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SUSTAINABLE ENVIRONMENTAL SANITATION AND WATER SERVICES

Emergency infrastructure planning

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Humanitarian interventions following disasters require rapid but systematic planning. Priorities are often not as they at first appear and ill-founded assumptions are routinely made, especially by less-experienced staff. Capacity building among the affected population and longer-term sustainability are commonly neglected by implementing organisations in the rush to action. Members of the affected community are rarely given the opportunity to identify the causes of problems that affect them or to help plan appropriate solutions. Emergency water supply and sanitation programmes, in particular, are often implemented by personnel with limited experience of post-disaster situations, limited training and few resources to guide them.

Emergency infrastructure planning should be conducted by following an assessment and design process specific to post-disaster situations. It is essential that infrastructure developments meet the emergency needs without detrimental effect on longer-term objectives. Programmes should be designed to facilitate rapid procurement of funds and resources, immediate implementation of emergency measures and capacity building for long-term sustainability.

Planning infrastructure in post-disaster situations poses specific challenges which differ considerably from those faced in 'normal' or stable conditions. There may be limited institutional capacity, expertise and resources to assist in the assessment and design process. Risk factors are often high whereby the consequences of mistakes or delays may be disastrous. Furthermore, community members may be disorientated, especially when first arriving in a new environment, or there may be a large proportion of unaccompanied women or children. Community and local government structures may also be severely disjointed.

In emergency situations there is normally limited time for planning, and situations may change rapidly. There is often uncertainty about the future and hence appropriate design lives can only be estimated. As it is difficult to predict the life-span of refugee camps and other 'temporary' settlements, in such situations it is best to plan on a cost-effective long-term basis.

This paper is based on research recently undertaken at WEDC to develop guidelines for the planning and management of emergency sanitation programmes.

The planning process

The first step in the planning process is to determine whether intervention is appropriate. Assuming external assistance is required, the political and security context will have a major influence on where agencies are able work or decide to intervene. Insecure conflict-affected areas may be too dangerous to work in, or access may be extremely hazardous or even impossible.

Where the above considerations are not major constraints, the over-riding factor to be considered for an emergency programme is public health. The purpose of any programme should be to sustain or improve the overall health status and well-being of the affected population. Many diseases that occur after disasters are linked to inadequate water supply or poor sanitation and hygiene practices. Frequently, the most common cause of death in young refugee children is diarrhoea (Davis and Lambert, 2001). The importance of clean water, sanitation and hygiene in such situations is therefore far-reaching.

Where available, appropriate morbidity and mortality data can be used to determine whether intervention is appropriate and if so the degree of urgency required. Crude mortality rate is the most commonly used indicator and approximate threshold levels for different levels of severity are indicated in Table 1.

Where mortality rates are unacceptable, poor health is widespread or where the potential for disease transmission is high, intervention is necessary and the action planning process should commence immediately.

The action planning process (Figure 1) is divided into five stages. The time-frames for these activities vary but typical times for an affected population of 10,000 are indicated below each stage.

Rapid assessment and priority setting

Assessment is an important aspect of the planning process and one of the keys to a successful water supply and sanitation programme (Adams, 1999). In emergency situations, initial assessments must be rapid to ensure that

Table 1. Threshold levels for mortality (adapted from Hakewill and Morden, 1991)

SITUATION	CRUDE MORTALITY RATE /10,000/DAY	INTERVENTION LEVEL
Stable and under control	<1	**Short-term minimum objective**
Serious situation	1-2	**Immediate minimum objective**
Emergency/Out of control	2-5	**Unacceptable**
Major catastrophe	>5	**Very unacceptable**

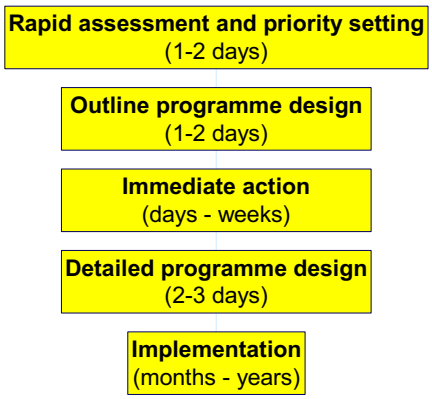

Figure 1. Action planning process

emergency measures can be implemented quickly, but they should still be comprehensive to ensure that the right needs are met and to prevent inappropriate actions. The assessment process may be divided into three stages.

Data collection

The speedy collection of relevant data is a necessary basis for assessment. It is most easily assisted by a series of checklists that remind users of what is relevant. Each checklist should be sub-divided to ensure that the user gives equal attention to all aspects of the service or facility. This is done by dividing the list into 'quality', 'quantity' and 'usage'. Relevant information should be collected through mapping, observation and interview. Each checklist can be completed rapidly on location and data recorded in a notebook.

Sector analysis

The collected data for each sector is analysed through comparison with recommended minimum objectives for quality, quantity and usage of facilities or practices. The recommended objectives used are based on the *Sphere Project* Minimum Standards in Water Supply and Sanitation (Sphere Project, 1999).

These objectives are divided into immediate, short-term and long-term to represent appropriate targets for different stages of an emergency programme. The immediate stage represents the first month of a programme, the short-term stage covers the first six months and the long-term stage represents any further duration.

Comparison between collected data and minimum objectives can be done by inspection, however in complex emergencies a more rigorous approach is recommended. Numerical comparison is one approach that can be taken in which the collected data is compared with the minimum objective and a score allocated depending on how closely they align (Harvey et al., 2002).

Prioritisation of intervention

Once the collected data has been analysed through comparison with recommended minimum objectives the results can be used to determine priority intervention sectors, priority geographical areas and to determine the degree of urgency required for intervention.

Outline programme design

The purpose of the outline programme design is to rapidly produce a plan of action for raising the infrastructure to a standard compatible with the Sphere guidelines and the likely life-span of the settlement. It should also act as an initial proposal to facilitate the speedy procurement of necessary finances. At this stage the design is produced primarily by agency field staff. Consultation with the affected community is kept to a minimum in order to prevent unnecessarily raising expectations prior to programme approval and the release of appropriate funds.

The first step in the outline programme design is to review the data collected during the assessment and highlight the main problems, constraints and points of interest. It is then necessary to determine appropriate solutions for each problem area and whether a separate or single strategy is appropriate. Selected solutions should be compared with current practice to determine whether the problem is technical, managerial, social or financial, and appropriate methods for overcoming such problems should be decided upon.

An outline design should include a simplified logical framework, personnel, resource and logistical requirements, a generalised activity plan and time-frame, and an outline budget. Provision for contingencies should normally be made within this. Such a design can be used as an outline programme proposal to inform the organisational headquarters or donor of the overall aim and focus of the programme and the estimated costs. Initial approval in the immediate emergency stage of a programme is normally granted rapidly and appropriate resources and personnel are mobilised by the agency with great speed.

As soon as the outline programme design has been produced immediate action can commence.

Immediate action

Immediate action is designed to meet existing and imminent urgent needs. It should involve relatively simple emergency interventions that can be implemented rapidly. The emphasis should be on preventing the spread of disease through the provision of basic infrastructure (services and amenities) and the promotion of good practice.

The rapid assessment and priority-setting stage is likely to identify the need for the immediate provision of basic facilities or activities. Assuming that the agency has the capacity to do this, it will allow them to act whilst they or other agencies design an appropriate longer-term programme.

Although it is essential that immediate actions have the maximum beneficial impact and that they can be implemented rapidly, it is also important that they do not conflict with or complicate long-term needs and plans. It is also an unfortunate fact that funds are more readily available immediately after a disaster than at a later date. A wrong decision or inappropriate solution at the beginning frequently causes insoluble problems in future months and years.

The basic principles of immediate action can be summarised as follows:

- Select emergency measures that most closely reflect those proposed in the outline design.
- If that is not possible select the most appropriate actions that conflict least with the proposed longer-term actions.

Once the immediate actions have been selected they need to be implemented immediately and rapidly. The level of technology is usually basic to allow rapid implementation, and the emphasis is on temporary emergency measures rather than long-term solutions.

Detailed programme design

The detailed programme design is an extension and elaboration of the outline design. The primary difference is that it is produced through consultation with key stakeholders such as representatives of different groups within the affected community, local authorities and institutions and other humanitarian actors in the area. The first step in the detailed design process is to identify key stakeholders and their interests and importance in relation to the programme.

Community participation at all stages of the design process should ensure that infrastructure developments and programme activities are socio-culturally acceptable, and will lead to improved overall sustainability. It will also encourage the community to take an active role in decision making and counter the frequently experienced move to passive resignation and a dependency on outside assistance. Community leaders should be involved in the consultation process but it is also important that vulnerable groups, such as disabled people and female-headed households, are represented.

Additional data needs to be gathered through interviews, questionnaires, community mapping and meetings with members of the affected community. Collecting key information about community attitudes, behaviour and cultural practices will prevent the selection of inappropriate actions.

Agency staff can work with community members to select detailed actions and develop activity plans and timeframes. By working together it should be possible to determine responsibilities, materials, equipment, facilities and services required for implementation. A budget should then be produced and the consequences of this, including respective costs, discussed with the relevant stakeholders.

The detailed programme design serves two purposes: to act as a detailed programme proposal for approval for longer-term implementation and the allocation of appropriate funds, and to facilitate the smooth implementation of the programme.

Implementation

Implementation management comprises three dimensions: monitoring, contingency planning and supervision. Each of these dimensions should consider various key implementation components, such as staff, resources, costs, time, logistics and information exchange.

Emergency infrastructure programmes face specific problems and challenges during implementation. By definition, emergencies are unpredictable and often situations change rapidly. Uncertainties regarding population, accessibility, security and supplies are common. An essential component of implementation is to monitor the situation on a day-by-day basis and combine this with an appropriate information flow system to pre-empt internal or external circumstances which may affect the programme.

In emergency situations it is especially important that managers are ready to respond to rapid changes in the current situation. Appropriate contingency plans should be put in place to respond to possible scenarios such as a sudden large influx of refugees or an outbreak of cholera. Effective programme management and monitoring will minimise the problems associated with such potentially volatile situations.

Conclusions

It is essential that a systematic approach be taken when planning any infrastructure development programme in a post-disaster context. Common mistakes and short-fallings are often caused by insufficient attention to detailed assessment and programme design. The main conclusions of this paper are:

- Comprehensive planning of appropriate infrastructure in emergency situations is essential to ensure programme effectiveness.
- Assessment and priority setting should be based on qualitative, quantitative and behavioural data.
- A balance between speed and comprehensive planning should be sought at all times.
- Immediate emergency measures should be planned in harmony with longer-term needs and sustainability.
- The involvement of affected communities in detailed programme design is a key ingredient of programme success.
- Operational difficulties can be overcome and future capacity enhanced through the use of systematic monitoring and appropriate contingency plans.

- Staff preparation and training is a key component of any successful emergency programme.

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