheets rust within a short time and wells collapse. The more involved alternative was to make concrete casing on site. Although a permanent solution, it can take up to several weeks to complete one well and it presupposes availability of steel moulds, all building materials and water for mixing and curing concrete. It also needs the services of at least one skilled mason per well to mix, place and cure the concrete in the moulds. These moulds, materials, skills and water are not always readily available, and if available their costs are prohibitive. To cut down on the cost of bulk imports, long lasting, lightweight rapidly assembled sectional polyethylene (plastic) and Fibreglass lining materials, with bolted-in (captive) nuts have been developed, and are being piloted on a small extent. The sections of the liners can be nested and flown in small aircrafts. They are lightweight, and can be pottered over long distances by beneficiaries.
- In areas where ground water level is between 5m-10m, shallow boreholes have been successfully drilled to average depths of 25m by hand drilling techniques with the 'Tanzania' Vonder Rig. A 10-man crew could drill these holes within 3 days.
- Latrine Construction: – Polyethylene plastic slabs strengthened with two GI pipes embedded into the slab have been developed, and are being used to facilitate take up of household latrines, in areas where sand, gravel and supervisory skills for construction are not readily available. The slab has it's own integral plinth or frame which is placed on the top of the pit, and therefore eliminating the need for the traditional brick stone or concrete plinth. The slabs are hygienic and easy to wash down and clean. It has moulded-in raised footrests and it slopes inward into the drop hole for efficient urine drainage. The slab can be moved easily when the pit gets full, and reinstalled at another location on the same day even by an unskilled person. Pre-fabricated plastic latrine huts (super structure) have been designed and constructed with lightweight materials that can get erected within an hour, very suitable for refugee camps. Appropriate 'marketing' strategies for promoting latrines along social lines, has helped in unlocking demand. This is a departure from most projects that try to encourage latrine construction/ usage purely on health grounds. With the marketing approach, the reasons why people prefer to use latrines are discovered and the promotion activities are based on the findings. Some common reasons given include, privacy, convenience and status symbol

- Hygiene Promotion: People affected by disasters are more likely to become ill and die from diseases related to inadequate sanitation and water supplies than from any other single cause, as suggested by Caincross and Feachem(1999). It must be stressed that benefits to improved water supplies can only be maximised with appropriate hygiene practices. A strong community focus is recognised as a successful approach for achieving sustainable changes in sanitation and hygiene related behaviours. Emphasis therefore should not be on training a select group of Hygiene Promoters or Volunteers, but involving the larger community, as this will avoid a situation whereby the project is seen to 'belong' to the promoters and not the entire community. Following Focus Group Discussions with the various segments of the community hygiene messages are developed to build on current positive practices. Behavioral change does not happen by just providing information that is missing and describing exactly what people must do. People must understand why their behaviours are 'risky' before accepting to change.

Challenges

- The drilling of boreholes though a viable option, could be very risky, due to insecurity, which subsequently leads to additional costs, as rigs cannot remain on ground for long periods of time. In most of the regions access roads do not exist so drilling equipment has to be flown in! There is general lack of data and information on geological/hydro-geological nature of underground rock strata. This results in very low success rates in most drilling programmes.
- There has been limited success achieved, with the polyethylene plastic liners. The coupling of the lining sections has to be carefully undertaken to make sure their vertical alignment is maintained. Some of the plastic lining sections have been observed to collapse under the weight of the surrounding soil. The thickness of the annular space between the liners and well walls has to be uniform and filled with gravel material to help stabilise it. The fibreglass liners though strong, and not liable to collapse are relatively more costly. The manufacturers are currently working on improving the plastic liners by introducing a metal ring to reinforce them.

  Problems associated with the weight of the concrete head works causing collapse of the liners have been reported. Proper construction practice to distribute the weight of the head works uniformly must be strictly observed and adhered to.
- Some communities do not accept the need to participate in hand dug well construction activities, in areas where this option is feasible. This is because some organisations have assisted their neighbouring communities with drilled boreholes. They claim it is time consuming and sometimes due to lack of food, the people are too weak to carry out the digging.
- In conflict zones where people are constantly displaced from their communities, setting up the 3-tier operation and maintenance system in line with the Village Level Operation and Maintenance (VLOM) concept is very difficult. In most of these areas there are no market economies or clearly defined structures of administration, so setting up this system is a hard task. To achieve a sustainable operation and maintenance system for hand pumps in such communities, each water point constructed has at least two people trained as village based mechanics, responsible for the operation and routine maintenance of pumps. They are provided with a tool kit and a set of fast moving spares.
- To ensure a reliable supply chain for pump spares, zonal spare depots are established with local authorities responsible for storage and distribution, in the absence of defined government/administrative institutions. Parts are sourced from neighbouring countries. Due to the remoteness of some communities, people have to walk on foot for 3-4 days to report pump breakdowns and request for spares. In some relatively stable areas, communities do contribute cash towards the part and/ or repairs if the work undertaken is beyond the skills of the village based mechanics.
- For the agencies implementing WatSan activities in South Sudan, there are a couple of difficulties they grapple with. Funding has increasingly become a limiting factor to the number of water points that could be put in place. There is increase donor fatigue in addition being a lingering conflict, it is generally considered to be a "forgotten crises".

  Most donors give priority to food and primary health care compared to the provision of water. It is common knowledge however that the benefits of improved health can only be maximised if there is potable water.

Conclusion

Conflicts by their nature have major consequences especially on the provision of basic services to the affected populations. Studies have indicated that people affected by disasters are more likely to become ill and die from diseases related to inadequate sanitation and water supplies than from any other single cause.

The provision of water supply and sanitation facilities including promotion of safe hygiene practices in these areas has continued to be a huge challenge to aid agencies. Constraints posed by insecurity, non-availability of local construction materials, and particularly the high costs of flying in supplies and rigs, with this being the only option for transport, has led to the development of innovative lightweight plastic liners and latrine slabs for the construction of hand dug wells and latrines respectively.

The establishment of operation and maintenance systems, for hand pumps is a challenge, in view of the constant movement/displacement of people. Monitoring indicators and impact therefore becoming difficult to undertake.

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