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WATER AND SANITATION FOR ALL: PARTNERSHIPS AND INNOVATIONS

Emergency water supplies for transient populations

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IN 1994 THE civil war between Hutus and Tutsis in Rwanda caused 700 thousand Hutu refugees to flee to Goma in E Zaire and a similar number to NW Tanzania. They had been living in refugee camps until November 1996 when fighting between rival groups in Eastern Zaire caused them to return to Rwanda. Although a repatriation had been anticipated by humanitarian organisations working in the area, nobody expected the scale of the sudden mass movement of people which commenced on 16th November. Preparations had been put in place, but a repatriation on this scale had never been seen before, resulting in Non Governmental Humanitarian Organisations (NGOs) being unprepared for the number of people involved. Close co-operation was therefore required between these NGOs and the United Nations High Commissioner for Refugees (UNHCR) to provide water and sanitation supplies to facilitate the return home of this transient population.

This paper discusses the strategy that these agencies adopted following the start of the refugees' walk to their homes in Rwanda. It also explains the problems that were encountered and the lessons learnt, which assisted the planning and implementation of a similar operation to supply water to the refugees who returned from the camps in Tanzania a month later.

The UNHCR definition of a refugee is "a person who is outside his country of origin and who, due to a well found fear of persecution is unable or unwilling to avail himself of that country's protection" (UNHCR 1982). Throughout this paper the term refugee has been used to describe a person who has left a foreign country to return to their original country of residence.

Strategy

The provision of water to the refugees was co-ordinated by the UNHCR with their implementing partners; Oxfam, Medicins sans Frontieres (MSF), Trocaire and Italian Co-operation (COOPI). Trocaire had been preparing a transit centre at the Zaire/Rwanda border near Gisenyi over the preceding weeks and COOPI had undertaken a similar task at Nkamira. These organisations remained responsible for water supply at each of these centres while MSF and Oxfam prepared water supply points on the road between Gisenyi and Kigali via Ruhengari. The general strategy was to provide water points along the roadside at 5 - 8 km intervals, which consisted of a storage tank of between 10 and 30 m^3 capacity and a tapstand(s) with 6 or 12 taps. The interval was reduced in particularly arduous areas such as steep terrain and increased in easy walking areas. Where possible water points were connected and supplied by existing water systems such as gravity fed water from captured springs. In other areas water points were supplied by water tankers provided by the implementing partners and filled from emergency and permanent water treatment works along the route.

There were discussions within the group on the quantity of water which the implementing partners should provide following requests from UNHCR to provide a minimum of 15 litres per person per day (UNHCR 1982). It was agreed that, as the refugees were moving, a target of between 5 and 10 litres would be more appropriate (UNHCR 1992). Although these targets were set it was impossible to measure if they were achieved; a more acceptable measure of success would have been to ensure that each water point permanently had a store of water.

Figure 1. Africa

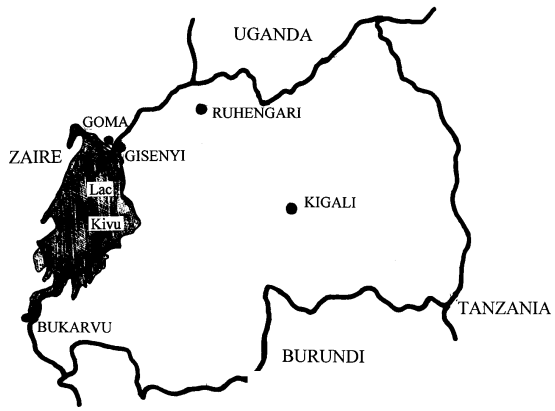

Figure 2. Rwanda

Following the start of the repatriation it rapidly became apparent that the Rwandan authorities would not allow large numbers of people to congregate in one area, resulting in the frequent forcible emptying of the transit centres (resting areas). These centres had large water storage capacities (70 - 100 m^3) which were connected to a piped supply initially became redundant and a wasted resource. More use was made of this resource when pipes were laid to service new tapstands outside the transit centres along the roadside. The refugees were also prevented from leaving the main road unless they had reached their home commune. This made existing water points or taps more than 50 metres from the road, highlighted in the initial assessments, redundant. More water points supplied by water trucks were therefore required.

Where water points were not connected to an existing system they were supplied by a fleet of water tankers with combined capacity of 90m^3. This low capacity was acceptable due to the number of water points connected to existing systems. The tankers consisted of a mixture of cleaned petrol tankers and flat bed trucks with bladder tanks mounted on the back. Large pumps with a capacity of 30 litres/s were set up at water treatment plants for rapid loading while truck mounted pumps of 7 litre/s capacity were used to discharge at the water points. As the authorities were keen to move the refugees to their home communes as quickly as possible they commandeered any vehicle larger than a Land Rover to move people. This often resulted in the flat bed trucks being commandeered to transport people, further reducing the trucking capacity.

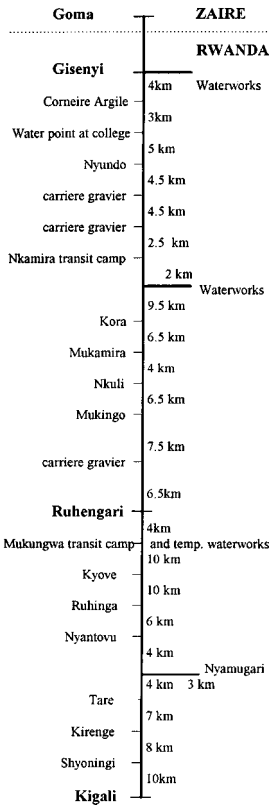

Figure 1. Water points for the Goma repatriation

As the refugees were permanently moving the water demand constantly varied at each water point. This resulted in some tankers being used as mobile water points. While existing opinion is that water tankers should only be used to transport water from a supply to a storage tank (Davis J and Lambert B 1995 and others) this assumes that the location of the demand is static and in general the transport is from one supply to a central piped distribution network. Two tankers were fitted with a tap bar on the back of the truck with 6 or 8 taps. Drivers were instructed to deliver water to the water points but if they were prevented by the number of people on the road they should stop and open the valve on the tap bar to supply water directly from the tanker until they were able to proceed down the road.

Water and sanitation review

After the majority of refugees had returned from Goma the watsan (water and sanitation) implementing partners and UNHCR held a review to discuss successful actions and lessons learnt.

Due to the lack of a secondary road network in NW Rwanda the water trucks were forced to travel along the main road being used by the refugees. During the main influx the road became too congested with people to be used by vehicles, preventing the trucks from travelling between approximately 8am and 4 pm (it took 2 hours for a truck to travel 2km near Nkamira during the main influx). This resulted in water points with lower capacities running dry by mid-afternoon. Areas which are likely to be difficult to reach if an alternative route is not available should be provided with larger water storage capacities and filled early in the morning or late in the afternoon.

It was agreed that one person should control all water tankers to achieve effective co-ordination due to the number of collection and delivery points. It is essential that this person and all the truck drivers have a VHF radio and desirable that radio communication with treatment plants and major water points is also available. This person should pay careful consideration to the deployment routes of flat bed water trucks if they are likely to be requisitioned.

Once the refugees started returning from Goma there was little time available to prepare water points for deployment. Oxfam and MSF utilised equipment packed in kit form (MSF 1992, Luff 1997). However, for both organisations a water point consisted of at least a couple of kits, plus some additional pipes and fittings. Towards the end of the initial influx both organisations were often searching in their stores for additional fittings that were required to complete a water point. In order to improve the deployment of water points NGO field stores should be prepared with 'bundles' of water points, consisting of all kits and items necessary to provide a 10 m^3 or 30 m^3 water point. This preparation would allow field staff to rapidly collect

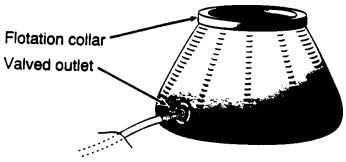

Figure 4. A flexible 'onion' tank

and deploy a water point from the store. It was pointed out that, if rapid deployment was necessary, a number of these water point 'bundles' could be distributed on a truck, with a guard for each point. A vehicle of technicians could then follow behind to set-up and install the equipment.

Due to the rate of influx it was felt during the review that the large Oxfam metal tanks (Luff 1997) were unsuitable for use at water points, unless prepositioned in advance, due to the set up time required. Bladder tanks and Oxfam 'onion' tanks with a capacity of between $10m^3$ and $30m^3$ proved to be the most practical. Any tanks with a capacity of less than $10m^3$ were unsuitable for water points which required trucking due the frequency of visits required. However, down to $5m^3$ they were useful at water points fed by gravity from capped springs as, at times, the demand was greater than the supply flow.

When the refugees fled Zaire they had very few possessions due to looting by retreating soldiers and the speed with which they left. Apart from the plastic sheeting from their camps each family generally had one or two 20 litre jerry cans which had been provided by NGOs in the camps during the previous 2 years. These jerry cans were carried by people of all ages from 5 years old upwards. While these size jerry cans may be ideal in refugee camps, were water only has to be carried a few hundred metres, they proved unsuitable, especially for children, on the long walk. Due to the spacing of the water points it would have been sufficient to carry approximately 5 litres of water for two people. Small jerry cans of 5 litre capacity were therefore urgently needed to be provided to the refugees returning from Goma.

During the Goma repatriation the refugees had no indication of the distances between water points, which resulted in many of them carrying an unnecessary large quantity of water and only filling their jerry cans at every second water point. It was therefore agreed that signs should be prepared in Swahili and Kinyarwanda (or the local language) and positioned at each water point indicating the distance to the next.

Tanzanian repatriation

Following the watsan review of the Goma repatriation, 'bundles' of water points were prepared before the major influx of refugees from Tanzania. As the repatriation did not occur at the rate witnessed in NW Rwanda, rapid deployment of water points was not necessary. However, the preparation of water points in the stores highlighted item shortages before they were required to be deployed

As a secondary road network existed in SE Rwanda the water trucks were able to bypass 'human bottlenecks' on the main roads and continue delivering water. In areas where a suitable secondary route did not exist larger water storage capacities of 30 m^3 were provided and only supplied by large tankers (25 m^3) in the morning and afternoon.

The idea of mobile water points was refined in the Tanzanian repatriation with some water tankers carrying tapstands and connecting pipework. The refugee transportation pick-up and set-down points, where there was the highest demand for water, changed by the hour over a period of about a week. The water tankers equipped with tapstands were able to move to these new locations and immediately supply water. They supplied their tapstands by gravity, the tank being high enough on the chassis to deliver all the water at sufficient head.

The availability of radios at all the water treatment plants and in the majority of the water tankers resulted in a faster tanker turn around, a more efficient deployment of mobile water points and fewer static water points running out of water.

During the Tanzanian repatriation and return of refugees from the forests surrounding Bukarvu, south of Goma collapsible 10 litre jerry cans were handed out to refugees passing along the road at some feeding stations along with high energy biscuits. Although the collapsible containers were generally handed out empty, some were filled and oral rehydration salts (ORS) added. These containers were handed out to people who were identified as suffering from dehydration. The fact that the cans were supplied collapsed allowed one pick-up working in the Bukarvu area to leave the field base and fill up limited numbers of cans with water and ORS, as required, to be handed out to people as they joined the road from the forests without having to return to base during the day. In areas where there was a high incidence of dehydration local Red Cross staff were employed at each water point to prepare barrels of ORS and hand out measured quantities to people as they passed.

Signs were prepared in Swahili and Kinyarwanda, along with simple drawings, and positioned at each water point indicating the distance to the next. These signs proved very

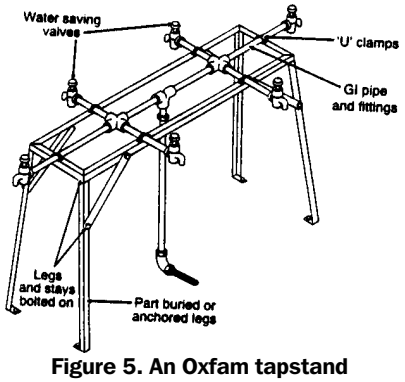

Figure 5. An Oxfam tapstand

effective in reducing the quantity of water that the refugees carried. Similar signs were also successful in dissuading people from taking water from untreated/polluted sources when they were aware that a water point was a short distance down the road.

Lessons Learnt

Additional implementing agencies assisting in the Tanzanian repatriation, where there was a longer lead time to procure suitable water trucks, had neglected to address the issues of loading and discharging water. This resulted in some trucks being inefficient or causing delays at the water treatment works as they had no truck mounted pump. In the worst case one truck with a low mounted tank was unable to deliver water into the majority of water storage tanks. In future operations all water trucks should carry a small pump capable of loading and discharging water from its tank.

The collapsible jerry cans distributed during the had a number of advantages over the 'traditional' 20 litre jerry cans:

- They were not as bulky as the 20 litre containers which made them easier to carry by young children
- If they were only half filled their volume was only 5 litres which also made carrying easier
- As they were supplied collapsed a large number could be transported on each delivery trip. (e.g. A Land Cruiser pick-up could carry 1000 containers in two packing crates rather than 80-100 rigid 20 litre cans.)

The disadvantage of these collapsible jerry cans is that they are not as durable as a rigid container, probably only lasting a few weeks or months rather than a year or two. However, for the walking phase of the repatriation the distribution of small containers to as many people as possible was the primary objective. The working life of the container after the repatriation was not important.

As these water containers were viewed as a vital commodity, even when empty, scuffles and even fights could break out where they were handed out. The most effective distribution points with the least disturbances were near the top of a long rise, when the refugees were more spread out and walking slowly. If people arrived faster than the cans could be distributed it was easier to arrange for a queuing system to be formed in these locations than in flatter areas.

Although these signs reduced the amount of water carried and evened the refugees' demand along the road, they highlighted the areas where a large proportion of water was being taken by the local population. In these instances the emergency water point was located nearer to their home than their usual supply. It was clearly politically unacceptable to prevent the local population from taking water resulting in a higher than expected demand being supplied.

In emergency situations it is generally agreed that the level of residual chlorine in potable water should be between 0.2 or 0.3 and 0.5 mg/l (MSF 1994, Davis and Lambert 1995, UNHCR 1992). Due to the number of water transfers and receptacles which were involved during the trucking of water and the cleanliness of the refugees water containers, it was discovered that a residual chlorine concentration of between 1.0 and 1.2 mg/l was necessary for water leaving the treatment plants. This resulted in a residual chlorine concentration of 0.2 - 0.5 mg/l in refugees' jerry cans.

During both major repatriations, especially the Tanzanian, there was a high level of inter-agency co-operation. This co-operation highlighted the different equipment specification which agencies work to, especially in terms of pipe types, diameters and fittings. If it is anticipated that other interagency operations of this kind are likely to be required in the future it would be highly desirable if the major public health NGOs met to agree a common standard for water pipe fittings. If it is not logistically possible to achieve a common specification then adaptation fittings should be procured by implementing agencies in greater numbers than are currently available.

Conclusion

It is impossible to determine if the water supply targets were met due to:

- the use of the water points by the local populations;
- the supply of some water points from existing systems;
- widely varying estimates of the number of refugees travelling down the roads.

However, medical reports indicated that the instances of dehydration reduced following the installation of all the water points in NW Rwanda, and the incidents of dehydration were also significantly lower during the Tanzanian repatriation.

The scale of water supplies required on both repatriations was too large to be managed by one NGO. The success of each operation was only achieved through the close co-operation between all agencies to achieve the common humanitarian goal of the relief of suffering.

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