6. Sanitation: General Principles

Emergency sanitation services should have the objective of providing a healthy environment for a population to live in. General objectives can be stated as:

Latrines

To isolate and contain human excrement in a culturally appropriate manner.

Other sanitation considerations

To modify the environment in which disease-carrying organisms are simultaneously most vulnerable and threatening to humans.

6.1 Latrines

When large numbers of people settle on a new site an immediate concern is how to prevent major outbreaks of diarrhoeal diseases. Control of defecation practices can play a large part in this. It is useful to think of a sanitation and latrine construction programme in two phases: first, to offer communal facilities to be used by large numbers of people; second, to provide a level of service which tries to reduce the numbers of people using a facility to family or small community structure levels such as groups of families. The two phases are not mutually exclusive, and work on the second phase can start as soon as possible and can be simultaneous with the first. The first-phase facilities should be designed to contain the volume of communal excreta that will be produced until the second-phase facilities are functional (for design criteria see Annex 3).

Immediate approaches. Quite clearly, it will be impossible to provide each family with a latrine of their own overnight. Alternative measures have to be taken. The most immediate response is to establish defecation areas. This is called managed defecation, the theory being that if as much faeces as possible

is isolated to one area it will be possible to control, to a limited extent, the opportunity for faecal-oral disease transmission. People can be employed to clean the area and bury the faeces. The opportunity for disease transmission can be further reduced if people are encouraged, and given the means, to bury their own faeces. A simple 'cat-hole' can have positive benefits. This simply means making a small hole into which people defecate and then cover it over; this has the direct advantage of placing a barrier between the faeces and flies which can play a role in the faecal-oral transmission route.

As its title implies, to be successful, managed defecation requires a high degree of management. It is not enough simply to demarcate an area for defecation, its use needs rigorous promotion amongst the population and concerted effort to ensure that the area is cleaned. The defecation area needs to be down-slope and downwind of the camp.

A preferred alternative to the defecation area is the trench latrine. This is simply a long, narrow trench dug as deep as possible, which may or may not have some form of shelter over it, where people can defecate. The trench needs to be managed and people employed to cover the faeces in the trench with a layer of soil on at least a daily basis. When the trench is full, another can be dug and used.

As the next stage in the development of the latrine programme, communal latrines can be provided. These are simple latrines designed to be used by large numbers of people and are usually built in rows or clusters which are segregated into facilities for men and women. As many people will use these latrines it must be recognised from the outset that they will fill very quickly and it will be necessary to make provision for either emptying them or re-siting new ones. It should be emphasised that whoever is responsible for establishing communal latrines must inspect them regularly and ensure that they are hygienic and safe to use. Poorly maintained communal latrines pose a major threat to public health. Special measures will be necessary to cater for the infirm, elderly and children who may not be able to use communal latrines.

Pit latrines. Providing communal latrines allows a breathing space whilst work on the second phase is under way. This second phase will have been decided upon early on and will be seeking to provide latrines on a ratio of at least 1:20, i.e. 1 squatting hole for every 20 people. This is UNHCR's guideline figure. A number of agencies, including MSF and OXFAM, aim to reduce this ratio further and bring it down to 1 latrine for every 1 or 2 families. The distinction between 'squat hole' and 'latrine' is made deliberately at this point. According to the design, it is quite possible that a latrine will house more than one squat hole. Latrine refers to the shelter and pit, whilst squat hole refers to the hole(s) through which people defecate within the latrine.

A good latrine is one which provides a barrier between the faecal matter contained in it and the outside environment. If this is achieved, human and fly contact with the faecal matter will be limited and a major disease-transmission route will have been interrupted. This implies that digging a hole and placing a shelter over it does not represent a good latrine. The pit must be completely sealed between the bottom of the shelter and the ground; the squatting slab has to be sealed, e.g if wooden planks are used, the gaps between the planks must be filled; the hole in the squatting slab should have a cover which is placed over it after every use; and the squatting slab must be kept clean of all faecal matter. By following this practice, smells will be minimised and people will be encouraged to use the latrine.

The **Ventilated Improved Pit latrine** (VIP) has received much attention in recent years. This is a latrine with a pipe coming out of the back of the shelter. If designed and constructed correctly, these latrines can be very effective at controlling flies and odours. However, in an emergency, the necessary materials are frequently not available for their construction. VIP latrines are more expensive than basic pit latrines. This usually means that the limited funding be available for a latrine construction programme will build more latrines if a basic design is adopted in preference to the VIP model[6].

[6] See Morgan, 1990 for good detailed designs in Annex 1.

Another recent development in latrine design has been the introduction of the **Sanplat latrine**. This is the name given to a squatting slab that is designed to be easy to clean, to provide a good sanitary seal between the pit and the outside atmosphere, to use minimal amounts of construction materials and to be inexpensive. The squatting slab is dome-shaped which ensures maximum strength with minimal thickness of non-reinforced concrete[7].

Box 8

At a refugee camp site in Rwanda, much attention was given to the provision of recreational facilities for children. In itself this is to be commended. Many photographs were taken by visiting press of children playing on the swings. In the immediate background were communal trench latrines. These latrines were less photogenic since they were inadequately managed and unhygienic, offering little more then a very shallow trench, some widely spaced planks to walk on and a minimum of shelter. They almost certainly posed a health risk to the children using the swings and to the people living in the shelters close to them. There is nothing wrong with providing recreational facilities, but every effort should first be given to ensuring that good basic services are provided.

Planning. Crucially important is the planning stage when it is decided where the latrines will be sited. There are specific guidelines on this (see Annex 3), but in general consideration must be given to keeping the latrines as far away from shelters as space allows, whilst not placing them so far away as to discourage their use. Particular difficulty will be experienced when space is very limited. Latrines should not be closer than 6m to a shelter. If this cannot be achieved for the second phase of construction, shelters will either have to be moved or latrines placed at the periphery of the camp/area.

[7] See Waterlines (April 1994) in Annex 1.

Technical constraints

Other circumstances may force decisions which dictate the position of a camp in relation to a spring source, and this means that standard practice guidelines have to be disregarded. The advice must be: if in doubt, build the latrines further away. If the camp is 100m above a spring, the chances are that very little contamination of the water will take place; if the distance is 30m, 40m, 50m or 60m the decision is more difficult. Whenever latrines are placed uphill of a spring or other groundwater source, it is absolutely imperative that the bacteriological quality of the water is monitored at regular intervals. Once a week would be a good start; this will give early indication of contamination and allow remedial measures to be taken.

Depending upon the soil type, it may be necessary to consider total or partial lining of the pit to protect against collapse. Total lining means that the pit is walled from top to bottom on all sides, whilst partial lining entails providing an apron of wall on all sides of the pit from the surface to a calculated distance below ground level. Materials that can be used for lining are normally bricks and mortar, concrete or wood. In areas where bamboo is in plentiful supply, this can be used as a substitute, although it should be considered as a short-term lining since the sludge in the pit will quickly destroy the bamboo. The decision to line pit latrines has significant implications for the cost and speed of construction and should be taken from an informed standpoint. Advice can be sought from civil engineers or people with experience of excavations in the relevant area.

Some labour force issues. First-phase latrine construction will usually have to rely on paid labour to do the manual work. Whilst it is desirable to use voluntary labour throughout the programme, the rapid provision of early communal facilities is of prime importance, and organising and motivating voluntary labour can become a major bottleneck. Paying people helps to bypass this problem. However, for the second phase, where families or well defined groups will receive their own latrine, every attempt should be made to use voluntary labour, especially for digging the pits, carrying materials and any other

unskilled tasks associated with the construction. Each social unit to receive a latrine should be encouraged to participate in the construction process. If things are well organised, sufficient pits should be available each day to allow the team building the shelter and squatting plate to follow on without waiting. From the view point of quality control, it is usually preferable to retain teams of skilled labour, which can be voluntary or paid, to build the shelters and squatting plate.

This Section gives an indication of the scale of work required at the beginning of a latrine construction programme. It has all been considered without specific reference to the cultural habits of the population to be assisted. This can have major implications for the programme and may mean that traditional thinking on the part of the agency may be inappropriate (see Box 9) .

6.2 Other sanitation considerations

A number of issues including children's needs; solid waste disposal; drainage; provision of services at market areas; the burial of dead bodies and disposal of waste from medical facilities fall into this category.

Children's needs. Children are a very important category in a sanitation programme. This faeces contain far more pathogenic organisms than those of adults. It is therefore essential to keep to an absolute minimum the amount of infant faeces on the ground. Children do not like dark latrines. Special features can be designed into the latrines to help this. The squat hole should not be so large that children can fall in or be intimidated by it. A successful innovation to a standard double latrine in Rwanda involved constructing a third squatting hole over the pit for use by children. Unlike the other squat holes, it was not sheltered; a cover was provided for the hole and a wooden support to hold on to was placed around the squat plate. This design proved to be very effective and children could be seen helping each other whilst using the latrine.
Other measures should be undertaken to ensure that when children defecate in the open their stools are cleaned up and buried. Any hygiene education initiative should raise this issue with parents, and persuade them to consider safe

Box 9

When 70,000 Hindu refugees from Bhutan arrived in eastern Nepal in 1992, a standard sanitation approach was adopted by the agencies present. Communal latrines were provided whilst planning got under way for family-level latrines. It soon became clear that the communal latrines were totally inappropriate for the population. Hindu culture poses some very difficult problems for sanitation work so far as communal facilities are concerned. With this particular community, privacy and hygiene were very important. When at home, people would use the fields for defecation, but would go to great lengths to ensure that they did not use an area which had previously been used. The idea of stepping in an area where people had defecated was abhorrent. Thus the notion of communal latrines and defecation areas was repugnant to them and represented all that was unhygienic.

Another problem was that talking about personal hygiene practices was virtually taboo. It was absolutely essential that men and women had separate facilities. Most of the camps were densely populated and siting latrines proved very difficult. From a sanitation perspective a number of the camp sites were inappropriate but when it came to allocating space for the refugees the local authorities were constrained by enormous land pressure in a densely populated area.

What could be done? Dysentery was escalating, cholera was endemic in the region and there was a real threat of an outbreak. The obvious thing was to provide family-level latrines as quickly as possible. However, optimistic estimates put a timescale of 16 weeks on the construction of the 5,000+ latrines. Short-term measures were needed. It was decided to establish sanitation committees in each camp. These provided a forum for discussion of sanitation issues, a body of people with responsibility for promoting good hygiene practice and a means of helping to organise the labour for the latrine programme. The eventual outbreak of cholera forced the refugees to reconsider the approach of the agencies, and communal latrines were constructed after major consultation with the committees about their location and design. People were employed to keep these latrines clean (these people were not from the camp populations, but were drawn from the Untouchable class in the nearby villages as no-one else would do the work).

Box 9 (continued)

It had been agreed with the camp population that the second-phase latrines should be shared family latrines i.e. 1 latrine for 2 families. It was acceptable for people to share facilities on this scale and take the full responsibility for cleaning and maintaining them. Two years on, these latrines are reported to be functioning well, people are using them and they are being kept clean.

The emergency phase of the sanitation programme was far from successful, and it could be argued that the initial inappropriate programmes created a separate sanitation emergency. However, this was the first Hindu refugee population that any of the agencies involved had encountered and was a particularly difficult community to work with on sanitation issues. Salutary lessons can be learnt from this experience, the most obvious being to work with the population, not in isolation from them.

and practical methods of disposal of their children's faeces.

Dealing with solid waste. Solid waste disposal is unlikely to be a serious problem during the early stages of an emergency, as very little solid waste is generated at this time. However, as part of a vector-control programme, it is an issue that needs to be addressed sooner rather than later. The basic principle is to contain the solid household waste and prevent contact with humans, flies and vermin such as rats.

A number of approaches can be adopted. The first, and simplest, is to provide each sector of a camp with a hole which is centrally located, into which all families in that sector deposit their waste and then cover it with soil. This has the advantage of being simple but the disadvantage of needing to dig fresh holes every time one fills up. An alternative approach is to consider a waste collection system. It may be possible to provide rubbish bins e.g. old oil drums, within each camp sector, into which waste is deposited. These bins can then be emptied regularly on to small hand carts which transport the waste to a burial pit outside the camp. This system has the option of burning the waste,

something which should not be encouraged in the first alternative because of the high risk of in-camp fires.

Drainage is something which again needs to be considered in the context of vector control. Standing water provides an optimum breeding ground for mosquitoes, and the aim of a drainage programme is to prevent this occurring. If the camp or settlement site is on a slope, the drainage should be designed to take advantage of this and the water carried away down-slope. A perfectly flat surface is very rare and just about any slope can be utilised for drainage purposes. The water should be carried some way from the site to an area where it can either drain freely away or soak into the ground. Conversely, if the problem is standing water as a result of depressions in the site, it may be necessary to consider filling in these depressions to prevent future collection of water.

The drainage system should be designed to channel away water from large rainstorms. Intense rain can do a great deal of damage to makeshift shelters, if it is not adequately diverted away from them. A network of large drains should be provided for the whole camp, with feeder drains channelling into them from shelter, sub-sector and sector levels within the camp.

It is important that drainage activities are co-ordinated with other infrastructural developments in a camp. Roads, in particular, can cause problems for drainage works. Elevated roads which are designed to be free draining and quick drying, and are on the down-slope side of a camp, need to have culverts built in, otherwise they will act like a dam, and shelters close to the road can be flooded very quickly in heavy rainfall.

Special consideration should be given to the waste water produced by water collection areas. The design of these areas aims to minimise the loss of water and prevent puddling. One solution is to provide a concrete apron around the water point, which channels the water away. Inevitably considerable amounts of water are spilled around the water points. If possible the water should drain into the larger camp-level drainage system, but if the terrain does not permit this

other solutions need to be sought. One of these is to dig soak pits (sometimes referred to as soakaways). A soak pit is simply a hole in the ground which is filled with gravel to support the walls against collapse. How well the soil absorbs the water will determine the size and number of soak pits that are required.

If there are livestock in the area, an appropriate means of disposing of drainage water may be to channel it to watering troughs for the animals.

Waste from health centres is particularly dangerous. It should be handled carefully and preferably should be destroyed on a daily basis in an incinerator. Failing this, an incineration pit can be used and the residue comprehensively covered. *Important Note: it is always good practice to bury incinerated waste as temperatures may not have been high enough to kill all pathogens.* Special care must be taken with drainage water from cholera isolation units. Large quantities of water are used at these centres and good drainage must be ensured to a soakaway, which must be well protected and guaranteed not to discharge into any water source.

Market Areas are particularly difficult from the point of view of sanitation. They are notorious for posing public health risks, especially when food and drink are for sale, but they are also important trading and social facilities for camps. If possible the market area should be sited outside the camp. In view of the health risk, it may be desirable to create a number of small market areas rather than a single large one. Latrines should be provided at these sites and some form of cleaning, almost certainly entailing paid labour, should be organised. Whether or not it is possible to provide water at the marketplace will depend very much on the design and capacity of the water system. However, in general it is best to keep water out of the immediate area, and, where possible, to have a distribution point nearby.

Solid waste from a market area should be collected and buried or burnt.

6.3 Hygiene awareness

The example of the situation in Nepal spelled out in Box 9 illustrates very positively the need to take time to collect information about a population's hygiene practices. In addition, it is useful to try to determine the level of understanding that exists about the relationship between water, sanitation and personal hygiene. Depending upon how good the understanding is, it may be necessary to consider undertaking a hygiene awareness or education campaign. In some cases where the understanding is good, it may be helpful to inform people about the unusual risks they face because of their densely populated living conditions. In others, the emphasis may need to be more basic, with a concerted effort to educate people about good hygiene. Whichever the case, time spent early on trying to understand the affected population and designing into the programme a component dedicated to helping them organise themselves to obtain the maximum benefit from the infrastructure being installed for them, will play a significant role in their future wellbeing.

It is highly likely that there will be skilled and educated health professionals within the population. Such people are invaluable to an education programme as they can not only bring the required expertise, but also share a common language and cultural background with the population. The latter aspect is irreplaceable and every effort should be made to involve these people.

Helping people to understand the risks of their new environment is the first step towards improving hygiene practices. However, unless modified practices can be facilitated the impact will be negligible. In this context, it is important that basic non-food items which are directly related to hygiene behaviour, such as soap, cooking pots and utensils and water containers, are distributed. It is futile discussing improved water storage and handling practices in the home if people do not have suitable storage containers.

Agency staff should be equally aware of the importance of hygiene. This particularly applies in the case of cholera. Measures should be taken to ensure

that staff are aware of the risks not only to themselves, but to the community with whom they are working (see Annex 5).