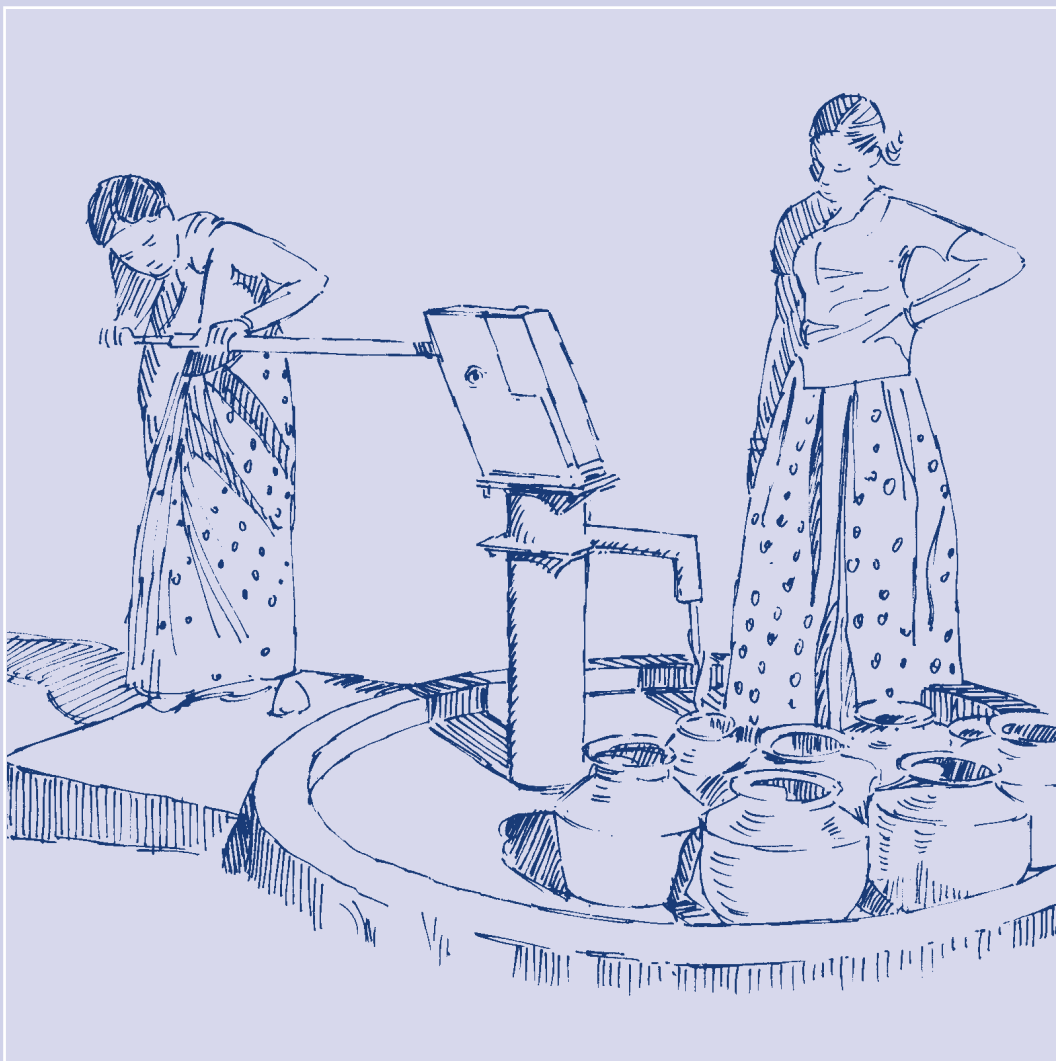


LESSONS LEARNED FROM NGO EXPERIENCES IN THE WATER AND SANITATION SECTOR

Edited by Ian Smout and Sarah Parry-Jones



WELL

WATER AND
ENVIRONMENTAL HEALTH AT
LONDON AND
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LESSONS LEARNED FROM NGO EXPERIENCES IN THE WATER AND
SANITATION SECTOR

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Chapter 1 *Introduction*

Background

This book comprises 31 summaries of NGO projects in the water and sanitation sector, and the lessons learnt from them, together with the proceedings of a workshop held in London on 21 January 1998.

The purpose of the workshop was to:

- enable information sharing on water-related technical, management and social issues between UK-based development organisations
- disseminate that information to project practitioners through existing channels of communication.

The project summaries were prepared by NGOs before the workshop and circulated to participants. They cover a wide geographical range, with a variety of lessons identified from the projects. The lessons are distilled in Chapter 2 and the summaries themselves can be found in Chapter 3. Chapter 4 comprises the three overview papers which were presented at the workshop:

- An overview report on the technical appraisal 1996-97 Joint Funding Scheme submissions
- The findings of the Water and Livelihoods Workshop in Harare, 1997
- Sources of information and networking for water supply and sanitation professionals.

A total of 65 participants from British NGOs, universities and the UK Department for International Development attended the workshop, which was held at British Overseas NGOs for Development (BOND) in London. The participants considered lessons to be learnt from the project summaries and overview papers. Discussion groups focused on water supply and sanitation in rural projects, in urban projects and in emergencies, and identified specific themes which they discussed later in more detail. The following emerged as the main issues of concern:

- sustainability and long-term benefits
- community approach
- poverty focus – livelihoods and reaching the poor
- going to scale and replication
- timing and phasing of projects
- inter-relations with major players (utilities, local government etc.).

DFID gave a panel presentation on the role of NGOs in improving water supply and sanitation for the poor, following the White Paper on International Development.

The Workshop proceedings are outlined in Appendix 1 and the reports from discussion groups are given in Appendix 2. Appendix 3 contains ten tables, which summarise the lessons learnt thematically.

The WELL resource centre was commissioned by DFID to organise the Workshop and disseminate the Project Summaries, working with a Steering Committee from Africa Now, WaterAid, BOND, Bradford University and DFID and staff from Christian Aid, SCF and WaterAid who prepared the standard formats and sample summaries. The workshop was chaired by David Collett.

This was the second Water and NGOs Workshop. The first was held at Loughborough in June 1996 and focused on discussion of five overview papers:

- NGO involvement in the water and sanitation sector
- Selected evaluation summaries of DFID projects
- Technical and management issues
- Social issues
- Policy issues.

The first Water and NGOs Workshop proceedings and the papers from the second workshop are available from WEDC in print form or by downloading from the WELL web site on the Internet, at <http://www.lboro.ac.uk/well/pubs.htm>.

Lessons from the workshop

Apart from the detailed lessons described in each paper, what can we learn from this workshop about NGO projects in the water sector?

Firstly, the number and quality of the project summaries and participants' contributions shows the commitment of British NGOs to the water sector and the strength of their assistance. They are supporting numerous projects in many countries in the South and have a wealth of experience of working with local NGO and government partners and poor people. Despite the pressures they are under, NGOs have the capacity to reflect on what they are doing, and to generate reflective summaries of their projects and the lessons which can be learnt from them. These are of wider interest.

Secondly, many NGOs are struggling with similar problems – particularly on community management, gender and hygiene promotion. The project summaries describe NGOs experience in addressing these and other problems in specific circumstances. It is hoped that these will be useful to others, for example, an NGO starting work in the water sector in a particular country can learn from other NGOs' experience in the same region. BOND can assist this exchange by producing database reports showing which NGOs are working in the sector in specific countries.

Thirdly, that the lessons learnt by NGOs are broadly consistent with the international consensus which has emerged since the International Drinking Water Supply and Sanitation Decade. An important qualification to this is a concern which came out of discussions about the implications of treating water as an economic good when providing water supplies for poor people. The International Conference on Water and the Environment held in Dublin in 1992 formulated as one of its four key principles "*water has an economic value in all its competing uses and should be recognised as an economic good*". Amplification of the Principle in the Dublin Statement reads "*Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water*

and sanitation at an affordable price...” NGOs would probably have no problem with these statements. However, workshop participants were clearly concerned that in practice, economic tariffs are being demanded from unserved poor people seeking access to clean water supply, rather than from those richer people who currently enjoy subsidised supplies, and rather than applied to the allocation of water between sectors such as water supply and irrigation. Workshop participants emphasised the need to assist the poor and warned that economic arguments could be used to reinforce inequity. This has implications for demand-responsive approaches which the World Bank and other agencies are advocating to offer users choice from a range of levels of service and cost. These need to be developed appropriately for the local context, rather than seen as a standard package.

Fourthly we learn, perhaps disappointingly, that most of the lessons have been noted on previous projects. The problem remains putting these into practice, and, in this respect NGOs face similar problems to other external support agencies. There are no quick fixes. Perhaps the most innovative approaches come out in the discussion on Inter-relations with major providers. Similarly, it is clear that most NGO projects focus on rural water supply, though many also include sanitation and there are interesting developments in urban water supply and sanitation which should encourage other NGOs to expand their activities in these areas. There are also concerns here about the effects on poor consumers of privatising water supply utilities in countries without a strong regulatory framework.

It would be easy to conclude from this that NGOs have not learnt the lessons of the past, but have run into the same problems and failed to overcome them. This would be unfair. The project summaries remind us how difficult these problems are to overcome and show NGOs trying to apply the recognised approaches (particularly community management and hygiene promotion) in particular situations. Of course, mistakes are more apparent in retrospect than at the time, but analysing past experiences and the lessons from them should help all external support agencies and their staff to recognise similar problems in future and to develop corrective actions. These project summaries should help this process.

Learning from past experience needs to take place both in NGO management, and amongst NGO field staff. It is particularly pleasing that this London workshop included so many papers prepared in developing countries by project staff and local NGOs. We hope that UK NGOs will support the lesson-learning process further by circulating this book (or copies of selected sections) to their field officers, partners and project staff.

Some observers may feel that the scale of NGO operations, even when aggregated, is too small to make much impact on the size of global problems – for example, the two-thirds of people in developing countries who do not have adequate sanitation. But large-scale approaches may also miss these (for example, privatisation of utilities is unlikely to improve sanitation coverage) and may introduce new hazards (such as large-scale solutions neglecting the needs of the poor). An important feature of NGO work is the concentration on poor communities and development of partnerships with them, and practitioners and policy makers elsewhere can learn much from shared NGO experiences, as described here. NGOs, through their closer contact with poor communities and having the flexibility to allow them to experiment, are often at the forefront in developing new approaches which larger agencies and local governments can adopt. The challenge for

NGOs is to learn from others' experience of various approaches and to disseminate key lessons from their own work, both within their own organisation, particularly to project staff, and, more widely, to other NGOs, external support agencies and government.

Chapter 2 Key lessons learned by NGOs in the Water and Sanitation Sector

The 31 papers submitted for the workshop provide a wealth of information and lessons from NGOs working on water, hygiene education and sanitation projects or programmes in developing countries. The discussion groups held during the workshop also drew together some interesting perspectives on successes, failures, constraints and challenges faced by these NGOs. Many of the lessons learned are not new and there are recurring issues and concepts, which crop up throughout the papers and the group discussions. It was commented during one of the group sessions that NGOs tend to have short memories; there is often a relatively high turnover of staff and lessons learned by more experienced staff do not get handed down. In order to avoid too many wheels being invented, it is important that NGOs learn from the collective positive and negative experiences of their staff and take responsibility for disseminating and sharing these lessons with other NGOs and practitioners.

The key lessons, which emerged from the discussions during the workshop and from the summary papers, are outlined below. They are only intended to provide an overview of the issues and practitioners may want to obtain more details or guidance from the relevant project summaries and selected texts which are referred to with each key lesson.

Community participation

The importance of community participation is a common theme running through the project papers. Most NGOs accept and understand the need to fully involve all members of a community in the planning and implementation of a water and sanitation project. It is only through participation that communities will get a sense of ownership and should, therefore, feel motivated to operate and maintain the system. However, the reality is that many NGOs, for a variety of reasons, still fail to fully involve communities (Papers 4 and 12) which leads to unsustainable projects. In order to achieve meaningful community participation, NGOs need to adopt flexible policies and procedures that allow communities to explore ideas and make their own decisions (Papers 12, 14 and 23). The WaterAid Hitosa project described in Papers 24 and 26 has achieved a strong and successful management structure. Table A3.1 lists the papers that can provide lessons on community participation and management.

Recommended references

Abbot, J, Sharing the City: Community participation in urban management. Earthscan Publications, London 1996

Carrol, T, Schmidt, M & Bebbington, T, Participation and Intermediary NGOs, The World Bank, Environment Department Dissemination Notes, Number 22, Washington DC, 1995

Evans, P & Appleton, B, Community Management Today – the role of communities in the management of improved water supply systems. IRC June 1993

Narayan, D, The contribution of people's participation. Evidence from 121 rural water supply projects. Environmental Sustainability Development Occasional Paper Series No 1, The World Bank, 1995

The role of women

Women and children generally carry the burden of water collection and it is now widely accepted by NGOs that gender issues must be integrated into project development. However, the practicalities of balancing the roles of women and men in water and sanitation projects still present many difficulties to NGOs and some of these problems were discussed during the workshop. For example, inclusion of women on water committees does not necessarily guarantee that they will get involved in decision making (Paper 18) but conversely, additional responsibilities may only serve to increase women's already heavy daily workload. A participant in a group discussion mentioned that in Nepal they were seeking ways to reintroduce men into management committees because they had become totally excluded from planning and decision-making.

A number of the summary papers included lessons learned on gender issues (see Table A3.3) and some NGOs can offer very positive experiences in successfully involving women, particularly in community mobilization and hygiene education (Papers 2, 7 and 10).

Recommended references

Legum, M & Field, S, Gender Planning – A Handbook of Training Material in the GAPA Methodology. Gender Planning & Associates, 1995

Van Wijk-Sijbesma, C, Gender in Water Resources Management, Water Supply and Sanitation – Roles and realities revisited. IRC Technical Paper 33, 1998

Wakeman, W, Gender Issues Sourcebook for Water and Sanitation Projects, UNDP-World Bank Water and Sanitation Programme, PROWESS; Working group on gender issues of the water and sanitation collaborative council, The World Bank, Washington DC, 1995

Waterlines, Gender and Water – Six years on, Vol 17 No 1, July 1998

Williams, S, Seed, J & Mwau, A, the Oxfam Gender Training Manual, Oxfam, Oxford 1994

Project planning and timescale

Involving communities in identifying and planning projects is time-consuming and cannot be rushed. The traditional hardware-driven approach to water and sanitation projects does not allow time for community consultation or participation (Papers 7 and 30). A community-based approach requires a much longer lead-in time and NGOs must have a long-term commitment to see the project through. This is particularly important when working with poorer communities who may be lacking in organizational structure and need more capacity building. Projects with a significant hygiene promotion or behaviour change component also need long-term inputs from the implementing NGO (Papers 2 and 25). Donors need to be educated to understand the need for longer-term funding to achieve sustainable projects, and both donors and NGOs should move away from the "target number of installations" approach and concentrate on achieving positive long-term benefits for end users (Papers 21 and 30).

Recommended reference

White, J, Evaluation Synthesis of Rural Water and Sanitation Projects. DFID Evaluation Report EV 596, May 1997.

Community contributions and financing

Most NGO water and sanitation projects expect communities to contribute some labour and local materials; some projects also require mobilization of financial contributions. If water is a strongly perceived need, then communities will be prepared to make significant time and labour contributions (Paper 11). These contributions should be properly valued so that a community's contribution or commitment is not underestimated.

Communities are normally expected to finance and manage the operation and maintenance of a system. This requires capacity building in money management and organisation and planning (Papers 3 and 27) and it is also important that there is a high level of trust between the community, water committees and traditional leaders (Papers 1, 7, 10, 12 and 24). Further lessons from the papers on financing and funding are summarised in Table A3.4.

Recommended references

Evans, P, Paying the Piper: An overview of community financing of water and sanitation. IRC Occasional Paper 18, 1992

Varley, R C G, Financing Low-Income Household Sanitation Facilities Through Household Credit, in Simpson-Hebert, M and Woods, S (Editors) Sanitation Promotion Kit, World Health Organisation, Switzerland, 1997

Tackling poverty

DFID's White Paper has put the spotlight on poverty issues and this was a recurrent theme throughout the workshop. Most participants agreed that the linkage between water, health and livelihoods is unclear and that more research is needed for a better understanding. However, two of the summary papers discuss the positive impact of water provision on livelihoods and earning potential (Papers 3 and 26).

The main constraint faced by NGOs, who are trying to tackle poverty, is how to scale up activity from small projects to make an impact on poverty. The poorest communities, or groups of people within communities, are often the most inaccessible and also the least able to organise themselves or vocalize their needs and problems (Paper 12). NGO staff need to be proactive in identifying and targeting marginalised groups, but it is also essential that donors are educated to understand the cost and timescale implications of working with the poor.

Recommended reference

Beall, J (Editor), A City for All: Valuing Difference and Working with Diversity, Zed Books, London 1997

Partnerships and co-operation

There is an increasing need for NGOs to adapt in order to encourage and forge partnerships with local governments and the private sector. These partnerships with the service providers are crucial to provide projects with the continuity that is needed to develop sustainable solutions. WaterAid and Save the Children Fund are striking in their policy in that they work closely with local government partners (Papers 19 and 24). NGOs often find working within the existing political and administrative framework frustrating and time-consuming (Papers 7, 8, 10 and 22) but participants agreed that such partnerships

are central to sustainability. Table A3.7 lists the papers that include lessons on project management and partnerships.

NGO experience of working with the private sector appears to be limited, and is mainly limited to capacity building in setting up spare part outlets (Papers 18 and 29). During the group discussion on inter-relations with major providers, some interesting experience was drawn out: in Bolivia, a private water company has taken a multi-partner approach by consulting a range of groups including local NGOs. In South Africa, the government has awarded a water concession to Lyonnaise des Eaux; the nature of this agreement makes it advantageous to encourage partnerships with NGOs to serve the poorer communities. These examples of co-operation between all partners suggest the way forward for the sector.

Recommended references

BOND (British Overseas NGOs for Development), Partners in Development – the case for joint funding, 1996

Jarman, J and Johnson, C, WAMMA: Empowerment in practice, WaterAid March 1997

USAID Environmental Health Project, Building Community Partnerships for Change – the CIMEP approach

Technology choices

The choice of appropriate technology can result in the ultimate success or failure of a water and sanitation project. In Cambodia, the introduction of the treadle pump (Paper 6) proved to be popular because it is similar to locally used technologies, whilst the use of the hydraulic ram in Mozambique (Paper 4) was unsuccessful because the concept was not understood by the local population. Where a government has attempted to standardize on technology, for example, on the use of India Mark 4 handpumps, NGOs should try to follow these standards. Some governments may be unwilling to accept innovative approaches such as the low-cost drilling program in Malawi (Paper 8). There is a need for agencies involved in relief operations to standardize their equipment in order to facilitate provision of emergency water supplies (Paper 17).

Despite the acknowledged importance of selecting the appropriate hardware, engineers and other NGO staff must try to strike a better balance between the hardware and software components of a project or programme (Papers 21, 24 and 30). Lessons learned on technology are summarised in Table A3.10.

Recommended references

Arlosoroff, S et al, Community Water – The handpump option. IBRD/World Bank 1987

IRC, Small Community Water Supplies. Technical Paper 18, 1983

Davis, J & Lambert, R, Engineering in Emergencies, A Practical Guide for Relief Workers. Intermediate Technology, 1995

Integration of water, sanitation and hygiene promotion

The full potential of health benefits to communities will only be achieved if the provision of water is accompanied by hygiene promotion and sanitation. Many NGOs are adopting innovative approaches such as social marketing of latrines (Papers 3 and 12) and development of participatory health education materials (Papers 15 and 16). School

programmes have been found to be particularly successful in carrying hygiene messages to the home (Papers 14 and 20). Lessons learned on health, hygiene promotion and behaviour change are summarised in Table A3.6.

Recommended references

Boot, M, Just Stir Gently. The way to mix hygiene education with water supply and sanitation. IRC Technical Paper 29, 1991

Mehra, S, Social Marketing for Sanitation Programmes. Sanitation Promotion Kit, Water Supply and Sanitation Collaborative Council Working Group on Promotion of Sanitation, 1997

Replication

Some of the larger NGOs, for example WaterAid, have a policy to innovate and experiment in the hope that local partners will try to replicate and improve on their example. However, most of the papers presented in the pre-prints describe unique projects and the only example of replication is the Hitosa project (Papers 24 and 26). NGOs often suffer from lack of continuity in staffing and funding and so are not in a favourable position to replicate projects.

The concept of replication was discussed by participants during the workshop, and its advantages and disadvantages were considered. The discussion group concluded that pilot projects set up for future replication may be distorted because they receive more resources, better staff and more monitoring and evaluation than a typical project. The group also highlighted the fact that replication is only possible where the government is open to change and NGOs should lobby to influence policies where appropriate.

Gaps in lessons

The pre-prints and the group discussions suggest that many practitioners are still learning, and making, the same mistakes; there are few new lessons to be found in these pages. Some of the notable gaps in this lesson-learning exercise are in:

- Integrated community water resource management
- Management and conservation of the environment
- Collaboration with the private sector
- Innovations e.g. community financing mechanisms for sustainable O&M
- Social marketing techniques.

These gaps may reflect the way the workshop was organised, as NGOs were asked to submit short lessons from individual projects rather than a comprehensive review of all the issues. Many of the papers were prepared by fieldworkers and reflect practical problems of project implementation. Nevertheless, NGOs should note that preoccupation with these problems may obscure other important issues for project success, such as those listed above.

Recommended general further reading

DFID, Guidance Manual on Water Supply and Sanitation Programmes, 1998

Fowler, A, Striking a Balance – A guide to enhancing the effectiveness of non-governmental organisations in international development. Earthscan 1997

Silkin, T, Hitosa Water Supply: A people's project, WaterAid, April 1998

UNDP - World Bank Water and Sanitation Programme, Proceedings of Community Water Supply and Sanitation Conference, May 1998

WASH, Lessons learned in Water, Sanitation and Health: Thirteen years of experience in developing countries, USAID 1993

Chapter 3 *Summary papers*

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Water and Group Enterprise (WAGE) – Western Kenya

Patrick Goss, Programme Manager, Africa Now

Outline

This report relates to the first two years of a five-year project. The project, based from Kisumu in Western Kenya, involves the construction of roof rainwater catchment tanks at primary and secondary schools in various districts of Nyanza Province. It started in April 1995 and emanated from an earlier project in one district. The project has two major themes: the supply of potable water predominantly for children; and to promote enterprise initiatives for small businesses and encourage females to train as *fundis* (artisans). During the five years to March 2000, the project aims to construct 800 tanks and 260 spring protections.

The project is funded by a range of donors including European Union, DFID (JFS), National Lottery and States of Guernsey. It has a budget of nearly £700,000 over five years.

Activities

Applications for tanks are handed to fundis who pass them onto Africa Now (AN) staff. AN staff discuss the proposal with the Parent Teacher Association, clarify community and AN responsibilities/contributions, carry out the design, arrange for the materials to be delivered, contract the construction to one of three fundi groups, and supervise the works. In addition, they promote capacity building of the fundi groups (which are akin to small co-operatives). This includes training in business management and loans to diversify their activities.

Successes

- In the first two years, 212 tanks were constructed benefiting 57,673 people. The tanks provided 6,360,000 litres of storage at a cost of 2 pence per litre.
- Tanks were completed within budget (£600 per tank), and the community's contribution has grown from 34% in the first year to 39% in year two.
- Two fundi groups have begun new business activities. These activities will be monitored over the next few years.
- In total, 69 people (including 16 females) have been trained in tank constructions.

Constraints

- The hygiene education component was initially slow to get off the ground and was not well developed or executed.
- A proportion of the community contribution was paid in cash to the fundi groups. Misappropriation of some of this by members of one of the fundi groups led to severing the partnership. To remove future temptations, the community was required to purchase such items themselves (even if they have to pay additional transport costs). Follow-up capacity-building activities for this group were also suspended. This affected other project outputs as this group had the most progressive attitude towards recruiting/training female fundis.
- Project impact monitoring is poor. Initial baseline data has been attempted, however, involving the beneficiaries has not been successful (e.g. most schools failed to keep records contrary to agreements).

Lessons learned

- This year the project has been restructured. Many beneficiaries accessed unprotected sources outside school hours. Consequently, spring protections, previously done on a small ad hoc manner, are more integrated into the project. The hygiene education component has been revamped and is now conducted in conjunction with existing Community Health Workers.
- Community participation, initially limited to the PTA and schools, has been enhanced, and local committees have taken over the responsibility for needs assessment and prioritisation.
- Greater priority has been attached to maintenance, through the formation of Water User Committees (WUC), with members participating in three-day training workshops.
- Female fundis have a tendency to quit after a relatively short time. Initial recruitment is difficult in this male dominated activity. It may be necessary to introduce positive discrimination as an incentive for the groups to promote female involvement.
- Health impact is particularly difficult to assess, and functioning and usage (necessary precursors) require monitoring in sufficient detail.
- These changes have not yet been implemented for any length of time, and new lessons learned not yet known.

The Sanitation and Family Education (SAFE) Project

CARE, Bangladesh

Background

CARE-Bangladesh, with technical assistance from the International Center for Diarrheal Disease Research, Bangladesh (ICDDR,B), developed and implemented the Sanitation and Family Education (SAFE) project starting in May 1993. It followed a Water and Sanitation/Hygiene (WASH/CARE) cyclone relief project implemented in the coastal belt of southeastern Bangladesh. The objectives of the WASH/CARE project included the repair of damaged tubewell platforms, provision of tubewells, and latrine construction with a limited hygiene education component. The SAFE project built on the earlier experience, but emphasized hygiene education rather than infrastructure development. Specifically, the SAFE project compared two models of outreach. Model 1 was based on courtyard education sessions with the tubewell caretakers, their spouses, and tubewell users. Model 2 included additional outreach activities such as school programs, child-to-child approaches, and the involvement of key opinion leaders in the community. The purpose of this comparison was to see whether a more intensive outreach program would have a greater influence on hygiene behaviors.

Location

SAFE was implemented in a coastal area near Chittagong in southeastern Bangladesh. Chaturi Union of Anwara thana and Saidpur Union of Sitakunda thana were chosen as the project areas. Chaturi had a total of eight communities, which averaged 1,800 households each, and Saidpur nine communities averaging 2,500 households each. The major occupation of the project population was agriculture with very few engaged in business or service. The majority of the population was Muslim, although there were some Hindus and Buddhists.

Objectives

The SAFE project had the following objectives:

- *To develop effective and replicable hygiene education outreach strategies to promote behavior change*
- *To develop and assess different models for health and hygiene education outreach*
- *To design and implement a behavior-based monitoring system for the hygiene education program.*

For achieving these objectives, community participation was considered the key strategy and was followed in every aspect of the SAFE project.

The project

The central features of the SAFE approach were the following:

- The development of hygiene education interventions was based on information collected in small qualitative and quantitative research activities, rather than depending on stock messages and materials. Interventions focused on reinforcing existing behaviors (where beneficial) or developing specific, appropriate alternatives to existing behaviors.

- An incremental approach to improving hygiene behaviors was used. Rather than promoting a large number of 'perfect' hygiene behaviors, SAFE sought to identify those behaviors most strongly associated with diarrhea in children and to target these priority behaviors with locally appropriate interventions.
- A behavior-based monitoring system was used to identify problems and opportunities for improving the intervention, for analyzing the problems and developing solutions with community members, and for adjusting and improving SAFE activities continuously.
- Participation of community members in every aspect of the project was emphasized. This included program design, outreach activities, monitoring the identification and analysis of problems, and evaluation.

The interventions for the SAFE project were based on the conceptual model of fecal-oral transmission of diarrhea and baseline information from the intervention areas, including findings from both baseline surveys and qualitative studies. The interventions were further refined based on dialogue with community members and information from monitoring surveys. Based on the data, priority behaviors for interventions were identified in six areas:

- 1) clean water
- 2) latrine use and feces disposal
- 3) environmental cleanliness
- 4) hand washing
- 5) food hygiene
- 6) diarrhea management.

The interventions were developed and refined to address specific behaviors. Thus, SAFE interventions were focused on behavior change rather than message retention.

Two different models of extension were used in the SAFE Project. Model 1 was more limited and conventional, working only through caretaker sessions. Model 2 was an expanded model involving, in addition to sessions with caretakers, school sessions, child-to-child sessions for non-school children, and sessions with key community persons. The interventions were implemented by 13 field extensionists. Their role was primarily to facilitate discussion during the sessions, providing technical input when required. Outreach methodologies varied by target group, but included group discussion, demonstrations, participatory action learning exercises, flash card displays, folk songs, role playing, comic story sessions and games. All communication materials and approaches were developed step-by-step, and carefully field-tested at the community level to ensure that both message content and dissemination channels were relevant and appropriate for the local context.

Key findings

After one year of pilot implementation, dramatic improvements were seen in all areas of intervention, for all targeted behaviors, and by all measures – knowledge, reported behavior, demonstrated practices and observations (see Tables 1 and 2). In addition, an estimated two-thirds reduction in diarrhea prevalence was seen in SAFE intervention areas. These results provide strong evidence that the SAFE approach can be effective in improving hygiene behaviors and reducing the incidence of diarrhea in children.

In comparing the two models, it appears that Model 2 performed better than Model 1 by most measures, in all areas of behavior studied. Nonetheless, the difference between Model 1 SAFE

intervention areas and Model 1 control areas was significant. Thus, caretaker sessions alone (Model 1) were worthwhile and had important benefits. Model 1 was a very good intervention; Model 2 (with multiple channels of communication) was a slightly better intervention. The dramatic difference between the intervention and control areas found in both models suggest that the key elements of a successful hygiene behavior change program may be those that are similar in both models. The similarities include focusing on a few, key behaviors, community participation in all aspects of the project, participatory extension methods, and a system of continuous monitoring and improvement of the interventions.

Table 1: Model 1 Results

| INDICATOR | BASELINE | SURVEY | FINAL | SURVEY |
|---|--------------|---------|--------------|---------|
| | Intervention | Control | Intervention | Control |
| • knowledge of the causes of diarrhea (six or more causes known) | 0% | 0% | 84% | 0% |
| • knowledge on diarrhea prevention (six or more means of prevention known) | 0% | 1% | 90% | 1% |
| • reported latrine use mothers, men, and children (over five usually us the latrine) | 41% | 36% | 91% | 54% |
| • observed handwashing technique (all five correct elements demonstrated) | 4% | 3% | 74% | 3% |
| • observed environmental cleanliness | | | | |
| - no feces in the yard | 21% | 15% | 99% | 82% |
| - no feces inside the latrine | 44% | 26% | 88% | 53% |
| • impact on diarrhea | | | | |
| - diarrhea prevalent in a least one child in the household in the past two weeks | 50% | 61% | 23% | 65% |

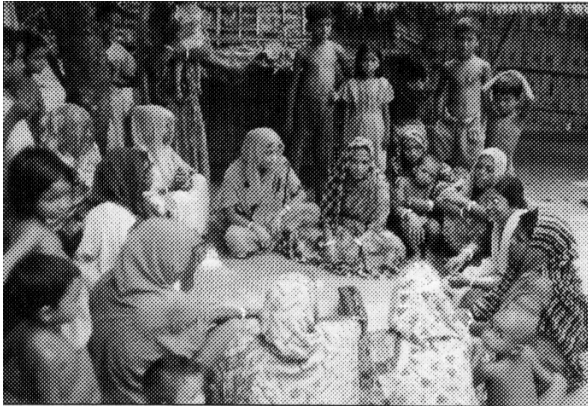
Table 2: Model 2 Results

| INDICATOR | BASELINE | SURVEY | FINAL | SURVEY |
|---|--------------|---------|--------------|---------|
| | Intervention | Control | Intervention | Control |
| • knowledge of the causes of diarrhea (six or more causes known) | 0% | 1% | 100% | 4% |
| • knowledge on diarrhea prevention (six or more means of prevention known) | 0% | 1% | 100% | 7% |
| • reported latrine use mothers, men, and children (over five usually us the latrine) | 51% | 37% | 90% | 58% |
| • observed handwashing technique (all five correct elements demonstrated) | 1% | 2% | 82% | 16% |
| • observed environmental cleanliness | | | | |
| - no feces in the yard | 11% | 34% | 99% | 76% |
| - no feces inside the latrine | 37% | 62% | 99% | 85% |
| • impact on diarrhea | | | | |
| - diarrhea prevalent in a least one child in the household in the past two weeks | 44% | 52% | 20% | 57% |

Lessons learned

Insights regarding the intervention process should be gained primarily through qualitative investigations. Quantitative surveys can provide information on what happened, but offer little on why it happened.

Recognising that behaviour change is a long-term process, CARE must make provision for long-term interventions in communities, either through direct CARE activities, or through facilitating



sustainable systems for continued hygiene improvements. The SAFE pilot intervention extended for a period of nine months in each community.

Means of devolve responsibility for organising hygiene behaviour change activities to the community need to be sought. Many avenues may be explored, from continuing similar sessions with a community person in charge, to evolving away from initial, group sessions to other means of communication and community action.

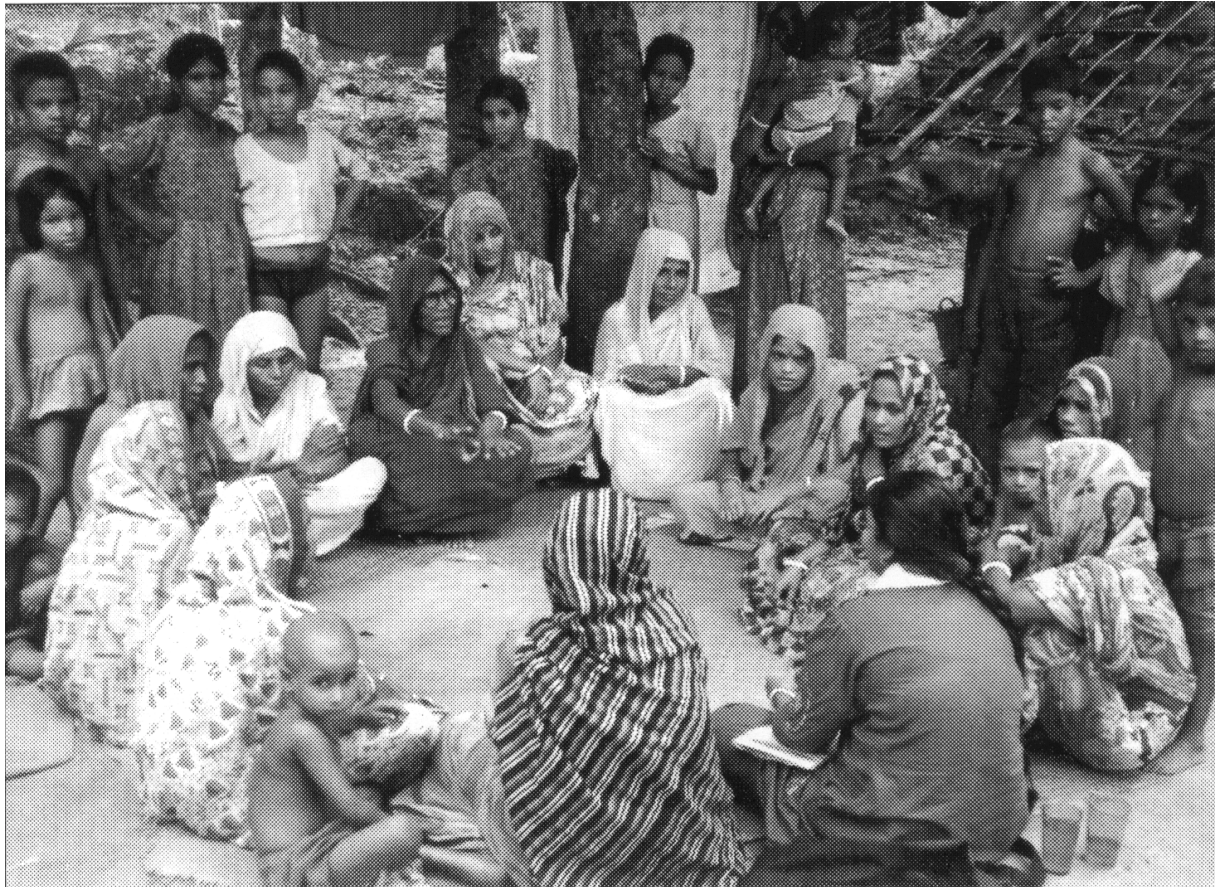
Group sessions similar to those that work well with women may not be appropriate for men. The differences between men and women in social activities, communication patterns, and daily schedules should be taken into account when developing means to reach men. For example, SAFE reached men at various levels: tubewell caretakers individually, group sessions at tea stalls, and on-the-spot informal sessions with young males.



For priority setting in project interventions, those behaviours that are already adequate in nearly all households should be reinforced, but may receive less emphasis and reiteration than behaviours which need a considerable amount of refinement. Just as priorities need to be set to reduce the number of behaviours targeted, setting priorities in the amount of time and effort spent among the targeted behaviours may improve program efficiency.

Interventions should continue to evolve in order to realise continued success. As new challenges arise, additional rounds of problem analysis and development of alternatives are needed. Projects have to be dynamic in order to be effective.

The SAFE interventions took place in the context of a high profile national latrine promotion campaign. The lack of increase in hygienic latrine coverage in control areas suggests that a national campaign alone will have limited impact in the short run. On the other hand, the dramatic increase in hygienic latrine coverage in the SAFE intervention areas may in part be due to the combination of the national campaign and SAFE's community-based approach.



The SAFE project was conducted in areas where community members have access to tubewells. The success of the interventions was depended, to some extent, on access to safe water supplies. In areas where water is less accessible, integration of water supply interventions with hygiene education activities will be important.

Safer

The success of the SAFE project represented an important opportunity to extend experience from the project to others in order to facilitate the broader implementation of successful hygiene behavior change programs. Thus, in July 1995, CARE-Bangladesh began implementation of the five-year Sanitation and Family Education Resource (SAFER) project in Chittagong. The main approach of the SAFER project is to provide technical assistance and training to Bangladeshi NGO's on planning and implementing high quality sanitation and hygiene education programs. Six NGO's, which already implement water and sanitation programs, will receive intensive, tailored, on-site technical assistance and a further 160 interested NGO's will be made aware of the concepts and basic principles of hygiene behavior change.

This case study is based on an article prepared by Raquiba Jahan, Masee Bateman, Sumana Brahman, Sandra Laston, Sushila Zeitlyn, Dee Jupp and Florence Durandin and published in *Learning for Health*, Issue 8, Oct 1995 - Mar 1996.

A number of reports describing the SAFE project in more detail have been published, including:

- Sanitation and Family Education Pilot Project (SAFE): *Don't Just Say It Do It!* by D. Jupp, CARE-Bangladesh, 1995

- *Prevention of Diarrhea Through Improving Hygiene Behaviors: The Sanitation and Family Education (SAFE) Pilot Project Experience*, by O. Masee Bateman, Raquiba A. Jahan, Sumana Brahman, Sushila Zeitlyn, Sandra L. Laston, CARE-Bangladesh and ICDDR,B, 1995.

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Local Management of Community Water Systems

CARE, Honduras

Background

This case study is based on a field evaluation of water supply systems conducted in February 1996 in the departments of Francisco Morazan, La Paz, and El Paraiso in Honduras. The evaluation looked at four gravity water supply systems serving ten communities that CARE Honduras constructed from 1987 to 1989 as part of the CIDA-funded ICWS (Integrated Community Water Supply) Project. CARE was present in the communities for about one year, of which five to six months were dedicated to system construction. CARE provided orientation and training in operation and maintenance, community organisation and administration, and protection of the watershed. CARE also provided communities with extensive training on sanitation and hygiene, and assisted each community to establish a Sanitation and Hygiene Committee that promoted latrines (the project did not subsidise or construct latrines), improved water use, sanitary disposal of refuse, control of animals, etc.

International development organisations such as CARE are rarely able to work with the same communities for many years. The evaluation was conducted in an effort to examine three important but unknown factors:

- 1) the fate of the water systems
- 2) the water systems' impact on their beneficiary populations
- 3) effectiveness of the approach used in the project.

More specifically, the evaluation studied four topics closely:

- 1) costs and cost recovery
- 2) project design methodologies – choice of technologies, impact, and sustainability
- 3) watershed management and multiple use of water
- 4) community management.

Location

All ten communities served by the CARE-constructed water systems are located in the Honduran Highlands within a three-hour drive from Tegucigalpa, the capital. The communities are in three different departments: Francisco Morazan, La Paz, and El Paraiso.

The project

Implementation of the ICWS Project was governed by signed agreements between CARE Honduras, the National Service of Aqueducts and Sewers (SANAA), and each community. The responsibilities of the three parties were as follows.

CARE provided:

- **all PVC and GI pipe** and accessories used in system construction. No replacement pipe was left in the communities after construction was complete
- **major tools** such as pipe cutter, threader, wrench, and the first 500 meters of barbed wire for the protective fence around the watershed
- **training** for community operators, leaders, and community members in system operation and maintenance, community organisation and administration, the relationship between the watershed and the quality and quantity of drinking water, sanitation and hygiene
- **guidance** in the formation of committees, in the construction of the systems, and in the purchase and protection of a portion of the watershed above the community water source
- **technical oversight** in project design and construction
- **an institutional presence** of approximately one year in the communities including engineers, builders, and principally extensionists.

SANAA provided:

- **technical studies**, designs and supervision of system construction
- **an institutional presence** alongside CARE.

The community provided:

- **all unskilled labor** and collection of local materials including rock, sand and gravel
- **the purchase** of all cement, rebar, nails, wood and from two to six hectares of land in the watershed to protect the water source, as well as payment for all skilled labor and material transport.

Key findings

Infrastructure design and construction

The overall quality of construction was good, and all systems were providing ample water to their communities after seven to nine years despite below standard maintenance. An important consideration is that all systems evaluated were over-designed by a factor of from two to four with respect to provision of domestic water. In only a few cases were problems in service delivery attributable to design or construction problems.

Watershed protection

Although the "Microcuenca" (small watershed) committees formed by CARE no longer exist, the communities understand that protection of the small watershed is a responsibility of the community water board. Three of the four gravity system sources visited were protected by well-maintained barbed wire fences, which surround the two to five hectares originally purchased by the community. However, a major concern is that the watershed zones outside the fences were being cleared, cultivated, burned and grazed, even though nearly all the inhabitants recognise the importance of protecting the watershed for the provision of water. In only one system did the communities appear to be taking an active stand to control activities taking place in these zones, working with the Municipality to prevent the clearing and farming of the forest above the intake. This could be explained by the fact that, here, in contrast to the other systems, there was a dry season water shortage.

Community organisation and administration

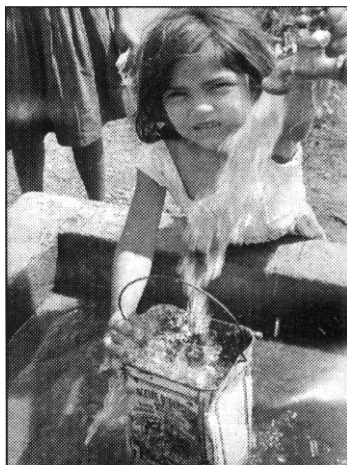
All systems are run by water boards, with each community having their own board and the two multi-communal systems also having a general board (twelve organisations in all). Twenty percent of board members were women with several serving as treasurer or secretary, but none



as president or vice-president. Nine of the twelve organisations held annual elections and three held elections every two years. At each election, the entire board was replaced and only in one case, did the outgoing officers formally orientate their replacements. All twelve water boards possessed the original regulations developed with CARE at the beginning of the project, but very few board members were acquainted with them. All boards maintained minutes of meetings, but eight of these were disorganised. Most boards held meetings 'as needed', although the best-managed board held meetings monthly with mandatory attendance.

Operation and maintenance

All ten communities (four systems) had community water system operators. All were paid for their work, normally on a per-job basis which equated to about US \$2.00 per day. In addition, all operators organized large work teams with the help of the water board when repairs were needed. All have, at some time, repaired pipe breaks or dealt with other problems that cut off the water supply completely, but no community has faced a catastrophic system failure such as the destruction of the intake, reservoir tank or a large length of pipeline.



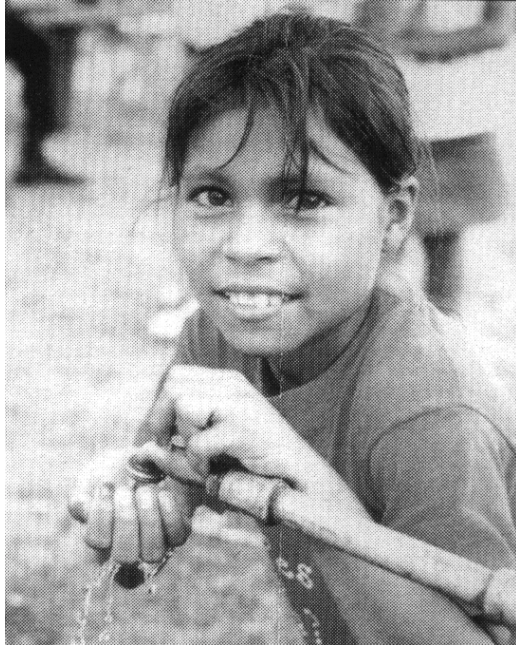
No community operator had a design or plan of the system, a written schedule of activities or was performing system-wide disinfection. Overall, the community operators were lacking in their ability to manage water distribution in their systems and only one out of the ten demonstrated a basic understanding of the concept of flow. None could measure water flow. In one system, chlorine was regularly administered to the reserve tank. Finally, the operators in one system were vigilant in the control of household water use. They toured the households periodically to ensure proper water use and to check on the status of the connections. In the communities served by this system, there were no observed instances of large-scale irrigation or industrial

water use, and very few tapstands were leaking. In the other systems, it was found that some households were misusing water and one-third of the tapstands were leaking.

Tariffs and financial management

Each of the ten communities utilized a tariff system for water use and monitored the money collected. Tariffs were charged monthly, but could be paid monthly or annually depending on the resources of family. There were, however, problems in money management that may threaten the long-term provision of water in the communities. For example, no community has ever raised the

tariff. The monthly fee that each family paid that was worth US \$1.50 at the beginning of the project is now worth US \$0.25. In addition, there were no surcharges for macro-consumption. For instance, families with large tomato gardens irrigated from the tap paid the same monthly fee. Nearly all users paid the tariff and were satisfied with the current charge, although some board members perceived a need to raise it. The water boards of the two multi-communal systems maintained bank accounts, but none of the community water boards did.



Sanitation and hygiene

All communities participated in extensive training and orientation on sanitation and hygiene. CARE facilitated the formation of sanitation committees in all communities with the purpose of promoting latrine construction, household hygiene and improved water use. Although the ICWS Project did not provide for their construction, 73% of families had concrete wash basin-storage tanks, 28% had some type of shower, and 94% had latrines (unfortunately, no baseline information is available but, in adjacent communities served by an earlier project also implemented by CARE but without a sanitation and hygiene component, only 53% have latrines). About 75% of household connections observed were in reasonable condition – not leaking, overly dirty or damaged. The disposal of residual waters was appropriate in 84% of households, household hygiene was acceptable in approximately 75% of households and soap was present at the taps of 70% of homes. Two notable areas of concern were the presence of refuse and lack of control of animals, namely pigs, dogs and fowl.

Community status, water use and development

The typical rural community served by the ICWS Project has grown about 16% in the last eight years, although one community, San Jose, has grown 244% due to its proximity to the region's main city, Teopacenti, and due to its ample water supply. The quantity of water delivered by the systems at the time of the field evaluation was very high, averaging 300 liters per person per day. In the cases where the water board management was weak, overuse by individuals was common. For example, large irrigated commercial gardens, watering of cattle and production of adobes and ceramic tile were observed in several communities that were also suffering from water shortages. Few homes had family gardens, but almost half were watering ornamental plants and shade and fruit trees located around their homes. In terms of further development, no community has used the water boards or their funds for any cause outside the water system. The effect of the construction and local management of the water systems on the capacity of the community to take further steps in its own development is not clear, although most communities have participated in other community development projects with outside entities to some degree. Examples are latrine construction and coffee co-operatives. In contrast, wholly internal community development projects were not observed. Finally, all community members served by the CARE water systems were quick to point out the significant positive changes in their lives realized because of the systems. The positive impacts most often mentioned included children's health, personal hygiene, not having to wash clothes in the creek, and the ability to have shade trees and other plants around the home.

Lessons learned

All of the systems were over-designed by at least a factor of two with respect to pipe and tank size. Using the very narrow criteria of cost per liter of water, systems should be downsized. However, the added benefits of abundant water enjoyed by a community have value. Water availability increases earning potential, people can actively change their immediate environments with shade trees, and nutrition can be improved through the presence of fruit trees. Thus, when feasible, CARE should adopt project methodologies that allow communities the option to pay more and access a larger quantity of water than is required for solely domestic use.

The ICWS Project was extremely successful in watershed protection as measured both by attention paid to the watersheds by the communities and their awareness of the importance of trees in the watershed. This project component should be further developed and expanded. Communities should receive information and training on their legal right to a protected watershed and how they can work with landowners and municipalities to protect this resource. Moreover, CARE should advocate at higher levels of government for the management of watersheds to secure drinking water and for the rights of communities to oversee their water sources.

It is critical that community water system operators receive adequate training in the following areas: system designs and plans, the concept of flow that links bucket filling times to the number of houses served and guarding against misuse of the system. In addition, CARE should promote a salary structure for operators that reward vigilance. One possibility is a base monthly salary with bonuses derived from fines collected from households that misuse the system.



Women should be actively identified, trained and promoted as water board members and as office holders such as president, secretary, or treasurer. In addition, CARE should propose two or three year terms for board members with no more than half of the board members leaving of lice every year. This would provide for a continuous carryover of experience into new administrations and alleviate the loss of institutional memory as board members leave office.

Each community water board should calculate an appropriate tariff for monthly water use with surcharges for high levels of consumption. Also, the board should be trained to raise the tariff over time. Each community or system should deposit payments

into a bank account in an effort to promote savings and keep financial records organised.

It appears that the sanitation and hygiene component of the ICWS Project had a significant positive impact on the communities. This conclusion is based on limited data available from a comparable CARE Honduras water system project that did not include a sanitation and hygiene component. Thus, this component should be a part of future projects. Because behavioral issues, such as refuse disposal and animal control, were problematic, they should be emphasised in future projects.

The communities discussed here tended to see the water systems as 'ends' rather than a step in the community development process. Communities should be encouraged to apply skills in planning, organisation, money management, and administration gained in one project to future projects.

CARE has a role to play in providing ongoing support to communities beyond the one-year time period of the project. Follow-up visits to communities of two to three days per year are necessary for providing guidance and training to the water boards and community operators who actively seek further training and advice on system operation and administration. In addition, visits are important for gathering data to assess project status, measure impact, and make any necessary adaptations or changes.

This case study was prepared by Scott Tobias. 'Lessons Learned in Water, Sanitation and Environmental Health' is a series of short case studies designed to identify best practices in water, sanitation and environmental health through the lessons learned in projects implemented by G4RE and others. The series is edited by Ion Macy and Peter Lochery.

Namarroi Water Supply, Zambezia, Mozambique

Gillian Peace, Programme Officer for Southern Africa

Christian Council of Mozambique (CCM)/ Christian Aid

Outline

This project was to repair war damage to the town/village water supply system for Namarroi, Mozambique. The system was to provide piped water for 10,000 people costing approximately GBP90,000. Initial planning began in 1990, but owing to the war, the implementation was delayed until 1992-1993. CCM implemented the project, with support from the local government and using parastatal engineering companies. Owing to a number of problems the project was not successful.

Activities

During the war, Namarroi was occupied by both Renamo and Frelimo at different times, with intensive fighting between 1987 and 1991. The town water and electricity systems, which had formerly been diesel-powered systems, were destroyed. CCM was involved in emergency work, as well as reconstruction and rehabilitation of social infrastructure, including the schools, hospital, roads and government buildings during the time of the war in very difficult conditions.

The small town/village, which is the administrative centre for the whole district, and includes a hospital and boarding school, had no clean water supplies and people had to fetch all water from streams and a river in the valley bottom – a difficult and arduous task on the slippery slopes. From 1987 to 1993, up to 10,000 displaced people were living within the town. Planning began in 1990 and a number of spring boxes were constructed down in the valleys on perennial springs as a quick solution to clean water. The town is isolated (at that time difficult to reach by road except by army convoy, had no fuel, no communications and no mechanics. Additionally, the town, due to isolation, had no cash economy and the local authorities had no funding for maintenance. A hydraulic ram, which needs no fuel, very limited monitoring and maintenance was chosen in consultation with the Provincial Department for Construction and Water (DPCA) as a sustainable solution. This was purchased in late 1990, but installation was delayed owing to further Renamo attacks on the town. Repairs to the pipe work and storage tank were planned and additional standpipes were constructed where the population was centred. However, it was not planned to renovate the filtration system and this was bypassed. I cannot find any information as to why this decision was taken and do not know if local people would have agreed with this decision if they had been consulted.

Preliminary survey on the dam catchment was done by the DPCA and a local parastatal did the repair work on the dams and also on the pipe system. This work was done during 1992. Originally, the work was done poorly and had to be redone later in the year. A report produced by DPCA in December 1992 indicated there were still problems of infiltration but this was not acted on until later in 1993. Supervision by the DPCA engineers of the parastatals was weak owing to travel difficulties.

The pump was installed in 1992 by a Dutch engineer working with the DPCA. Provincial engineers were training in the installation and a local person was training to monitor the pump. The pipe system had been repaired by another parastatal company, but when the pump began operating later 1992 it was obvious that leakage was still serious. More work was done to repair the pipe work in 1993. This work was completed and the pump functional again.

By 1993, the Dutch engineer and the engineers trained at DPCA had been transferred and the local government officials in Namarroi attempted to operate the pump as a diesel pump, i.e. instead of letting the storage tank overflow into the waste channel, they shut down the pump. Repeated shutting down of the pump lead to strain on the system, blew seals and gaskets, and finally, cracked the pressure chamber. Later, inspection by an engineer showed the pressure valve had been altered to an incorrect high setting, adding to the troubles.

The DPCA engineers made a complete survey of the system in 1995. The pump now needed an expensive replacement pressure chamber. The standpipes also needed repositioning because the population had moved away from the centre to be nearer to the fields. There was also now concern by the authorities because the filtration system had been bypassed, rather than renovated. The engineer concluded that the hydraulic ram was only a solution for a war situation, but a diesel pump was the normal peacetime pumping mechanism in Mozambique.

Successes and constraints

There were limited successes because the system only functioned very sporadically. The attacks on the town hampered installation work. The unsafe and difficult access to the town affected the delivery of supplies and the supervision of the work. Transfer of government officials caused problems of continuity.

Lessons learned

In Mozambique, there is little experience of using water to lift water and this concept was not fully understood. Therefore, this technology was alien, even if it did seem a good solution for the conditions. In countries where water is often scarce and where people are used to conserving supplies, it was uncomfortable for people to see water running to waste, so they closed down the hydraulic ram once the storage tank was full. For this reason, the technology was also alien. The contractors cut corners because they were not adequately supervised by government engineers who had this responsibility. The problems of access and isolation of the area were the main reasons for this. This may just be a war casualty, but certainly a system to enable close supervision of contractors would have saved a lot of time, effort and money. Given the nature of the parastatals and the limited legal system in Mozambique, it will always be difficult to enforce contracts with these agencies. Field staff did not understand the engineer's reports and did not react when reports showed up problems. It would have been valuable if engineer's reports were shared immediately with an independent qualified person. The project was designed by engineers who did not involve local people in planning and who decided to cut on water quality. In an unstable situation, it is difficult to take account of population movements and user needs. A later survey in the area showed the local population had little understanding of water hygiene and sanitation – the constructed spring boxes were used in an unsanitary manner and many people still used contaminated water sources, rather than the springs. Community education was not considered important during the war but this resulted in very limited health gains from the clean water available.

The Kolinghuesse Dam

Hannah Williams, Christian Aid

Outline

The Kolinghuesse Dam is situated in Ouhritenga Province, in the Département of Ziniaré, 50km north east of Ouagadougou, Burkina Faso. The project was implemented by the ODE (Office de Développement Evangelique) Fédération des Eglises et Missions Evangeliques (FEME) with the co-operation of Band Aid and Christian Aid. The expense of the project was originally seriously underestimated (110, 000 000 CFA, which was later increased to 243,000,000 CFA) Christian Aid increased the amount of money previously committed in order to finish the construction. The system was to provide irrigation for 40 hectares of valley land, and to affect 1386 (study in 1975) inhabitants from four villages in the surrounding area. A later study in 1995 shows that 896 households (an estimated 4220 people) now benefit from the dam.

Activities

The original proposal was for the construction of a dam of 1200 metres long that holds around 300,000 m³ and irrigates 40 hectares of land. ODE/FEME planned to create one large, integrated project, with the potential for developing small projects within the larger one over a period of time. The dam was built by the members of the eight surrounding villages, with about 70 people working on the site each day. These people were already aware of the potential of the dam, continually emphasised by ODE and, therefore, were keen to work on the project. Some of the materials, sand, gravel, stones and materials for the construction of the embankment, were already on site. The water used for the construction came from 10km away.

Sluice gates were built in to the dam, so that the water could run downhill from the dam, through secondary cement channels and into the tertiary channels, which supply the water to irrigate the land. Each secondary channel irrigates up to 5 hectares of land. ODE/FEME made at least one trip a week to the dam site to check up on the technicalities, and the DEP (Direction des Etudes et de la Planification) from the Ministry for Water inspected the site every two weeks. FEME had three of its members working on the dam project: an assistant technician, a general geotechnician and someone to study the socio-economic situation. There were also a dam engineer and a topographic specialist from outside FEME. The plots of land were divided up on a points system. A commission, led by the Prefect of Ziniaré, gave out all of the necessary information to the local people before the construction began. Those that contributed the greatest amount of hours to the construction were entitled to the better plots. There were originally 385 plots but this increased, with demand, to 413.

Successes

- A large-scale dam was constructed, which now benefits 896 households in the eight surrounding villages.
- In each rice-growing season, the farmers harvest about 150 tonnes of rice paddy (3.75 tonnes/ha).
- In the dry season, the vegetable harvest has helped generate revenue and has increased the nutritional quality of the local people's food.
- Although the primary objective was to increase agricultural production, there are various secondary projects, not originally planned, that have had some success:

1. The first survey showed that it was not considered possible for women to have their own plots of land, but thanks to awareness-raising, 100 women work on a plot each, and during the season of 1997/98, 40 of them will work fattening animals and use the manure on the land.
 2. A fishing group was formed and equipped for activities as a small fishing industry. This group has been successful, and has paid back its first loan. The production is about five tonnes of fish from the dam area each year.
 3. Downstream from the dam, more than 100 people use the surrounding area for market gardening during the dry season.
- All of the area is fenced off with a hedge and they are carrying out a reforestation programme.
 - During 1996, 75 hectares of land was provided with anti-erosive bunds to prevent water erosion and silting.
 - The estimated number of beneficiaries is 4220, roughly three times as many as originally anticipated.
 - Most of the animals in the eight surrounding villages are supplied with water from the dam.
 - Water from the dam supplies the water table / main water supply, which helps those who live by the riverside, and is also used for the construction of houses.

Constraints

- The original study for the proposal seriously underestimated the amount of money that it would take to build a dam of this size. ODE/FEME made a second evaluation and found that it would cost much more than the original amount quoted. Christian Aid had to supply extra 73,000 000 CFA.
- Initially, community mobilisation was not good – the villagers were involved with their farming. The predicted period for the construction was eight months but, after subsequent studies, this was increased by another two or three months.
- They were slowed down by machinery breakdowns.
- The low level of literacy of the population is one of the major constraints for learning. They are working towards higher levels.
- The management/administration of the area upstream is not very easy; people from outside the dam area want to use the water as well and overuse will cause silting.
- There is great demand for the plots of land and FEME has been obliged to extend the area beyond the previously delimited area of a four hectare perimeter.
- The years of limited rainfall have decreased the possibilities for farming the land.

Lessons learned

- It is necessary to make a realistic and carefully researched survey of the area and appropriate estimates made when working on such large-scale projects, so that enough funding is there before the project gets underway.
- The socio-economic study reveals that it is very important to involve women in agricultural activities, and this has, in fact, been one of the most successful aspects of the project.
- ODE/FEME hope that the local people will benefit from credit for the development of small enterprises, such as small-scale animal farming.
- As far as FEME is concerned, the dam shows the enormous potential for real integrated development in the Sahelian region.

- At the outset, the emphasis was placed on the improvement of agricultural production in the area, but now there are more integrated and consistent activities that take place around the dam.
- Those involved have learnt to appreciate the value of the water and to use it profitably.

ABCD Programme

Introduction of Treadle Pumps Prey Veng Province, Cambodia

Bernard Crenn, Desk Officer, Christian Outreach

From a report by Dr S J Bachelor and Mr Jim Goodchild in November 1994

Outline

The programme is one of integrated community development, including agricultural activities and the use of appropriate technologies. In this instance, Christian Outreach, in partnership with World Concern, promoted the use of three types of human-powered pumps across four communes centred around the town of Prey Veng. The project started in 1993 and continued into 1996 by which time, 2,480 pumps had been installed. The project was deemed successful as local manufacturers readily made the pumps and added their own improvements.

Activities

From the Bachelor and Goodchild report, covering the period May 1993 to November 1994

As part of the community development project, villagers had asked for handpumps and they had access to a revolving fund. A choice of pumps was made available: two handpumps (one imported and one locally made) and one treadle. They debated the respective merits of the pumps according to the criteria of maintenance and repair, water output, water supply and costs. Different villages chose different technologies. The treadle pump had the advantage of easier maintenance as the washer on the piston can be taken out and replaced without the need for tools. It also had about double the output/unit time than any other hand pump. Another issue is that of water supply and the treadle pump can lift water from four metres below the surface. The treadle pump is also cheaper than the other two pumps (\$12 vs. \$25 or \$32 plus \$50 for the well itself).

In May 1993, the first demonstration model was imported from Vietnam. Further units were ordered but, due to delays, local manufacture was started. By March 1994, 72 pumps had been installed. Each pump was shared by two or three families and most were used to produce a small dry season vegetable crop around each house. A number of innovations in pump usage began to emerge. By July 1994, both manufacturers had sold about 100 pumps privately.

Christian Outreach started a new programme to promote the pumps district-wide and gave credit for 50 pumps throughout the district. The strategic placement of two or three pumps in a village stimulated interest and private purchases were made thereafter.

At the end of 1994, the programme had requests for approximately 300 units, although the village level credit fund would only allow 150 to be installed. There were also requests throughout the district and from neighbouring districts and even from the province to the north. The total demand was estimated to be 1,000 units. The restriction to fulfil this demand now rested on the capacity of the manufactures who could produce about ten every two or three days and the number of drillers who could each only install one a day.

In 1994, a number of treadle pump owners grew a plot of about 10 metre by 20 metre of 'dragoon', a popular Cambodian vegetable. The farmers tell of harvesting enough for their family and selling approximately \$60's worth of produce over and above the needs of the family. This would indicate that the treadle pump would nearly pay for itself in the first year of operation.

Update from the ABCD programme report 1996/97

Loans made for equipment to start the treadle pump manufacture in two district towns have now been fully repaid. After the initial rapid growth, treadle pump sales have reduced in comparison with the previous year. The manufacturers have made and sold very few in the last year but have significantly increased the number of motorised pumps sold.

The reduction in demand for the treadle pump can be attributed to the fact that the latent demand for has now been satisfied and that there has been a significant shift in emphasis to more advanced machine pumping technology capable of irrigating larger areas.

Successes

- By the end of 1996, a total of 2,480 pumps had been sold in the four targeted towns in Prey Venn province.
- Most of these were bought privately and manufactured locally with indigenous modifications.
- The uptake of the technology spread to other neighbouring districts.
- The treadle pump has enormous potential for rural Cambodia particularly the Southern provinces where ground water is relatively easy to access.
- The drought may have resulted in a temporary but significant increase in treadle pumps sales as farmers endeavoured to save their rice crops.

Constraints

- At some stages, the diffusion of the pumps was limited by the amount of credit available.
- In some villages, the treadle pumps were not used due to a lack of wood to make the frame.

Lessons learned

Appropriateness of the technology

- **Social:** the most persuasive aspect of the treadle pump which influenced so many villages to choose it is its similarity to their traditional technology. For centuries, the Khmer people have used the rice pounder, which is very similar in its wooden framework. Similarly, the idea of using feet for pumping water is a common idea as they shift water with various types of pedal pumps.
- **Technical:** when the villagers saw the first treadle pump, they immediately understood the mechanism of the framework and have been able to duplicate and make modifications easily (for example, to hold water overnight, a measure adopted by 90% of the customers, or a re-design into a handpump.)
- **Financial:** low cost, access to credit (on Grameen bank principles) and high return on the investment encouraged the uptake.
- **Resources:** intensive use of local materials and access to shallow water.
- **Scale:** small farmers were able to purchase and use the pumps, which then enabled some of them to use mechanical pumps to irrigate larger areas.

Community participation was essential in the dissemination of the pumps. Communities had a sense of ownership from the initial assessment and choices of pump technology through to the manufacture and then making successful modifications in response to consumer demand.

Mecanhelas Water Programme

Mecanhelas District, Niassa, Mozambique

Prepared By Steve Hucklesby, Desk Officer, Christian Outreach

Outline

Access to clean water in the Mecanhelas district was very poor, with some villagers having to walk 17kms. The Mecanhelas Water Programme has been carried out in two phases. The first phase, from July 1994 to April 1996, was implemented under UNHCR's Repatriation and Rehabilitation programme for Mozambique. The second phase is ongoing and is one of a number of activities implemented under a community development initiative titled 'Helping Themselves'. The first phase was successful in meeting a target of 25 water points. This was achieved with the construction of 20 shallow wells and five boreholes serving an estimated 23,000 beneficiaries. Community mobilisation and animation are seen as key to the sustainability of the programme.

Activities

Villages were selected in discussion with District Authorities. A readiness of the community to participate was a pre-requisite to working in a village. Suitable wells sites were identified with the use of a hand auger to determine soil profile, analysis of the topography and investigation into existing wells.

The community dug a hole of 1.6 metres diameter to an average depth of 9 metres (maximum 13.5 metres). The well lining used mass concrete rings or stone masonry for the upper three metres. Smaller diameter concrete rings with 6cm holes to let water enter the well are used for the lower section of the well.

At ground level, teams constructed a concrete apron extending about 1.5 metres from the outside of the top ring and a 6 metre long spillway ending in a soakaway pit. Either AFRIDEV pumps or a windlass with bucket and chain were fitted depending on the yield of the well.

The initial contact with a village was made by a team of community workers who discussed the project and organised the formation of a village water committee. A separate community animation team then followed up, conducting a series of visits (three to eight visits per site) using drama, songs, talks and information cards covering:

- the importance of keeping water clean
- hygiene practice in the house
- common diseases
- the need for maintenance, cleaning and regulation of the pump
- formation and training of a maintenance team
- small latrine lids were distributed to encourage the use of latrines.

Thirty staff were employed on civil works and five on animation duties (consisting of three women, two with babies or young children, and two men).

The communities were involved in the whole process. To encourage community responsibility, it was explained from the outset that six months after installation, Christian Outreach would not re-visit.

The second phase of water provision commenced in March 1997. The construction of wells is one of a range of activities or 'joint actions' carried out under a community development programme. Joint actions were only embarked upon following a year of staff training, Participatory Rural Appraisal and the establishment of Village Development Committees. Eight villages identified water as their primary need.

Successes

- The UNHCR funded project was successful in meeting the initial objective of constructing 25 water points in the district. Communities appear to have developed a sense of ownership of the wells and are taking initiative in obtaining parts required for maintenance (e.g. coming to Christian Outreach to purchase them for cash or maize).
- The animation was well received with some communities asking Christian Outreach staff to come back and perform the same presentation a second time. One village Chefe (village head) said that he would fine anyone who did not construct a latrine after the presentation. Up to six months after the installation of pumps, it appears that most villages cleaned the wells and adequately maintained pumps.
- When communities had failed to keep wells clean, Christian Outreach staff worked with the community to clean the well so that the difference was apparent.

Constraints

- Twelve sites had to be abandoned due to lower than expected yields. Improved assessment practices introduced during the course of the project lowered the risk of failure.
- In five sites, Christian Outreach agreed to a request from UNHCR to commission a contractor to drill boreholes. The leadtime did not allow for adequate community consultation. Limited community animation and education took place in these after installation of the boreholes.
- The inaccessibility of some villages due to the lack of roads or presence of mines has prevented their inclusion in the project. Other sites have been reached with the help of motorbikes, bicycles and wheelbarrows to carry pumps and equipment.
- While the support of Chefes has, on the whole, been positive, some Chefes have made community mobilisation difficult.
- As the current techniques used for well construction and lining require substantial financial and technical inputs, there is little potential for communities to undertake construction without outside support.
- The poor capacity of the district water department is a potential constraint to long-term sustainability, as villages currently rely on Christian Outreach for the purchase of pump parts.

Lessons learned

Now, two years on from the installation of the majority of pumps, further follow-up needs to be planned to assess the functioning of wells and communities' health and hygiene practices. Continual monitoring is not thought to be desirable as the community must be encouraged to assume responsibility and to take the initiative on their own if they experience problems with pumps, etc. However, a further round of hygiene animation would be useful at this stage.

It was realised that if the Chefe was not involved in the setting up of a water committee, he often felt threatened. The project then made a conscious effort to mobilise the community through the Chefe.

Women animators are well accepted in villages and the presence of children helps in 'breaking the ice'.

The question of who has access to the well needs to be established at an early stage especially if there is likely to be a lot of competition for the available yield. In one village, a Chefe ruled that only those in the village who had helped in digging the well would be granted access. The pump was then sabotaged.

Introduction of Low Cost Rotary Drilling to Malawi: Specifically the Eureka Port-a-Rig

David Hillyard and Masauko Mthunzi, Concern Universal

Outline

From 1989 onwards, Concern Universal (Malawi) was involved in drilling boreholes through sub contracting, use of the Vonder rig (hand-operated auger) and Shallow well construction. In 1995, Concern Universal began its investigations into the use of the Eureka Port-a-Rig. This was as a result of Concern Universal's own experience in the water sector in Malawi and a recognition of the high cost of engaging commercial contractors. The Water Department and UNICEF was also developing its programme plan of action for the period 1997-2001 and also recognised the need for alternative technologies, and stated:

'Given the present coverage and technologies available, Malawi urgently needs to find a means of accelerating its population's access to clean water and adequate sanitation facilities. Investigations are necessary to find the technologies that are quickest and most cost-effective for installing both water and sanitation facilities.'

And specifically, *'(I) To identify appropriate and low cost existing and new technologies in water and sanitation, such as alternative drilling methods.'*

Concern Universal experience in the sector concurred with the Water department/UNICEF. The Eureka Port-a-rig was identified as one such possible appropriate technology. The Port-a-rig is a rotary, diesel-operated, compressed air/fluid flush rig that is assembled on site and is carried from site to site in a 4WD Pick-up truck.

As a result, Concern Universal approached the British Government for funding to pilot test the Eureka Port-a-Rig in Malawi. This proposal was supported and pilot testing of the rig began in November 1995 in Central Malawi, with an initial 30 holes.

The test period was successful with a variety of geological conditions encountered requiring mud and air drilling. All of these holes remain within areas where Concern Universal are operating and a check of all pumps in April 1997 (on average 18 months after construction) found them working effectively. A further eight holes had their pumps removed for more detailed inspection and depth measurements.

Having initially tested the rig with good results, it was promoted as an appropriate drilling technology that could be used more widely. Therefore, operation of the rig continued and specifically on a Ministry of Education Primary Community Schools Project, since this project covered the whole country.

There are now three rigs in operation in Malawi, two by Concern Universal and one by Action Aid.

Construction methodology adopted with the Eureka Port-a-Rig

In fractured basement, holes are not fully cased (only the top unstable or weathered section is cased) and drilling at a smaller diameter of 95mm is undertaken, sufficient to allow installation of

the Afridev and Malda handpumps. This is what contributes to the significant cost saving in borehole construction, since the Port-a-Rig is a rotary diesel operated compressed air/fluid flush rig with the other associated running costs (although on a smaller scale and with a 12bar, 275cfm compressor), but of a much lower capital cost and drilling capacity. In any unstable or soft formation, drilling occurs at 150mm to allow installation of 110mm PVC casing as per current Malawi standards (i.e. borehole construction standards set in the early 1980's with support from British Geological Survey). It is worth noting that drilling technology and construction methods since then have improved and, hence, current advice from British Geological Survey indicate that the methodology adopted for the Port-a-Rig is sound.

Successes

- **Operation.** Drilling operations are entirely operated and managed by National staff after a six-week training period. To date over 100 new boreholes drilled and operational.
- **Maintenance.** Effective operation and maintenance established and maintained.
- **Low cost.** The nominal cost per hole using the Port-a-Rig currently stands at approximately £1,200 or MK36, 000. This is a very considerable saving over the use of commercial contractors, where total construction costs exceed MK100, 000. The Port-a-Rig can replace a good number of holes traditionally drilled by commercial contractors.
- **Effective communication and support.** Peter Ball of Eureka UK Ltd has been efficient in the supply of spare parts and in providing ongoing technical support as drilling experience was developed.
- **Integration.** The Port-a-Rig allows for a good deal of community participation in terms of its transport and erection on site, as well as during the construction period. It is able to access those areas where communities live but cannot be reached by larger rigs.
- **Flexibility.** The rig can be flexibly operated by CU to take into account community aspects (e.g. waiting for community to mobilise, ensuring participation, delays for funerals). This ties in well with community-based management and the need for maximum participation and ownership.
- **Complimentarity.** The rig is operated in conjunction with a number of Vonder rigs and use of commercial contractors. This allows most appropriate technology choice for differing circumstances.
- **Construction methodology.** Low-cost, alternative construction methodology re-introduced to Malawi, which can be monitored for its appropriateness.
- **NGO "Friendly".** The rig and its operation have shown itself to be within the management capacity of a small NGO with relatively little prior direct experience of borehole drilling.
- **Drilling rates.** Completion of drilling takes approximately two days, competitive with larger rigs. Further low-cost technology at present in Malawi is in the form of the Vonder Rig, which has a limited application as far as geology is concerned and can take in excess of two weeks to complete a hole.
- **Rig performance.** The rig exceeded its expected performance criteria, with many holes going beyond 35m in basement complexes.
- **Larger diameter drilling.** Current compressed air drilling in basement at 150mm diameter is proving effective against expectations.

Constraints

- **Acceptance.** Despite regular communication, government is not willing to accept any modification to borehole construction methodologies. This has necessitated the development of upgrades to the rig (see *Lessons learned*).

- **Drilling.** Limited to maximum depth of 50m with air and 36m with current mud pump (not a problem in Malawi as few boreholes exceed 45m and average depth is 35m). Cannot cope with complex or difficult geological/drilling conditions.
- **Construction methodology.** Due to lightweight, mechanical nature of the rig, sometimes difficult to ensure fractured basement has been reached and there is therefore a danger of leaving unstable sections of the hole uncased.
- **Spares.** Many spares have to be supplied by Eureka UK Ltd Despite efforts to source locally or in the region, these often turn out to be more expensive than Eureka supply. UK supply means it is necessary to carry a comprehensive spares stock to ensure rig is not held on stop awaiting spares.
- **Operation and maintenance.** Despite the simple technology, Local NGO partners would probably still have difficulty in effectively running the rig. This is more a reflection of the relatively weak local NGO sector than complexity of operations.

Lessons learned

- **Operation and management.** As with all drilling operations, good logistics support and efficient field management is essential for success. Project Field Engineer required on site frequently.
- **Borehole Monitoring Requirement.** Due to refusal of government to accept partially cased holes and lack of proper documentation of their performance in Malawi's geological conditions, it has been necessary to develop a monitoring programme and also upgrade the rig for the interim period. As a result, a Borehole Camera and VCR has been procured which will allow recording and viewing of boreholes constructed. Any indications that the boreholes are not performing and/or siting/collapsing will result in revision of the construction methodology or a reduction in terms of the areas of effective operation of the rig. This will allow for comprehensive testing and reporting.
- **Currently Proposed Upgrades to the Rig.** In light of current experience with the rig and also in response to some of the concerns raised by the Water Department with respect to construction methodology, Concern Universal with Eureka UK Ltd has undertaken efforts to consider improvements to the rig in order to try to enhance its capacity and performance. Some of these are outlined below and constitute part of the ongoing testing of the technology and it's adaptation to the Malawi conditions. These upgrades will be developed within the context of the monitoring programme.

Rig modifications/upgrades

150mm compressed air button bit combined with a high pressure foam pump

The variable rock hardness found in some areas had resulted in the need to abandon some sites as a result of drilling with compressed air (at 95mm diameter) through hard laterite layers and less weathered basement into softer formations below, which subsequently collapse and cannot be cased.

Since the 150mm dragblade bits used with a mud flush does not have the capacity to penetrate these harder laterite layers or less weathered basement complexes, it was deemed necessary to try to establish a method of penetrating the harder formations at 150mm diameter through air drilling and use of button bits that would subsequently allow for casing at 110m.

In order to enable air drilling to be carried out without casing the top section of the hole (to prevent hole collapse and probable loss of the down-the-hole hammer), it was necessary to be able to

inject stable foam into the hole while drilling with the button bits. The rig was equipped with a manual foam pump, which limited the potential for creating the stable foam required. Therefore, provision of a high-pressure (100 bar) foam pump, together with a 150mm button bit, would allow drilling with compressed air and stable foam without fear of collapse of the hole. It would also increase the penetration capacity of the rig at larger diameter.

It was hoped that this additional capacity and facility on the rig would improve the application of the rig and ensure that all potentially unstable formations can be fully cased with 110mm PVC casing. This would reduce the number of sites that have to be abandoned due to drilling difficulties.

Field testing of this technique began in September 1997 and to date results have been very successful, although only seven holes have been drilled so far and further testing is required.

Hydraulic feed/hoist to drilling operations

The manual operation of the hoist and light weight of rig limits the speed of drilling operations and also the available load applied to the dragblade bit during drilling operations. Therefore, addition of hydraulics to the rig would serve two functions:

- 1) Provide a feed weight during drilling therefore potentially increasing the penetration potential during mud/dragblade drilling.
- 2) Make drilling operations quicker and less labour intensive on the drill crew since the hydraulic hoist would be used to lift the drill stem from the hole - particularly relevant on the deeper holes.

New drilling rig – upgraded/up-sized Port-a-Rig

Eureka UK Ltd, having designed two appropriate technology drilling rigs (the 'Port-a-Rig' and the larger 'drill system'), is proposing to combine elements of both rigs in the design of a new intermediate rig which will be an up-sized Port-a-Rig costing approximately £12,000. The new rig would be fitted with hydraulics and deliver more power to drilling operations. Key improvements/differences to the Port-a-Rig would include:

- trailer mounted rig as opposed to loading rig components onto a pick-up
- hydraulic hoist/feed fitted as standard
- larger drill mast, gearboxes, components etc.
- 11Hp engine versus the current 5Hp engine on the Port-a-Rig.

It is expected that this rig would be able to demonstrate a clear improvement in performance and drilling capacity over the port-a-rig. It would also fit into the existing infrastructure of the project and Concern Universal. It would remain a low-cost drilling option, with drilling parameters established during design but likely to be very appropriate to Malawi conditions.

- **Government.** High personnel turnover has resulted in a change in level of co-operation at Ministry level. There is limited commitment to develop appropriate drilling technologies and research capacity at the Ministry is weak. Government drilling programmes are donor-funded and cost-effectiveness is not a key issue. Possible strong lobby from commercial contractors against introduction of low-cost alternatives.

Bangladesh Cyclone Shelter Preparatory Project for the Commission of the European Union & World Bank IDA

James Lewis, Datum International

Architect I with Ingenieria y Systemas SA/Mott MacDonald Ltd

Outline

The project commenced in 1995 following previous involvement by the author in Bangladesh on related projects. Its objective is to provide cyclone resistant infrastructure to serve as refuge from cyclones and accompanying storm-surges, which affect the entire high-risk area of the Bay of Bengal coastal zone.

The project is not yet completed, though numerous other multilateral and NGO projects have built cyclone shelters of many different kinds, which are now in use. Stage One, which comprises for example, mapping, refinement of high, medium and low-risk zones, strategic planning, participatory rural appraisals and building designs, will be completed in early 1998. Stage Two will comprise preparation of documentation for construction contracts, the location, size, content, cost and timing of which are currently being determined.

Description

Cyclone resistant infrastructure is dual-purpose and may comprise improved existing buildings and/or new buildings, each with a normal-time use in addition to serving as cyclone shelters when required. About a dozen different building types have been designed for dual-purpose use, and include primary and secondary schools, family welfare centres, mosques and madrassas, markets, ferry terminals, sluice gate stations, grain stores, etc. Construction will be in reinforced concrete, endemic in Bangladesh. Three-classroom primary schools are the preferred building type.

There is compatibility in design between many aspects of primary school and of cyclone shelter use, for example, separate rooms for school classes and for gender separation if preferred, large numbers of users at one time, a need for robust materials, etc.

Successes and constraints

It is too soon to know successes or to identify lessons learnt from this project. From cyclone shelter design and use generally, however, it is not too soon to identify problems and constraints. Predominant is toilet provision and the related supply of water. Primary schools are traditionally provided with external latrines. Cyclone resistance requires buildings to be raised on stilts above design heights for storm surge flooding in which external toilets at ground level become unusable. Normal-time use nevertheless requires the provision of external toilets at ground level, whilst cyclone shelter-use requires internal toilets at raised level.

Cyclone shelters become unbelievably overcrowded and are known to remain so for up to twenty hours. Overcrowding means enforced standing shoulder to shoulder for women and children as well as men. Notwithstanding space calculations on the basis of two persons per square metre (five square feet per person; not over generous), actual use is of five persons per square metre (two square feet per person and the Bangladeshi recommended norm).

The number of toilets to be provided for these circumstances is a source of endless debate. A practical view is that people in such over-crowding are reluctant to leave the space they have, even if they are able, and will not go to toilets. Another view is that people in such conditions of anxiety require more toilet provision than normal.

Toilets require water supply and notwithstanding cultural differences in use, sufficient water is essential in piped disposal systems to prevent drying of faeces and consequent blockages. Piped water from tubewells to storage tanks is being considered, as is the use of rainwater for flushing, though this has difficulties related to siltation and algae formation. More serious is the need for provision of drinking water in conditions of overcrowding in tropical temperatures for long periods. If people cannot or will not move, drinking water has to be taken to each room and space available to them. Three tubewells are planned for each building; one adjacent to each toilet and one centrally. From these, potable water supply will be piped to additional standpipes in classrooms, in the teachers' room and on the roof. Water provision in classrooms of government schools is unprecedented until now.

Interim concerns and satisfactions

The over provision and use of tubewells in Bangladesh is creating and exposing new problems. More and more tubewells are creating lower water tables for which deeper tubewells are required; more tubewells contribute to delta subsidence which will exacerbate flooding, and there is now the realisation of the presence of arsenic in substrata. Nevertheless, people are known to have died due to overcrowded cyclone shelters. Survival during cyclone shelter-use is a crucial issue during cyclones, as well as afterwards when rural tubewells may have become saline and unusable.

Primary school management norms, as well as cultural norms for adult crowd behaviour, need to be reflected in building design. Design priority is with the normal-time user, but new building types – as are dual-purpose cyclone shelters – may expose these norms as incompatible, possibly with consequent advantages to the normal-time user.

Urban Slum Water Supply, Dhaka, Bangladesh

Dushtha Shasthya Kendra/WaterAid/World Bank-UNDP

Water Supply and Sanitation Programme

Bruce Herzer, Research Assistant and Clarissa Brocklehurst, Country Representative, WaterAid Bangladesh, and Akhil Chandra Das, Project Manager, DSK

Outline

Dushtha Shasthya Kendra (DSK) is an NGO based in Dhaka whose goals include building strong and functional community organisations. As part of its projects funded by WaterAid, the World Bank and the UNDP, DSK has developed a series of 'waterpoints' in several Dhaka slums – legal connections to the city supply arranged and financially guaranteed by DSK on the slum dwellers' behalf.

The waterpoints consist of a water storage reservoir from which water is pumped using a simple suction handpump. The reservoir is topped with a concrete slab, which serves as a place for the users to bathe and wash clothes. Users can also collect water to take back to their homes. Some waterpoints also have a latrine on them for public use. The waterpoints cost £500-1000, which is loaned to the community as credit and eventually repaid out of the profit the site, generates from sale of water and user charges for the latrines.

Ownership of the facilities (which are built on city land) is, thus, transferred to local community groups who operate them as a business. Procuring permission to build these sites from both legal and unofficial authority figures, and then ensuring the sites stay in the communities' hands, is a difficult process, requiring a great deal of negotiating, politicking, and compromising. There are many people who do not want to see the waterpoints in place. Through its many years of experience, DSK has learned that there is no standard solution to overcoming opposition from these parties, although there are a number of options at their disposal. The anecdotes presented here recount some of the problems DSK encountered early on, and how they learned to deal with them.

Description

When DSK decides to build a waterpoint, they first meet with local inhabitants to explain the plan and decide on a specific location. Usually, most slum dwellers are very keen on the idea, whilst others are adamantly against it – they have illegal connections to city pipes from which they already sell water at a price twice that which the waterpoints charge.

During one of the first projects, DSK's problems began with the local mustan, or strongman. The community feared him a great deal and were, at first, reluctant to back anything that he would object to. After speaking to DSK however, they realised that the waterpoint would benefit them enormously and helped select a site. Suitable land is extremely difficult to find in Dhaka's slums, and the only available space was very close to one of the mustan's illegal connections. Of course, he wanted none of this, until the community bought his co-operation with the proposal that he could head the site management committee. DSK eventually got permission from the city corporation (DCC) and the water authority (DWASA) to build.

However, once the mustan realised how the site would be run and that he would not personally profit at all, he changed his mind. Under community pressure to keep his word, he did not overtly offer any resistance, instead sending his lackeys to harass the workers and insist they were digging on private land. Although they had permission from the city to build there, DSK had to persuade community leaders to stand up to the thugs and make them back down. Work resumed, but a few days later the workers were once again told to cease construction, this time by trade union leaders from a local fabric factory that apparently had the site in mind for an office.

DSK decided to review the site selection and, once again, consulted the community. One slum dweller offered the use of his land, provided that a reservoir was built on top of which he could place his residence. The community approved of the idea and construction on the new site began. However, authority figures from another local fabric factory told the workers, yet again, to stop. When they refused, the factory had the police arrest the workers, even though there was no legal premise. Realising this, the police let the workers go but, assuming that DSK had contracted out the work to a smaller group, demanded bribe money. In fact, DSK was doing the work itself and so directly confronted the police, who backed off, having no desire to clash with the city authorities.

Eventually the site was finished and the community began operating the facility (without the mustan at the helm). Soon after it opened, an 'informer' who represented the police came and demanded US\$25 a month for protection. DSK met with him and, having learned that throwing their weight around could work, told him to stop. This apparently succeeded, since six months have passed with no further harassment.

DSK has faced a variety of similar problems at their other sites also. In several cases, factory owners have hindered construction on uninhabited land near their factories ideal for a waterpoint. Usually, this is because they have unofficially claimed the land as their own and fenced it off as a barrier against the slum. DSK tries to maintain civil relationships with the owners, who have political ties, but sometimes have to resort to playing their own political power game with city officials and, even in some cases, cutting illegal fences to access public land.

Working with DWASA and the DCC has also proved trying; it took DSK a long time to establish good relationships. DWASA is fighting corruption within its employees; even so, there were frequent demands for money. DSK and its funding agencies have a policy of not paying bribes, so as a result, applications would get redirected and delayed, in some cases taking a year to process as opposed to a day if palms were greased. Through persistence and a successful (but hard-fought) appeal to the morality of water authority workers, DSK is no longer approached for bribes, and frequently enjoys DWASA's support on legal issues.

Another problem is preventing operational sites from falling into the hands of mustans. The community groups are designed to prevent this, but it is easy for a local strongman to get himself "elected" as head of the committee. The first site that DSK put in place was seized in such a manner: the mustans told DSK to leave them alone and never return, that they would manage the site themselves. This was unacceptable since the entire idea was to have a community-run, legal connection to the city pipes. The mustans bribed the meter readers to list the meter as broken and, thus, charge a vastly reduced water bill. In addition, DSK was unable to recover the cost of construction. At the time, the organisation was quite small and unsure of how to resolve the issue. They have since gained a good reputation with the city authorities and have returned to the site, demanding that the construction costs be repaid or the connection will be shut off. This appears to

have worked – the mustans have agreed to repay the construction costs, although removing them from the committee is harder, since they are the “elected” representatives of the slum dwellers.

Conclusions

These examples demonstrate how, with the right balance of diplomacy and political force, it is possible for an NGO to navigate its way through the red tape and power struggles that hinder project implementation. This is a skill frequently unique to smaller, locally-based NGOs who have the experience and cultural know-how to overcome such difficulties. Working with these NGOs is crucial for larger organisations that are developing projects in such environments.

Lessons learned

The committees can be weak and easily controlled by the mustans. So now, DSK selects members of the committee from participants in their credit program. They discuss clearly who will own and operate what and place emphasis on participation by women.

DSK now implements a two-committee system. The first committee, which manages the regular affairs of the site, is made up of only women. The second, smaller committee (five members) is an advisory committee of only men, who help the management committee to deal with problems such as strong-arming by mustans and ‘informers.’

Now that DSK is bigger, they have enough employees to monitor the sites regularly, something they were unable to do before. Mustans no longer have the opportunity to steal sites from under DSK’s nose.

Having the backing of DWASA and the DCC is of enormous help; they are regarded as organisations that no one wishes to cross. DSK’s work also benefits DWASA because the connections are legal and the bills get paid – a most unusual occurrence in Dhaka. The city workers generally have a good opinion of DSK and tend to co-operate. Furthermore, DWASA’s meter-reading branch is due to be privatised soon, which should drastically reduce corruption and encourage the establishment of legal connections.

FARM Africa Community Oriented Rural Development Project, Tigray Ethiopia

Vincent Gainey, Programme Officer with FARM-Africa

Outline

The Community Oriented Rural Development Project (CORDEP) is a multisectoral project based in the city of Axum, and covering one *Woreda* (District) of the Central Zone of Tigray Region in the north of Ethiopia. The project started in 1994 and the first phase lasted until the end 1998. The project activities cover dairy goat development, training of community paravets, community tree nurseries, Participatory Farmers Research, soil conservation (Gully control), livestock feed resources improvement, construction of rural access roads and domestic water supply, and an emphasis on training in all these areas.

As a result of the food deficit situation in Tigray, where, even in a good year, families can still only meet 60% of their total food needs, CORDEP has been paying food for work for community labour under a Household Income Support Programme. This is designed to provide local employment opportunities in order to discourage out-migration in search of paid work.

Provision of domestic water supply, rural road construction and the gully control work are all carried out using food for work. Food is supplied from the food aid component of the European Union Food Security programme in Ethiopia.

The availability of water was identified in a pre-project study as the main limiting factor. Water quality was a lesser concern. It was felt, therefore, that meeting this basic need should be the priority and that using food for work payments would not undermine the willingness and ability of the communities to manage and maintain the facilities in the longer-term.

The immediate objective of the water programme is that *domestic use of water by humans should be increased, and the physical stress on women, and the time they and livestock spend in collecting water should be reduced.*

Prior to the start of the project, average daily per-capita water consumption in this part of Tigray was 5-10 litres and journey time to collect water could be as long as a seven hour round-trip.

Activities

Construction of village, household and institution water supplies

Since the project started the following types of water supply structures have been constructed:

- Hand-dug wells with handpump: 7 completed and 7 under construction
- Cisterns: 1 completed and 1 under construction
- Small dam: 1 under construction
- Protected springs: 2 completed
- Roof catchments (on clinics): 5 completed.

Village water committees are formed to manage the labour and the completed water point. Pump caretakers are appointed by the community. This may be one individual selected and paid by the community or, in some cases, the responsibility will rotate within the community.

In accordance with the policy of the Tigray Regional Government, all wells must be fitted with a handpump, and, in Ethiopia, the national standard is the Afridev. Presently, the capital cost of the pump is fully subsidised by the project. Pump spares are being provided with the pump and water committees are trained in maintenance and repair. The continued supply of spares is being reviewed at Regional Government level with several options being considered, including supply by the Government and the use of private traders.

Successes

- Improved water supply established at locations where previously there was none. At one location, on top of a high rock *amba*, the construction of a cistern supplied by surface runoff, has supplied water to a community, which previously relied on sources over seven hours round trip distant.
- Journey time has been reduced (the project target was to reduce to a maximum of one hour for a round-trip) and there is anecdotal but, as yet, unverified evidence of an increase in per-capita water consumption.
- Water committees trained and established for each water point completed.
- Tigray regional government and adjacent *Woredas* (Districts) requesting the assistance of FARM to develop more water supplies.
- The degree of community participation achieved despite using food payments for work.

Constraints

- Agreeing value of the work to be contributed in terms of a set rate of (food) payment.
- Availability of workers (as in Ethiopia there are many days when work is not possible due to religious holidays)
- Excavation in difficult rock. Use of explosives has not been allowed by the regional government, and, until recently, the project did not have a compressor and rock breaker.
- Transport shortage.
- Shortage of water engineering skills on the project staff.
- None or limited hydrogeological information available for the region. Well siting, hence, a problem.

Lessons learned

- When the basic and over-riding need is for an improvement in availability and quantity of water, communities are prepared to contribute a great deal in time and labour.
- It is possible, as a short-term measure, to pay food or cash to beneficiaries and still attain a high degree of community involvement in the establishment of a community water supply. No payments from the project are subsequently made for maintenance, management and repair.
- It is too early yet for the project to assess whether the commitment of the community will be maintained in the long-term to ensure the continued future operation of the improved water supply. Experience to date is encouraging in this respect, but no definitive statement can yet be made.

West Myagdi Community Health Programme (WMCH), Nepal Organisation: International Nepal Fellowship

Chris Rudall (Seconded by Baptist Missionary Society)

Outline

Myagdi district is in the Western Region of Nepal. The first phase of this community health programme covered a fairly inaccessible region of small, scattered communities at altitudes in the range 1200m-3000m, between the Middle Hills and the Dhaulagiri/Gurja Himal Mountains. The weather pattern is typical of the Middle Hills of Nepal, with rainfall concentrated almost entirely in the June-September rainy season. The programme served a population of about 12000 people, the majority of whom are farmers, growing mainly wheat, maize and rice. High-caste (Brahmins and Chetris), low-caste and Magar and Chantyel tribal groups are all represented in the area. There are many good but unprotected water sources (springs and streams), but these are often accessible only via steep pathways and are often polluted by people and animals.

Activities

WMCHP is an integrated programme aimed at improving the health of the population via community activities, including Government Health Post support, mother/child clinics, school health programmes, literacy classes, horticultural and health activities, drinking water and sanitation. The drinking water work was entirely construction and rehabilitation of gravity feed schemes using water from either protected springs or remote streams. A total of 20 small gravity feed systems, plus additional spring protections, were constructed over a four-year period. Each scheme was initiated by request from the community, followed by planning, designs purchasing, construction and maintenance training phases. The work demanded a high degree of community commitment in terms of carrying equipment and site labour.

Successes

- **Basic health hygiene messages** were conveyed, especially to women and children via mother/child clinics, the school health programme and women's literacy classes.
- **Devolving power.** Early in the programme, we realised the need to shift 'ownership' of water schemes from the agency involved in the work towards the actual users. We began by establishing village level water committees, but these were invariably dominated by men, usually influential local figures. There were difficulties raising maintenance funds because no one trusted the committee. A small but significant success was to establish women's groups to look after their local tapstands and raise and administer their own contributions to the scheme maintenance fund. This was an effective way of devolving power and responsibility towards the end-user. It also helped to increase the confidence of women to manage their own affairs.
- **Health impact.** Taken as a whole, positive benefits have resulted from the programme. Over five years, the percentage of well-nourished 1-5 year olds increased from 70% to 80%.

Constraints

- **Male community leaders** continued to have great difficulty in understanding the importance of involving women in the planning and managing of water schemes.
- **Understanding** of basic scheme concepts was generally very poor, for example, the relationship between storing water in a tank and the need to turn off taps after use.
- **Preventive maintenance** is a poorly understood concept.

Lessons learned

- **Empowerment and ownership.** As the programme progressed, we became increasingly uncomfortable with imposing our specific health agenda on the community and being seen as a provider of services – a 'big cow there to be milked'. Whilst much was achieved, it was felt that the approach did not lead to an authentic sense of ownership or further the process of empowerment. The second phase of the programme, which is based on a neighbouring area, is taking a facilitating approach, designed to help community groups to understand and prioritise their own perceived needs, then follow through an action plan to bring about change themselves. The services of technical staff will still be available to these groups if requested. If other services are required by the community, the programme will assist community groups to make contact with government departments or other NGOs who can help.
- **Targeting the very poor.** We became increasingly concerned that the programme was not reaching through to the very poor in the community. They will always tend to hold back whilst more vocal and confident people will step forward to claim the benefits. In the water context, we had to take a firm stand at the planning stage to ensure that low-caste groups were adequately served. The message here is that it is not enough to classify an entire community as 'poor', since every community will tend to subdivide itself and marginalise sub-groups within it. In the programme's second phase, staff will take a proactive role in identifying and working specifically with marginalised groups.
- **Toilet construction.** It was decided at the beginning of the programme not to make toilet construction a pre-condition for going ahead with a water scheme. By taking a risk and relying on health messages conveyed through, for example, literacy material and the school health programme, we found that gradually people began to build toilets because they could understand the potential benefits, in terms of health and also convenience and privacy. In four years, the number of homes with toilets in use rose from 6% to over 50%.
- **A marketing lesson.** For villages where houses were too close together to build simple pit latrines, pour-flush pans were made and sold at a subsidised price. Because a value was put on them, demand was surprisingly high.
- **A 'democratic' approach is not always appropriate.** One remote village was 'ruled' by a very powerful leader, who was also sympathetic to the needs of the poorer groups within his community. It quickly became clear that a 'democratic' committee-based approach to planning the water scheme would not work. In this instance, the leader made most of the decisions on behalf of the community and the scheme progressed very well. This would seem to go against current development thinking but there may be a lesson here for agencies to take a flexible approach to the ways in which they are prepared to co-operate with communities.

Gunjur (The Gambia) Community Water Project

Nick Maurice, The Marlborough Brandt Group

Outline

The Marlborough Brandt Group has had a link with the predominantly Muslim town of Gunjur in The Gambia since 1982. The link has been based on the exchange of people and the development of strong relationships between the people of Marlborough, Wiltshire (pop 7,000) and the people of Gunjur, the largest fishing community in The Gambia, (pop 12,500).

Whilst exchange of people (approx. 500) between the two communities has been fundamental to the link, increasingly the two communities have together become involved in an integrated development programme. This includes health education, credit and savings, literacy, business education and now water.

Arising from the link and using the knowledge acquired of Gunjur, the MBG set up a Development Education Centre, The Wiltshire World Studies Centre WWSC, in Marlborough in 1990. WWSC provides teaching resources for schools through the UK. WWSC writes its own resources based on Gunjur and takes groups of teachers and county advisers to Gunjur for study visits.

Background

Our partners in Gunjur organised a participatory rural appraisal in 1995 and went through a strategic planning exercise in 1996. Both of these exercises pointed to the fact that easy access to clean water was considered to be the highest priority for people in the community.

Most of the surrounding villages have access to clean water from boreholes and/pumps. Because of its size, Gunjur falls between the stools of not being large enough to count as urban (the responsibility for urban water falls within the remit of the Government agency NAWEC) and not being small enough to count as rural (most rural water supplies have come from EDF) and therefore, has been ignored.

At the present time, the only access to water in Gunjur is from open wells, both public and private. It is estimated that there are 450 wells in Gunjur. Last year, four children died from drowning having fallen down wells. Many children die of gastro-enteritis from drinking contaminated water. No effort is made by women using the wells to keep the buckets clean. The health education programme is:

- a change in attitudes to gender as women have become increasingly outspoken and involved from their intimate knowledge of issues around water which is not shared by men
- the setting up of kabilo (ward) based womens' committees responsible for raising the money for the sustainability of the programme
- the raising of that money on a regular basis and the saving of that money in the community credit union
- a feasibility study which gives three options for developing a clean and accessible water system.

Constraints

The negative outcomes were:

- a misunderstanding in the initial phase of what a feasibility study set out to achieve
- the raising of false expectations of what the Marlborough Brandt Group's role might ultimately be and the particular expectation that MBG would provide sufficient funding to carry the whole operation through
- the realisation by MBG of how complex the situation really was and that MBG does not have the capacity to manage the project at the UK end.

Lessons learned

The options

The three options that have been considered are:

- 1) the capping of a certain number of key wells in the community with the installation of handpumps with the necessary support for the programme through training of women, in particular, in pump maintenance
- 2) the installation of an estimated six shallow boreholes in Gunjur with solar operated pumps and overhead tanks and a reticulation system that takes water to strategically placed street taps
- 3) to await for the Government plans for the extension to Gunjur of the public water system in the Greater Banjul area. This would involve a single deep borehole some 15 kms from Gunjur to escape from the possibility of salination as the town is only 2 kms from the sea.

The option chosen

Option 2 is the favoured option by the people of Gunjur for two reasons:

- 1) It gives them control of their own water supply
- 2) They feel that it is a sustainable programme.

There is little faith that the Government programme will be carried out in the foreseeable future and there is a feeling of urgency now that there is a momentum.

The present situation

Graham Fryer of Lewin and Fryer Water Engineering Consultants, who have a long history of supplying water to urban areas in The Gambia, is visiting Gunjur at the time of writing, to listen to what people there are saying and to give his views of the possible implications of any particular choice of water supply. He will be costing out a detailed engineering survey for consideration by the Marlborough Brandt Group and will be accompanying members of the Gunjur Water Committee while they lobby Government.

A feasibility study

In February 1997, a water engineer / development worker from the Institute for Irrigation and Development Studies at Southampton University undertook a feasibility study in Gunjur. The positive outcomes of the study were:

- a very good understanding of the present water situation in the community through the collection of data by the 'water team' set up to work with the water project manager
- the development of an infrastructure in the community that has the authority and trust of the community and is able to carry the developments further forward
- the empowerment of women.

Antitar Water Supply and Sanitation Project

Dinesh Bajracharya, Engineering Coordinator, Newah, Nepal

Outline

Antitar is one of the 51 water supply projects, which was implemented during the fiscal year 1995/96. This includes a component of integration of sanitation and health education as well. It is located at Bangesal village development committee of Pyuthan district in the Mid-Western development region of Nepal. This project serves a population of 397, 62 houses with six tapstands. The local unit of the Agriculture Development Bank of Nepal called the Small Farmers Development Programme (SFDP) implemented the project with financial and technical assistance from Nepal Water for Health (NEWAH), a non-government organisation working in the water sanitation and health education sector.

Description of Activities

The community people were fetching water from streams which was not safe for drinking. They used to spend about 45 minutes per round-trip for water collection. The sanitary condition of the village was very poor and, every year, 1-3 children died due to water-borne diseases. It was found that only one house had a latrine in the project area during the survey.

The Small Farmers Development Programme, Bangesal, Pyuthan, which is located adjacent to the project area, considered the hardship of the people and the alarming sanitary condition of the area and submitted a project proposal to NEWAH in December 1995.

NEWAH conducted a technical and social survey using PRA techniques in early 1996 and found that the project was feasible. It was then designed and costs were estimated and finally submitted to WaterAid for approval in June 1996.

As the project was approved, an agreement was signed between SFDP and the Project Management Committee (PMC). The selection of a local non-governmental organisation's representative designated as the NGO coordinator and health motivator from the project area was then selected and trained in project management and health education aspects respectively during September 1996.

In early November 1996, a suboverseer from NEWAH was sent to the project site to be stationed there for project implementation and related activity. They assisted the villagers in the formation of a project management committee, helped health motivators to raise the funds for sanitation, training of local mistries for the construction of water supply components, as well as for plumber training for pipe fitting.

This scheme consists of a construction of one intake (spring), digging and laying of 5500 metres of HDPE pipe, construction of three BPVs, one Reservoir tank and six tapstands.

A health education programme was conducted for an almost equal period as that of the water supply construction period. One local health motivator was involved in health education for each member of a household within the project area. The outcome of the health education programme resulted in the construction of 46 drying dish racks, 52 garbage pits and 46 direct pit latrines fitted with pans.

Lessons learned

NEWAH has learnt many lessons from the community, partner and project during the survey, implementation and evaluation of the project. Some of them are as follows:

- A project will be successful in a community where real need is felt by that community.
- Small projects are better than large projects for success.
- Similar types of cast (no big hierarchy within the cast) in a community like Chtry, Magar, Kami is conducive in creating a better understanding.
- Unity within the community is a most effective tool for success.
- Positive attitude of partner towards the project will have a large effect.
- Out school programme was very effective for the health and sanitation programme.
- Video show programme is an effective tool for the motivation in a health and sanitation programme.
- Availability of local materials e.g. sand, stone, wood etc. made the project cost-effective.
- Clustered village is an added advantage for the project to be successful.
- Project site visit from Senior Management Team (SMT) Members (Section Heads in NEWAH Headquarters) encouraged the community people to work better for their own recognition.
- Women participation was a very encouraging tool for the success of the project.
- Flexible policies and procedures helped the community to explore their own ideas, which created avenues for innovation. Besides the certain rules and regulations, there should be some flexibility where the community people can decide for themselves about the project.

Community Involvement in the Development of Participatory Health Education Materials – WaterAid Ghana Programme

Silas Quaye, Deputy Director (Social), ProNet, Accra, Ghana

Outline

WaterAid Ghana programme provides support to communities to enable them to identify problems relating to water and sanitation, construct facilities and undertake activities that will help solve those problems. This is achieved through the support and supervision of nine partner organisations working in the network.

In September 1996, a hygiene education policy was introduced. The objectives are to enable the beneficiaries' projects to limit:

- the occurrence of water and sanitation diseases through the adoption of safe behaviour
- the effect of water and sanitation diseases when they do occur through the adoption of safe treatment behaviours.

In response to the policy, the Ghana programme initiated a process to identify local health problems, identifying areas of risk, gathering information and understanding why people act as they do. This was to end with the development of hygiene education messages to be used to pursue the objectives set. The messages will be published in different forms of participatory hygiene education materials.

Activities

Our quest to improve the lives of the poorest of the poor in our society continues to introduce and bring up new and innovative ways of solving problems. In reaction to the widespread failure to achieve improved conditions among the rural poor, a methodology has emerged: the participatory approach. This approach placed emphasis on the involvement of local people in deciding their development.

People-centred approach to hygiene education message design material development

The development process

In developing the hygiene education messages, expertise was drawn on from all stakeholders: Project Supervisors, Resource Persons from the Ministry of Health, Community Development, Local Council and Partner Organisation networks.

Data collection

The hygiene education message development process was based on, among other things, the expressed perception of the practices and way of life of the target group. A baseline survey on selected communities across all Partner Organisations was conducted using a participatory approach. This formed the basis for what health issues to focus on. The data collected also covered background information on communities, occupation, facilities, culture and the physical environment of the community. Information from secondary sources, like the hospitals and health centres, prevalent diseases and health problems, their perceived causes, and remedial action usually taken.

The data collected was discussed and analysed, in the first instance with the community members and at a workshop: a consultative process to come out with the key issues. Participants to the workshop were from various backgrounds and professions related to the area of focus. Discussion of the data was done in various professional groups, as well as mixed professional groups. Some of the issues that come up during the discussion were:

- high-risk areas to focus on
- remedial action usually taken
- perspective of the problem from the community and public health institutions
- relevant physical features and facilities that affects the health of the people
- prevalent health problems and community perception on them.

Field visit and prototype development

Developing a more community-friendly hygiene education message requires the active involvement of the community in the creation of the graphics. The messages should be based on identified problems. It was, therefore, important to bring back the identified problems to the community and give them a role in the creation of pictures that would depict the problems. The result of the base line survey was thus taken back to the community and discussed with them.

The community was then given the opportunity to express problems and solutions through visualisation and drawing on the ground or chalk board. It was encouraged to include background images of their community and natural environment. During the process of transferring the problems and solutions into pictures and discussing them, the community perception was balanced with the outcome of the discussion with the other stakeholders. The totality of this process was a set of pictures depicting the health problems in the community and how they can be solved with the active participation of the community at all levels of its development.

Training

To complement and maximise the benefits of developing and using participatory materials, training is essential. Training, in this case, will be expanded to include how to adopt and combine other participatory tools like PRA during the process of development of the materials and when using the materials. It will also have to cover how to use the materials as tools for participatory monitoring. This training programme design has started and will be off the drawing board soon.

User guide

A user guide giving details on the materials and the various health messages, plus user guidelines in facilitation to serve as resource information for project supervisors using the materials, has been produced. The user guide also contains some background information on baseline and outcome of discussions during the process of developing the material.

Lessons learned

Hygiene education has become a technical activity that requires skill and training. To develop a user-friendly and interesting activity-based tools and materials, one needs creativity, foresight and the ability to link health to other subjects and fields. To be able to use the tools and materials to generate the necessary discussion and conditions for action to take place, one requires facilitation, interactive skills and an attitude that can exert a balanced power system between the facilitator and the target group. Indeed, material development is now everything in addition to 'what causes malaria'.

Development of Participatory Health Education Materials for Community Volunteers and Project Supervisors and Trainers – WaterAid Ghana Programme

Silas Quaye: Deputy Director (Social), ProNet – PMB, KIA, Accra, Ghana

Outline

WaterAid Ghana programme provides support to communities to enable them to identify problems relating to water and sanitation, construct facilities and undertake activities that will help solve those problems. This is achieved through the support and supervision of nine partner organisations working in a network. The technological options being used are the hand-dug well and borehole fitted with a handpump. In sanitation, the VIP is promoted at household level. The overall implementation strategy is based on initial animation and community mobilisation, selection and training of community volunteers, community participation in the construction of the facilities, health education, monitoring and follow ups.

Activities

The prime objective of the WaterAid programme at its inception was heavily weighed towards the provision of water. By 1989, Health Education had been identified as the missing link for the provision of good water. It was difficult at this stage to find appropriate rural water-related training materials with simple messages in institutions like Ghana Water and Sewerage Corporation and the Ministry of Health. It, thus, became necessary to develop some materials for the Health Education aspect which was lagging behind. As a step forward, actions were taken to develop Health Education materials. Presently, the programme has five participatory materials covering seven health topics. The materials have gone through a number of challenging phases and processes to get to what they are now.

- Visits were made to the community to observe health and hygiene-related practices of the people.
- Interviews were held with community members on health-related practices.
- Ministry of Health was contacted on what they thought were the prevailing health problems.
- Messages were then designed and divided into good and bad practice.
- An artist from the Non-formal Division of Ministry of Education was released to provide graphics that matched the messages.

The outcome was a set of pictures with messages like “Wash Your Hands” with a cross or tick to signify good or bad practice.

Most of the graphics could either be understood or related well to the background or environment of the target group. There were pictures of certain practices that were unrealistic. Trainers at district level and village volunteers merely concentrated on the message written under the picture without discussing it. What was achieved, therefore, was a recital of the messages, but little knowledge of why it should be practiced. Discussions using the materials were more of a lecture than participatory, as everyone read the message and agreed that the crosses were wrong and the ticks right.

Material production within the Ghana WaterAid Partner network 1992-1996

During the period between 1986 and 1992, the problems associated with these materials were confirmed in an evaluation of the health education programme. Some suggestions were made as to how to improve the situation. Three essential areas of recommendation were made:

- 1) The use of an institutional arrangement that allows the participation at every stage of implementation
- 2) The removal of inappropriate pictures from the health education materials
- 3) The materials themselves did not foster participatory discussion.

Some actions were taken in response to the recommendations made:

- All the ticks and crosses were removed.
- A workshop was organised for project supervisors and trainers to review the pictures and introduce participatory methods of facilitation.
- Some of the pictures were taken out and some new ones added in.
- Prototype copies of the pictures were produced and pre-tested.
- Changes were made based on pre-testing results and then published.

Problems

Whereas the graphics themselves did not pose any problems in terms of understanding what they meant, the use of the materials under the participatory approach by project supervisors was challenging. There was an absence of guidelines to facilitation, how to use the materials, what messages they carry and the various ways it could be adapted and used.

Lessons learned

During this period, two main activities took place; training workshops and rethinking of how best the pictures could be produced. The training focused mainly on the problems supervisors faced when using the materials. This was the driving force, in the sense that most of the problems related to the use of the materials to generate the needed discussion and health messages. The solution was always in the appropriate use of the participatory approach.

In relation to the material, it also always came back to the community and what they thought the picture was portraying. The obvious lesson was to start with them and finish with them.

In as much as the participatory approach has been applied to the use of visual aids, it was not applied fully. The participatory approach fell short when it came to the development of the beneficiaries, as it had only been used to a certain extent, initial survey and pre-testing. However, if one considers the intent and purpose of the participatory approach, the development and use of visual aids should go beyond this. At all levels, the relevant target group must be involved actively in that particular stage. This will include, not just providing information, but practice as well.

For sustainable development of materials, it is also important to apply the participatory approach to all levels of implementation. There is the need for training on the method for all those who are involved in its use. This will include village volunteers, district-based trainers, project supervisors, regional and national trainers as well as resource persons. The production of the materials without training on how to use them will not yield the desired results.

The way forward – People-centred approach to material development and use

Production and publication of materials

- Active participation of community members and use of local resources during hygiene education sessions.
- The involvement of community members in the development of materials will go beyond the provision of information on perception, prevalent diseases, etc. but also include analysing data collected, drawing of the pictures and production of prototype hygiene education materials for publication.

Training

Training in the use of the materials has been expanded to include how to adopt and combine with other participatory methods like PRA. It will also cover the use of the materials as tools for monitoring.

User guide

A user guide to serve a resource book for project supervisors using the materials will cover the messages being promoted, the various types of materials that have been developed and how they are used and, in addition, guidelines on facilitation.

Emergency Water Supplies for Rwandan Refugees

Paul Larcher, Oxfam and REDR (Registered Engineers for Disaster Relief)

Outline

In 1994, the civil war between Hutus and Tutsis in Rwanda caused 700 000 Hutu refugees to flee to Goma in E Zaire and a similar number to NW Tanzania. This Oxfam programme aimed to provide emergency water and sanitation facilities to the Rwandan refugees who were returning from the camps in Eastern Zaire and Tanzania towards the end of 1996. The whole programme, for Oxfam, ran from October 1996 to February 1997 and was financed mainly by the Belgium government.

The whole repatriation programme was co-ordinated by UNHCR who also oversaw the watsan (water and sanitation) activities. In addition to Oxfam, the other implementing partners primarily included MSF, ICRC, COOPI, IRC and Trocaire.

This paper is based on a review of watsan activities undertaken by UNHCR and its implementing partners involved in the repatriation of the refugees from Goma, Zaire and complemented by additional experiences of working on water supplies for the subsequent repatriation of refugees from Tanzania.

Activities

The general strategy was to provide water points along the roadside at 5-8km intervals, which consisted of a storage tank of between 10 and 30m³ capacity and a tapstand with six 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 close to the route.

The fleet of water tankers had a combined capacity of 90m³. 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 flatbed 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 litres/s capacity were used to discharge at the water points.

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, 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 six or eight 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.

Successes

The scale of water supplies required on both refugee repatriations, from Zaire and Tanzania, were 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 a common goal. The review of the water and sanitation activities towards the end of the first repatriation assisted the planning and operation of the activities from the Tanzanian repatriation.

Constraints

Following the start of the repatriation from Goma, 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 which had large water storage capacities (70-100m³) connected to a piped supply, often became redundant and a wasted resource.

Each family generally had one or two 20-litre jerry cans, which had been provided by NGOs in the camps during the previous two years. These jerry cans were carried by people of all ages, from five years old upwards. While this size jerry can may be ideal in refugee camps, where water only has to be carried a few hundred metres, they proved unsuitable, especially for children on a long walk.

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 which resulted in water points with lower capacities running dry by mid-afternoon.

There were areas where a large proportion of water was being taken by the local population, as a water point was located nearer to their home than their usual supply. It was clearly politically unacceptable to prevent these people from taking water, which resulted in a higher than expected demand being supplied in some areas.

Lessons learned

- To ensure an efficient water-trucking operation, one person should control all the water trucks in a given area. This co-ordinator and all the truck drivers should each have a radio. Ideally, personnel at water points and treatment works should also be in radio contact with the co-ordinator.
- Where implementing agencies wish to participate in water-trucking operations, they should ensure that they procure not only suitable trucks, but also water pumps to enable the loading and discharging of water from the trucks.
- Due to the relative rapid changes in concentration of demand, it was often necessary to install water points within a couple of hours. Water tanks which can be rapidly set up, such as bladder or onion tanks, are the most suitable, unless more permanent tanks can be set up at critical points in advance.
- Mobile water trucks were very effective. The rapid deployment of these mobile water points counteracted the negative effects of the low volumes of water, which they transported.

- Collapsible plastic water containers, which hold up to 5 or 10 litres, are already manufactured. They have a number of advantages over the 'traditional' 20 litre rigid jerry cans:
 1. They were not as bulky as the 20 litre rigid containers which made them easier to carry by young children
 2. Their volume was only that of the water they contained which also made carrying easier
 3. As they were supplied collapsed a large number could be transported on each delivery trip. (For example, a Land Rover pick-up could carry 1000 containers in two packing crates rather than 80-100 rigid 20 litre cans – cf. airfreight costs as well).
- These water containers were viewed as a vital commodity, even when empty. Scuffles and fights could break out where they were handed out. Distribution arrangements must be able to cope with the number of people passing at any time. The most effective points were near the top of a hill where people were spread out and it was easier to arrange a queuing system.
- The collapsible containers were generally handed out empty. However, some were filled and oral rehydration salts (ORS) added. These containers were handed out to people who were identified as suffering from dehydration, ensuring that they had the means to continue drinking water.
- 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 to give a residual chlorine concentration of 0.2-0.5 mg/l in refugees' jerry cans.
- The high level of inter-agency co-operation in this operation highlighted the different equipment specifications used by different agencies. It would be highly desirable if the major public health NGOs could agree common water equipment specifications. Alternatively, increased supplies of 'adaptation' fittings, other than old tyre inner tubes, should be deployed to future major relief operations, where interagency collaboration is likely to occur.

Mchinji Water Project, Malawi

Alan Nicol, Water Consultant, Save the Children Fund

Outline

Mchinji district is situated in the central region of Malawi on the border with Zambia, some 100km west of Lilongwe. It is an area of high agricultural production, chiefly maize and a key cash crop, tobacco. The Mchinji Water Project (MWP) developed out of the Mchinji Primary Healthcare Programme, which began in 1991 and identified a high incidence of water-related diseases within the district. A survey carried out showed water and sanitation issues to be key community concerns. The MWP, which began in 1993 (Comic Relief funding for 1993-1996 amounted to some £420,000), had the following objectives:

- Provision of safe water for communities through borehole rehabilitation and construction
- Promotion of community participation in rehabilitation and construction activities
- Promotion of a sense of community ownership of the water points
- Development of a community-based maintenance and management (CBM) capacity
- Adoption of a multisectoral approach involving line ministries, traditional groups and SCF.

The project has succeeded in meeting many of these objectives, and has been replicated in other districts of Malawi. However, questions concerning the long-term sustainability of the CBM concept have been raised and have led to requests for further funds to undertake a second phase.

Activities

Villages are chosen on the basis of data collected by extension workers, which includes the type of existing water sources and distance to supplies, population levels and prevalence of disease. A provisional list of villages is compiled and a local co-ordinating team of extension workers helps to develop awareness of the project activities in target villages through visiting local leaders with whom the aims and objectives of the programme are discussed. Further data is collected with the village heads and some informal, preliminary meetings held with other community members. Provisional lists are discussed by the local co-ordinating teams and submitted to the district CBM co-ordinating team (combining senior district officers from the Ministry of Health, Ministry of Irrigation and Water Development, Ministry of Women's and Children's Affairs and Community Services and representatives from SCF).

Once villages have been chosen, the extension workers consult with the communities and local leaders on the next stages of the project and on the siting of boreholes. New boreholes are drilled using the Yonder Rig (a hand augur). An SCF drilling team visits the community and drilling begins, with the community organising the provision of labour power.

If water is successfully reached, the establishment of a Borehole Committee (BHC) is undertaken. Where a borehole is being rehabilitated, the BHC formation begins immediately after the initial consultations with villagers. Advice is given to communities by extension workers on procedures for committee elections, gender composition and size. Three members of the BHC are duly elected as pump caretakers. SCF then organises the training of committees over two days (usually in groups of three committees), covering leadership skills, committee procedures, community-based maintenance, hygiene education activities, financial management and fundraising. The

pump caretakers are given a further three days of training in technical aspects of the Afridev handpump (the chosen preventive-maintenance pump), after which they are issued with tools and a maintenance handbook.

A spare parts distribution network has also been established through a nation-wide wholesaler (Chipiku stores) and local retail outlets, to service the preventive maintenance programme. Extension workers continue to monitor the maintenance and management of the handpumps after implementation.

Successes

- By March 1996, a total of 250 boreholes had been drilled or rehabilitated and 249 committees had been trained.
- By the end of the project (April 1997), a total of 524 villages were to have received safe water communities have participated in borehole construction using the Yonder Rig.
- Co-ordination between local line ministries has been established and is working.
- Women have been included on committees and are active in the maintenance and management of the handpumps.
- The spare parts supplier continues to stock and sell spare parts.
- Children appear to be collecting more water as a result of the installation of handpumps.
- Some communities have constructed walls and gardens around their water points and have kept the surrounds clean and inaccessible to livestock.

Constraints

- People continue to use traditional sources and little attention has been paid to including their protection in the project cycle (phase two is expected to do so).
- Some communities have shown an inability or unwillingness to continue the functioning of a committee and to raise community funds for spare parts.
- The project suffers from a lack of monitoring which has hampered greater understanding of project impact.

Lessons learned

- The project should be wary of raising expectations of communities prior to the successful completion of yonder drilling.
- Women's inclusion on committees may not necessarily mean their greater involvement in community decision making.
- The costs of spare parts and the ability to raise prices will affect the long-term viability of private sector provision.
- The impact of the project on the lives of children should be more fully understood given the apparent increase in frequency of water collection visits made by children following the installation of handpumps. Does this mean increased burdens?
- Protection of the water points from animals should be increased in villages where no walls have been constructed; monitoring (see *Constraints*) could help identify particular villages.
- Protection of traditional wells should also be considered, given that their continued use has been recorded after the installation of a handpump and the completion of hygiene education activities.

- Implementation of community-based management should take place in two stages; initially communities are trained in preventive maintenance and minor repairs, gradually being enhanced with the introduction of a second phase for more major repairs (and the protection of traditional wells).
- More needs to be understood about the impact of the project on the lives of women and children in particular.

Environmental Health Project Tibet Autonomous Region P.R. China

Save the Children (UK)/Jigme, EHL Tibet

Outline

The Tibet Autonomous Region of China is a Himalayan area with an average of altitude of between 4,000 and 4,500 masl. The region is sparsely populated with a population of around 2.5 million, occupying an area of 1.25 million square kilometres.

Save the Children (UK) has been supporting a programme in Tibet since 1990. This has included work in water and sanitation and provision of health education in villages in a relatively small area of Tibet, centred around the capital, Lhasa, since 1991. This work arose from a detailed survey into health, nutrition, water and sanitation in 1990, which recommended simple water supply improvements, health education and the promotion of household latrine construction.

The SCF-supported Environmental Health Project grew out of the original Water and Sanitation Project, which began in 1991 until 1995. The project, implemented in partnership with Lhasa Health Bureau, was established in response to the initial three-month-long survey which discovered a high rate of diarrhoeal and intestinal infection as a result of collection of water from highly contaminated irrigation channels, lack of sanitary latrines in many households and poor hygiene awareness.

The overall aim of the project was, and remains, to improve health in rural communities through provision of safe drinking water, hygiene awareness education and improvements in sanitation.

Activities

Water supply improvements

The water supply improvement component of the project concentrated on providing a mix of open wells, shallow tubewell handpumps, spring protections, well protection and piped water systems. Between the period from 1991 until mid 1995, more than 570 improved water supplies were constructed across the four counties, serving over 130 villages, 30 village primary schools, six hospitals and three monasteries. The population served by the project is circa 45,000 people. All these water supplies were constructed by village labour, supervised by County Health Bureaux (CHBx) staff with technical assistance from SCF.

Sanitation improvements

In conjunction with water supply interventions, SCF supported the construction or improvements of traditional style household composting latrines in private family houses and in village Primary Schools. Encouragement of latrine building was achieved through hygiene education training courses and the provision of financial and/or food for work payments as incentives. More than 5,500 latrines were built in the villages served by improved water supplies, and 65 latrines were built or improved in village primary schools.

Hygiene awareness education

Hygiene education training was held in villages where improved water supplies are provided, run by the CHBx Health Educators, with support from SCF staff, for selected villagers. Hygiene education inputs are primarily targeted for village women and school children, although it used to be for village leaders and schoolteachers with minimal representation of women.

Successes

- A co-operative relationship between SCF, LHB and the CHBx, on the basis of which the project is implemented.
- Both men and women from the village communities have been actively involved in planning a construction, and have been given basic training in hygiene education.
- New or improved water supplies have been installed to supply domestic water for than 45,000 people in more than 130 villages in four counties of Lhasa Municipality.
- More than 5,000 latrines of traditional design have been built, which are being used.
- Both SCF Environmental Health Project staff and Health Educators in each of the four CHBx have been trained both in simple hygiene education messages and participatory methods for communicating these messages.

Constraints

- Until recently, the project was target-driven and did not emphasise capacity building either at the government level or the community level.
- Owing to the lack of hygiene awareness and operation and maintenance training, a lot of water supplies that have been built over past few years have started to fall into disrepair.
- Former hygiene education messages were too numerous and too complex and communicated using a traditional classroom type style.
- No formal examination of the impact of our work on livelihoods in rural Tibetan communities.
- Harsh cold winter period poses difficulties in continuing construction of water supplies.

Lessons learned

- Good communication and frequent meetings should be held with LHB and CHBx in order that relationships on all sides are well maintained.
- Understanding and accepting the ideas of local community people, in project planning and construction, is important.
- Piped water technology or spring protection should be chosen wherever possible, if long-term benefits for the local people are to be expected.
- Women and children should be encouraged to participate in hygiene education courses, probably in different forums, and participatory methods should be applied.

Morrumbala Water and Sanitation Pilot Project, Mozambique

Geert Kroon, Save the Children Fund (UK)

Outline

With more than 1,400,000 students attending primary school in Mozambique each year (about 8,5% of total population), schools present a perfect opportunity for the promotion of good health practices. Theoretical teaching can be complemented by good practice in the schools to reinforce basic health and hygiene messages. Good habits developed at an early age will result in future parents, principally the mothers, being able to practice and teach healthy habits to their families.

With the above in mind, SCF and UNICEF agreed to support a one-year school health/hygiene education pilot project for <2500 schoolchildren in two districts in Zambézia province, Mozambique. It was assumed that significant progress could be made in a relatively short period of time, without large investment, by better teacher preparation, the availability of simple school material, the provision of water and the construction of latrines. SCF decided to implement the project at three schools in Morrumbala, UNICEF at three schools in Mocuba district. The total project costs (SCF and UNICEF) were 65.000 US\$.

Overall objective

- *A better understanding and practice of good hygiene by primary school children and their families.*

Specific objectives

- *All schoolteachers within the project carry out health education within the established curriculum.*
- *All the schools in the project have a functioning water supply, which is in daily use.*
- *All the schools have newly constructed latrines, which are in daily use.*

Activities

At the end of July 1996, the project started activities with a meeting of teachers from four schools in Morrumbala and teachers from three schools in Mocuba districts, district Education and Health authorities and a delegation from the Health Ministry in Maputo. After consultation with the Provincial Education/Health authorities and representatives of local communities, SCF finally selected three schools in Morrumbala district for this pilot project out of 13 schools rehabilitated/constructed by SCF after the war. Criteria for selection were:

- physical accessibility of the schools all year round
- sites near the school for water supply development
- competence of teachers participating in training, providing the necessary attention to health/hygiene education and observing pupils for their hygiene behavior
- motivation of parents participating in meetings and training.

A geophysical survey was conducted for borehole sites and hand-augering was done at one well site. In the end, two boreholes were drilled, one well constructed and all three water points equipped with AFRIDEV handpumps.

It was decided that the Ventilated Improved Pit (VIP) latrine, designed by the Blair Institute (Zimbabwe), would be the most appropriate for local conditions. For classroom of 50 pupils, two latrines were constructed. In addition, each school was provided with one latrine for male teachers and another for female teachers. Locally fired bricks were used for the construction of latrines and elevated water deposits for 400 liters of water were built at each of the three schools and fitted with four taps for hand washing.

A three-day workshop was organized at the district Education authorities' offices in Morrumbala, with the participation of the 12 teachers of the six schools concerned, district Preventive Health and provincial Education and Health staff. Children and parents, not being organized at that stage, did not participate. Health/hygiene training methods, the existing primary school curriculum and the development of simple teaching aids to help teachers transmit the health messages that already exist in the school teaching manuals were discussed and selected during the workshop. We also looked at ways of involving parents in the health/hygiene education and the maintenance of the water and sanitation infrastructure.

In collaboration with teachers from the three schools in Morrumbala and the national Community Training and Education Programme, SCF district staff assisted in organizing school committees, trained in school infrastructure maintenance and fund raising, and child-to-child education was initiated.

The supervision of these activities and the measuring of their impact are on-going processes, carried out by the district and provincial Education, Health and Water authorities, in collaboration with SCF and UNICEF.

Successes and constraints

The constructions in Morrumbala district were carried out to good building standard by SCF staff in collaboration with paid labour from the three communities. Some parents have started building latrines with local material near or in own courtyards, and these are used by the whole family. These latrines are cheap and appropriate.

The objective, or plan, to have schools involved in Health Promotion is still much more potential than real. Even though the current school manuals offer many opportunities in this area, badly paid teachers, overcrowded classrooms (high pupil/teacher ratios), insufficient preparation and little in terms of equipment and material have an adverse effect. However, it is recognised that current hygiene practices, in the absence of a water supply and/or adequate toilet facilities at schools, are more likely to exacerbate rather than prevent the transmission of disease.

SCF's constructions were only completed in July 1997 because of inaccessibility of one site. The latrine construction was expensive in the end (380 US\$/unit), which will not encourage replication quickly. One school near a market suffers from vandalism and soiling of the latrines. UNICEF's contracted builder encountered many difficulties during the construction, which has not been finished yet.

Lessons learned

- Meetings and discussions between parents, teachers and pupils to present the project's objectives and to consult with them the best methodology for effective implementation should be organized time ahead before construction.
- Define how the participants (including the pupils) will participate and how to create a representative body (if needed, selected through consultation) to continue health/hygiene messages/demonstrations in the communities. It is important not to impose the artificial creation of representative bodies or committees, if there does no real feeling for it. Simple meetings with the parents and consultations with the pupils at the end of a class may be satisfactory for the participants.
- Although the VIP latrines constructed are appropriate at schools, these are too expensive for households and low-cost sanitation construction has to be demonstrated, which could be done by the National Low-cost Sanitation Program (PNSBC).
- Site access and builders' competence has to be evaluated carefully because of weather changes and poor building standards in the province.

Kale Heywet Church Water Programme, Ethiopia

Richard C Carter, Senior Lecturer, Cranfield University at Silsoe; Consultant

Outline

The Kale Heywet Church (KHC) in Ethiopia has run a rural community water supply programme since 1986. Beginning with spring capping and construction of gravity schemes, and diversifying into water well drilling and handpump installation in 1989, the programme quickly developed a strong capability in water source construction and maintenance. It is this successful track record which has made it possible, in recent years, for a deeper partnership to develop between KHC and the main external donor (Tear Fund in UK), a partnership which has focused on maximising programme impact and sustainability.

Tear Fund requested evaluations of the programme in 1990 and 1995. Even before the second of these evaluations, some concerns had arisen about the effectiveness and likely sustainability of the programme achievements. There was little doubt that the programme was achieving valuable outcomes in terms of numbers of new sources constructed, but were people spending less time on water collection, using more water of better quality, and was their health improving? Would their new sources continue to function for the foreseeable future? In other words, was the programme having an effective impact, and would its work be sustainable?

Activities

Because of these questions, the donor, through one of its consultants, initiated a process of strategy development. This consisted of the consultant working with the programme coordinators to think through their approach, with the aim of maximising the programme impact and sustainability. This process is still under-way.

At the outset of this process, the interim lessons learned were as follows:

- With sound technical and management training, financial support from donors, it was possible to establish competent teams of field staff led by able and committed managers.
- Programme staff and leaders felt under pressure to maintain and increase outputs, in terms of numbers of new sources and numbers of beneficiaries; these measures of performance meant more than the actual impacts on communities or the issues of sustainability.
- Because of remoteness and poverty of many of the communities receiving new water sources (especially in the case of boreholes with handpumps), the programme had to set up a centralised maintenance organisation to deal with repairs.
- Although community work was strong in the part of the programme dealing with springs and gravity schemes, it was far weaker in the drilling component.

In the process of strategy development, attention was focused first on programme objectives, which, it was generally agreed, were insufficiently precise. Like many water supply programmes, this one had stated aims which were very focused on numbers of sources constructed, rather than on impact, and which were inherently difficult to verify or evaluate. KHC's aims were *'to provide safe drinking water and to improve quantity and quality of water available within a reasonable distance of the users'*. This statement begs a number of questions:

- What precisely should be the water quality target? (What does 'safe' mean?)
- What measures will be taken to preserve water quality between the point of supply and the point of consumption?
- What should be the design per capita water quantity available?
- What measures will be taken to encourage increased actual usage of water up to the design figure?
- How close is 'a reasonable distance'?
- Will any other measures than closer proximity be taken to alleviate the burden on human water carriers?

These are all issues of programme strategy, which a clear, consumer-focused, statement of objectives would make explicit¹. In working together on programme strategy, we have spent a good deal of time exploring these objectives, and the dilemmas involved in them.

The purpose of phrasing programme objectives in a more precise way, concentrating on the end use and users of water, is to focus attention on *impact*, not just on the outputs (new sources) produced by the programme. For instance, the programme may design and construct sources which can supply 20 litres per head per day of good quality water, but if the consumers only use half this quantity, and if they contaminate it between the source and the point of consumption, it is unlikely that they will realise any significant health benefit (although closer proximity may mean that they spend less time and energy hauling water).

By phrasing programme policy in terms of outcomes for the user (or impact), the importance of software – health and hygiene education, building of management capacity in the community, training, and maintenance – takes on much higher priority.

Lessons learned

Some of the lessons learned so far in the process of strategy development are:

- The programme should focus less attention on numbers of new sources and statistics of beneficiaries, and more on the impact on communities, in terms of time/energy saving and health
- This means a greater investment of time, effort and money in the community development, training and education areas
- This has implications for the donor's understanding of what the programme is trying to achieve, as well as for the way in which the public constituency which provides the donor's funds understands what is being done.

The issue of sustainability, especially in relation to continued programme support of communities, perhaps for many years after construction, still needs to be addressed fully.

Some important issues, which determine programme strategy, remain unknown. For example, where water users presently only consume about three or four litres per head per day (where water sources are very distant and round-trips up to 3-4 hours can be involved), we simply do not know the shape of the relationship between potential health benefits and increased consumption. Is it better for the programme to spread itself thinly, and increase consumption to, say, eight litres, or to

¹ See R C Carter, S F Tyrrel and P Howsam (1996). Strategies for handpump water supply programmes in less-developed countries. *Journal of the Chartered Institution of Water and Environmental Management* 10 (2), 130-136.

concentrate its activities and achieve the target of 20 litres for fewer people? This issue was raised more than 25 years ago by researchers in East Africa², and it still remains unanswered. In the situation where the programme has to choose whether to deliver limited benefits to relatively large numbers, or more substantial benefits to a smaller number, this is a key issue. What really is a *minimum* standard of service?

The issue of water quality in the home, and contamination between source and point of use, also needs to be better understood, although findings to date would suggest that more emphasis should be given to hygiene education in the community.

The issues discussed in this paper reflect some of the continuing explorations of programme policy and strategy between KHC and her main external donor. Much remains to be done to bring programme software to match the hardware, and this process continues. Many other water and sanitation programmes would benefit from similar processes of policy and strategy development, to maximise their impact and increase their likelihood of sustained operation.

² White, G F, Bradley, D J, and White, A U (1972) *Drawers of Water*. University of Chicago Press.

Mafefe Water Supply

Michael Webster, Tsogang Water and Sanitation

Outline

Mafefe is a tribal district in the Northern Province of South Africa. It is a remote, rural, undeveloped area of about 15,000 inhabitants settled in 33 villages. The Mafefe Water Committee (MWC) was formed in 1989 as a community initiative to supply clean domestic water to all the people of Mafefe. The need was accentuated by the pollution of the existing surface water sources with asbestos fibres and Shistosomes. Between 1989 and 1996, the MWC built water supply systems for 10 villages in the Mafefe region providing 5,455 people with water. The total cost of the 10 projects were R 830,738 (about £ 100,000 i.e. £18 per person). Development in the region has been difficult from the onset, but now the combined pressures of tribal conflict, local government and a rapidly changing political and funding environment may signal the end of the MWC and possibly jeopardise the sustainability of the projects which they implemented. Over the past four years, the MWC have been assisted by a small local NGO, Tsogang Water and Sanitation (Tsogang).

Activities

The need for clean water was seen as a priority by the residents of Mafefe, and the Mafefe Water Committee was democratically elected in 1989 to address this. The MWC, with assistance of the Rural Advice Centre (RAC: a national NGO), embarked on a number of village water supply systems. Funding was given by a number of national and international agencies for small amounts, none of which could finance an entire project.

The projects sourced spring water (and one borehole) through gravity-flow systems to communal standpipes. Community labour was used (some voluntary, some paid nominal wages) and the projects were all managed by the MWC.

There were many delays in the projects due to tribal conflict, political uncertainty surrounding the projects, lack of funding and the liquidation of the RAC. A new NGO, Tsogang continued the support work of the RAC.

The last of the 10 projects was completed in September 1996, but changes in the local political environment and a one in 50 year flood (that washed away the pump, engine and some of the pumping main) has rendered the project dysfunctional.

Local government now has the legislated responsibility for water supply to the ward and the role of MWC is unclear.

Political forces within Mafefe have tried to discredit the MWC, local government is ineffectual and a number of the projects which the MWC implemented need maintenance and repair work which is not being done.

A rival community organisation in Mafefe (with backing from the tribal authority, but allegedly not representative) secured funding through the government for R 3.3 M (£400,000) for water supply to the rest of the region. A private consulting firm was awarded the tender for this project. Work is underway but is riddled with problems, mainly institutional.

Successes

The community constructed 10 water schemes themselves. They were managed completely by the community and have supplied clean water to 5,455 people. These projects were also catalysts for other development initiatives viz. sanitation project, employment creation project, numerous women's groups, crèches, gardening initiatives and a general increase in community activity.

Constraints

The projects have experienced setbacks at many stages particularly due to the following constraints:

- The Mafefe community has few resources at their disposal to be able to initiate development projects themselves. This is compounded by the remote location of the area
- Sufficient, consistent funding
- Tribal structures feeling threatened by new developments
- The advent of local government and the inexperience and limited technical competence of these officials
- Changes in government policies regarding rural water supply and inconsistent implementing of these policies
- Fluctuation of personnel of the role players affecting water supply to the community, particularly in the government, private sector and NGOs.

Lessons learned

Lack of continuity

Various NGOs and funding agencies were involved in the project. The initial planning report developed by the RAC was never completely implemented, primarily due to lack of funding and political disruptions within Mafefe. This resulted in a lack of continuity and, possibly, a loss of credibility of the MWC and Tsogang. Also, a lot of the work carried out by MWC and Tsogang did not fall within the confines of a project cycle. Some critical stages were glossed over (such as proper monitoring and evaluation) and the result was a lack of focus and coherence. Even if funding is not secured for the whole project, project planning and management must be thorough and able to adapt to assumptions not being met.

Integration of all role players

The forces affecting communities are dynamic, particularly in South Africa over the last five years. NGOs need to be careful of being perceived to be 'taking sides' in politics at any level. NGOs may need to facilitate a forum in which government, private sector, all community structures and NGOs are represented. Tsogang was seen to be aligned to the MWC, which held a certain position in local politics and consequently compromised Tsogang's impartiality. Local government is a key and necessary resource that communities can utilise: NGOs should take cognisance of this and include them at every stage of the project cycle. It may also be beneficial to train these elected representatives.

Community management

The MWC did not annually re-establish their mandate as the legitimate community representatives on water supply. This enabled other groups to challenge their position and consequently disrupt the projects. It was relatively easy for more powerful bodies such as the 'elite's' in the community, local government and private consultants to ignore the MWC. Without one coherent community

voice, it is difficult for outside agencies to interact with the community. NGOs need to ensure that CBOs are legitimate community representatives and lobby their position with other role players.

Cost recovery

Cost recovery of operation and maintenance costs was never adequately addressed; appropriate tariff structures need to be established and negotiated with the whole community.

Water and Sewerage Engineer for the Maldives Water and Sanitation Authority (MWSA), May 1994 to present

Roger Kløvtveit, Technical Postings Desk, Voluntary Services Overseas

Based on reports from MWSA, Colin Smith (volunteer) and VSO Programme Office Placement Descriptions

Location

The Maldives consist of approximately 1500 islands arranged in a north-south chain of 19 atolls, stretching 800 kilometres from the equator to level with the tip of India, around 200 of these islands are inhabited. The total population is approximately 270,000, the capital, Male, having 50-60,000 inhabitants. The islands generally have a community below 1000 persons. A few 'atoll capitals' have a society of more than 5000 people.

The climate is tropical and monsoonal with high levels of humidity, with temperatures ranging from 27° C to 35°C.

The employer

The Maldives Water and Sanitation Authority (MWSA) is a government agency responsible to the Ministry of Health. MWSA was established 20 years ago, initially in response to the spread of diarrhoeal diseases and are today responsible for all water and sanitation matters in the Maldives (planning, implementation and regulations). This includes production and distribution of desalinated water, development and maintenance of water and sewerage systems, construction of water storage facilities and laboratory services.

VSO has previously provided two volunteers to MWSA (1987-1992). These were involved in plant and equipment maintenance.

Outline

MWSA entered into a five-year programme (from 1993) with UNICEF to erect community small bore sewerage systems in five islands per year.

The project was initiated as a response to the increasing contamination of the islands natural aquifers by sewerage from domestic pit latrines, especially in the more heavily populated areas of the islands (excluding the capital, Male, which already have a fully functional sewerage system).

The systems use gravity flow and discharge to septic tanks located at the beach periphery, from where the waste will gradually seep into the sea, rather than the aquifer. The proposed systems had been used in other countries and were deemed appropriate, by UNICEF and MWSA, for the use on the islands.

Due to the lack of technical expertise to oversee the construction of the systems, MWSA approached VSO and requested a Water and Sanitation Engineer.

The volunteer was initially intended to be responsible for overseeing the construction of these systems at several islands.

The construction of one island's sewerage system was anticipated to take up to one year, as each island community were to be responsible for organising their own construction work on a voluntary basis. The volunteer was expected to visit each island for periods of four to six weeks to plan and guide their construction activities.

Initial duties of the volunteer

- To undertake level surveying work in order to identify appropriate sites and construction of the system.
- Planning and documenting the design and construction of the systems.
- Assessing materials and labour requirements.
- Supervising construction work.
- Train Moldavian colleagues to continue the work after the departure of the volunteer.

Successes and constraints

Suitability of design

Three sewerage systems had been designed and built before the volunteer arrived at the Maldives. The design of these did not comply with the recommendations from a UNICEF consultant employed specifically to recommend the most suitable sewerage system for the islands. Due to this, the volunteer conducted an environmental impact study and found that the original specifications would only be suitable for a small number of islands.

As a response to this situation, the volunteer had to spend a substantial amount of time redesigning the systems (this work led to the creation of a 'Guide for the Construction of Small Bore Sewerage Systems'¹).

Construction code

The construction contracts for the first three systems were quite haphazard and undefined. Due to this, the work was performed in an unsatisfactory manner. This situation occurred mainly as a result of an absent construction code.

This situation has now changed; a code has been designed and implemented by the volunteer and staff from MWSA. This leads all construction contracts to be properly specified with a Bill of Materials and tight specifications, and the sewerage systems comply with these. The construction of the systems are intended to be supervised by a site engineer from MWSA.

Training of MWSA counterpart

This was supposed to be one of the main duties of the volunteer. The volunteer states, '*At the end of the two year placement, I am not confident that my Moldavian colleagues can now undertake the ongoing work on the project. This is mainly due to regular staff changes; I have had four counterparts during the last two years*'.

The volunteer had one person assigned to him during visits to the islands. However, this person did not have a practical engineering background and functioned more as an interpreter. It is envisaged that MWSA will need the support of another volunteer. However, role of the new volunteer will have a much clearer stipulated training emphasis.

¹ Copies of this can be obtained from VSO's Technical Postings Desk.

Community participation

The original concept of the project was that the island communities should construct their own sewerage systems under the direction of the volunteer and the Moldavian counterpart, but after conducting a pilot project, this was found to be impractical. The sewerage systems are now being constructed by local contractors who employ labour from the islands concerned. Groups of islanders often organise themselves as a contractor, under an Assistant Island Chief, or another person competent in organising this, and bid against other contractors for the construction work on their own island.

The reasons for calling the community participatory approach ‘impractical’ are numerous, i.e.:

- scale of the projects
- technology used
- inadequate original design
- lack of a construction code
- preparation of the community.

Due to the inadequacy of the original design and lack of a construction code, the volunteer did not have sufficient time to prepare the communities for a project at this technological level and scale. Also, the absence of suitably experienced personnel to act as supervisors for the communities during the construction phase led this approach to be deemed as impractical. (Strangely enough, the communities themselves managed to come up with experienced builders when bidding for the contracts),

Employers view of the VSO support

‘ . . . the volunteer placement have achieved the majority of the original objectives . . . surveying, design, construction guidelines etc. . . his contribution to the project was considerable . . . it was unfortunate, however, that the training component did not go as expected . . . ’

Lessons learned

Project objectives often change due to unforeseen circumstances (i.e. problems with funding, unsuitable designs, lack of community involvement etc.). Due to this, we must have a flexible approach to how long the support should last and incorporate this into the evaluation process. Because a volunteer does not achieve all the originally specified objectives, does not necessarily mean that the project is a failure.

A final question might be *‘What do we do when project objectives change their emphasis from facilitating community participation to managing local contractors?’*

Hittosa Water Supply, Sanitation and Health Education Management Schemes, Arsi Zonal Administration, Oromia Regional National Government, Ethiopia

Adane Kassa, Water Action, Addis Ababa, Ethiopia

Outline

In Ethiopia various governmental and non-governmental institutions are involved in the water, sanitation and hygiene education activities. Despite this, 74% of Ethiopia's population (58.4 million people) suffer from lack of safe drinking water. Although urban coverage is around 80%, the majority of the population (89%) lives in rural areas, where most reports suggest that under 12% have access to potable water. The majority depend on traditional sources which are often inadequate and contaminated and sometimes distant. Currently, it is estimated that only 19% of the rural population have access to safe drinking water supplies. According to the 1990 estimates the sanitation conditions are worse with only 4% of the rural population having access to some sort of sanitation facilities.

The Arsi zone has been receiving assistance from governmental and non-governmental organisations over the past 20 years or so. In spite of these efforts, like in all other regions, the water and sanitation problem is still acute in most parts of the region. The problem is even worse in Hittosa Woreda as there are no rivers, streams or any other source of water supply nearby.

For the last seven years, WaterAid has been supporting water supply and sanitation projects in the region. Currently, WaterAid supports five gravity schemes in this zone to enable some 138,000 people to have access to safe water. The Hittosa gravity water supply, and health education project is one of these projects. The project was intended to supply some 28 villages and three small towns in Hittosa Woreda.

Activities

The activities of the scheme included pipe laying of 139.72 km, 4 spring capping, construction of 19 reservoirs, 5 pressure breaks, 19 supporting structures and 122 water points with a total budget expenditure of £835,351.17 of which £732,808.60 was WaterAid contribution, £79,585.988 community contribution and £16,195.471 local government contribution.

The scheme has been implemented in the last five years by the Zonal Water Department. The Health Department has been responsible for the health education and sanitation activities. The scheme is a gravity system from spring sources and was evaluated in 1996. The construction of the water supply system and the establishment of the community management structures has been completed as planned by the Water Bureau, and the health education has been carried out by the Health Bureau. An independent community management system has been established and is working.

The whole concept of the Hittosa water supply schemes that include the lowland villages show a most effective use of the two available springs. The scheme is designed to provide 25 litres of water per day per person to a population of about 70,000 in a period of 15 years through the 139.72 km of pipeline system.

The income from the water sales can cover the management and maintenance costs of the scheme. The cost of eight pence per cubic metre of water is considered reasonable by the people.

Good financial records are kept by the water administration office of the scheme and people trust the system.

A very strong feature of the Hittosa project is the structures and systems for community management. This is reflected by the establishment and active operation of water committees at each village level; a Woreda (sub district) water committee co-ordinates the efforts of village committees and an autonomous Water Management Board for the scheme. An executive committee manages the Woreda (sub district) water committee, all the village water committees on one side and the water Administration Office of the scheme on the other.

The determination of the user community to take on the responsibility for community management is very encouraging. The reasons why community management can succeed is that the project is trusted and people accept its decisions and requests, and the people respond to the requests of the water administration office.

The local people have shown that they have the potential to manage and maintain the water system and there is sufficient income to pay the staff of the scheme a reasonable salary. There is a steady income that enables salaries to be paid regularly. All the employees provide a reliable service; good records are kept for all the activities of the scheme. The leadership of the scheme is responsible to the users, the leadership is committed and trusted and the supply scheme is well designed and constructed. Furthermore, the national policy on decentralisation to the Woreda supports the community management of the scheme.

The community participation has been excellent. There is a strong desire to obtain the water supply and willingness to contribute labour. The community participation has been of the compliance type and the project has not tried to have a continuing dialogue with the user community.

It is too early to see any direct economic development as a direct result of the scheme in the villages. Twenty-two households in seven villages have started cattle fattening businesses as a direct result of the water. This shows the potential and is an example of things to come.

Iteya town, the Woreda town for Hittosa will continue to develop rapidly. Even without water, the town has doubled in population in the last 10 years. Now there is water, businesses are starting in preference to Nazareth, the nearest commercial big town. Two large grain stores and many shops have been built and a cattle market started in the last year. Two large hotels have been completed. This development will have significant impact on water demand.

Successes and constraints

In the words of the evaluation team, the scheme is impressive for the following main things:

- The large scale: the project is providing safe water to over 62,000 people along 140 km of pipeline
- The design and construction has been completed ahead of time
- The commitment of the user community to take on the responsibility for the management, maintenance and finance

- The organisation of the community management and the commitment of the scheme's staff and committee members to the scheme and to their roles
- The Hittosa water scheme shows all the signs that the user community will be able to finance the maintenance and manage the whole supply system
- So strong is the people's commitment to the community management that the Hittosa project is likely to be a model in community management
- The project is led and managed by a water management board made up of government offices, community representatives and WaterAid in partnership with Water Action.

There was an effort to integrate hygiene components with the water construction. However, as the hygiene education and sanitation part have not been achieved as planned, intensive work on hygiene education has been planned for the second phase project which is starting soon. The second phase of the project is also charged with the responsibility of strengthening further community management through training and refresher courses.

Lessons learned

A very strong lesson that can be learnt from the Hittosa scheme is that carefully laid community structure and systems can effectively manage large water supply, sanitation and hygiene education schemes. The main reasons why the community management can succeed is that the water supply scheme solves a very big problem which is the same for everybody and which is seen as a personal benefit by everybody.

One other lesson that can be drawn is that the sanitation and the hygiene education components require a longer period of time in order to bring about change as compared to the water supply component mainly because such interventions deal with the change of people's attitudes, beliefs, behaviours and practises.

Bwera Water Supply and Muyembe Tubewell (WaterAid Uganda)

John Pinfold

Outline

Programme Support Unit (PSU) was established in WaterAid Uganda in order to tackle the 'software' aspects of projects that had, until then, been largely engineering-led. This describes PSUs involvement in two contrasting water projects from 1993-1995:

- 1) **Bwera Gravity Water Supply:** A large rural gravity scheme in western Uganda serving 80,000 persons with around 1,000 tap-stands. Kasanga Community Based Health Care (CBHC) were contracted to provide health education in the project areas with annual budget of £8,000 to top up staff salaries and cover running costs of vehicle previously donate by WaterAid.
- 2) **Muyembe Tubewell:** Providing an additional 12 Nira handpump for around 4,000 people as the final stage of a project that had already provided 42 tubewells in this rural locality. Budget of £12,000 for both hardware and software components.

PSU operated from HQ in Kampala, supporting five projects in different parts of Uganda with an annual budget of £90,000.

Activities

Specifically PSU activities covered the following:

- **Water supply:** Introduce participatory methods to assist community mobilisation and selection of water sources within specified technical conditions. Collect information about traditional water sources and patterns of water use.
- **Hygiene behaviours:** Identify and train local people in participatory methods for promoting hygiene behaviour. Identify current behaviours, beliefs and attitudes. Promote facilities for assisting behaviour change. Develop methods and materials for introducing hygiene behaviour in schools.
- **Latrines and latrine usage:** Introduce participatory methods for community selection and promotion of latrine types. Collect baseline information about latrines, patterns of use and constraints.
- **Operation and maintenance:** Establish roles and rules for the committees with community. Identify training needs and develop training programmes including financial management. Establish appropriate channels for transparent accountability.
- **Monitoring and evaluation:** Select appropriate indicators for monitoring and evaluating activities. Develop project level and community-based methods for monitoring and evaluation.
- **Training:** Assess training needs of local partner and project staff. Arrange and organise appropriate workshops and on-the-job training.

Successes and constraints

In Bwera, Kasanga CBHC (supported by a Catholic mission) was well established with a strong network of well-trained voluntary workers. Inputs from PSU focused on introducing participatory techniques for promoting hygiene behaviour and sanitation, organising training programmes and developing implementation strategy with Kasanga staff. They had previously employed a didactic approach and response to the new participatory techniques was excellent both from the

community and field workers. Even community-based monitoring was introduced where indicators of hygiene behaviours (e.g. number of tippy taps made) were recorded on community maps. In contrast, Muyembe had no strong CBHC group or other suitable organisation. Consequently, PSU established and trained a group of volunteers. However, this lack of organisational capacity meant that this project took up a lot more PSU time than Bwera, even though it was much smaller. Motivation and sustainability of the Muyembe group was another critical factor.

Central committees posed one of the main constraints to sustainable community management in both areas. In Muyembe, establishing water and sanitation committees for each tubewell was no problem but for holding and ordering spare parts, and hopefully sustaining a CBHC group, a central committee was also needed. Bwera was even more complicated involving a three-tier committee structure, from tap-stand to parish to central committee. Both areas had previous experience of misappropriation of water project funds and, consequently, there was a great deal of mistrust of committee formation outside the natural boundaries of a community i.e. tap-stand or tubewell level. Training in financial management and accounting transparency partly offset this problem, particularly in Muyembe, where PSU volunteers were closely integrated with construction activities. Bwera was a bigger problem not helped by the fact that PSU support came near the end of construction phase and, up until then, there had been little integration with Kasanga CBHC. For example, the already established central committee decided increase tariff rates soon after water came on line despite initial problems in collecting funds from some areas and before an effective system for transparency had been established (training had only just started).

It would be a shame if Bwera did fail due to lack of strong community management, as such was the impact of improved accessibility to water (from up to 4km to <100m) and success in promoting hygiene behaviour (latrines to a lesser extent, as thick vegetation and disperse homes provided strong competition). There were notable improvements in both health and wealth, for example, visible reduction in scabies in young children and an increase economic activities, such as brick making.

Lessons learned

- Should change emphasis of project objectives from providing improved water system to providing a water system successfully managed by community. Project design should then reflect this with construction becoming just one step in the process. The increased time scale for including community management fits nicely with that needed for promoting hygiene and sanitation. Bwera water supply would be in a much stronger position, had Kasanga been involved in forming committees from project inception.
- Baseline surveys should take into account local organisations. Project design should then reflect the amount of capacity building necessary for sustainable community management, sanitation and hygiene promotion. Building local capacity may be time-consuming but has added value, as it should provide a basis for introducing other need-based development activities.
- Sanitation and hygiene promotion need to be introduced at same time as community participation in planning improvements to water supply. Should be ready to hit hard once water comes on line when motivation is at its peak. Needs to continue well after construction completed.
- Participatory techniques help provide a real focus for training staff on a participatory approach. Good for community mobilisation but timing is crucial, particularly for large gravity schemes, as long delays before construction starts means the initiative is lost.

- Hardware and software components need to be integrated in project design. Generally, there still tends to be an emphasis on hardware in comparison to software aspects of water supply and sanitation activities. Software is more complicated than hardware, and allocation of resources and management of projects should reflect this if we want to improve community management, sanitation and hygiene behaviour.
- An ambitious water project, such as Bwera, can be a victim of its own success. There was both political and business interest in this system. Furthermore, there was a massive in-migration due to improvement of water supply and pressure to expand water system beyond the design capacity which may result in water shortages to some areas and this would be disastrous for the central committee. Community management needs to be very strong to avoid such dangers.

Note: John Pinfold worked for WaterAid for the period covered by this paper, until October 1995.

Hitosa Gravity Flow Water Supply Scheme (1993-1996), Ethiopia

Suba Shivanathan-Beasty, Sarah Gelpke, Julie Jarman, WaterAid

Outline

Hitosa Woreda, in Arsi Region, is situated 160 km south east of Addis Ababa in Ethiopia. The scheme was implemented by the community with the assistance of the Ethiopian Red Cross Society and the Oromia Water, Mineral and Energy Resources Development Bureau (OWMERDB). The scheme is a spring catchment and development project. There is a strong community management component. Support for this approach has come from both national and regional government authorities, as well as the local leaders. Phase II of the Hitosa scheme will take hygiene education and sanitation activities forward.

Activities

Water for the scheme comes from the Bukito (34 lfs) and Buro (8 lfs) springs on the high slopes of Mount Bada (4,000+m). Hitosa Woreda has three climatic zones. The area as a whole has very few reliable water sources. The lowlands below 1900m are hot and very dry with no permanent surface water, with large earth dams as the main source of water. The middle level plains of 2,200m elevation are extensively farmed for wheat, barley and oil producing crops. This is where 70% of the Hitosa water scheme users live. Previously, the community collected their water from a few shallow rivers and one spring. The amount captured for the scheme is 66% of the dry season output of the springs. The system, serving the current population of 62,236, takes the water through 140 km of pipe to 122 public water points and 143 private connections. The scheme was designed to supply 67,000 people with 25 litres per day and covers 32 separate communities and three small towns. The areas were selected on the basis of need of the community; the commitment that the community was prepared to make towards the overall scheme; and the capacity of the professional implementing bodies to oversee the work. The overall cost of the project was £1,084,213, with contributions from the local community in kind and in cash (17%), the OWMERDB and Ethiopian Red Cross (4%), ODA (25%) and WaterAid (54%).

Successes

- A well-designed, large-scale project was constructed which serves over 62,000 people along 140 km pipeline in 32 villages and three small towns.
- The project is completely community managed. This management system is strong enough to cope with some government opposition.
- Construction was completed on time and within cost, with the enthusiasm and commitment of community members.
- The project overcame early problems with participation and managed to unite all communities within the project area.
- The community leadership is trusted and responds to the needs of the users.
- Money from tariffs is well managed and people trust the system they pay into. There is no misuse of funds.
- Cost per head of this large-scale gravity scheme is comparable to a community shallow well scheme. It has cost no more to serve a larger number of people.

Constraints

- Initially community mobilisation was under-resourced, resulting in staff being overstretched and communities not understanding the project or showing interest in participating.
- Some members of the OWMERDB oppose the level of control of the community management system.
- The pipeline, supplied from the UK, may be too costly and inaccessible for replacement in thirty years' time.
- Hygiene education was implemented as an afterthought and treated as a separate component to the engineering work. Thus, little effort, staff commitment or resources were put into hygiene education and sanitation. The few hygiene education activities carried out were of poor quality.
- There was little local interest, awareness and commitment to hygiene education and sanitation activities.
- Livestock and people are using the water and this has led to some disputes and affected hygiene at overflow sites and some tap-stands
- The original project design was to provide 25 litres per day per person to a population of 70,000 in a period of 15 years. This target will be reached within 10 years because in-migration has been higher than expected and nearby communities travel to the tap-stands to buy the water.

Lessons learned

- Community management on a large-scale project is possible.
- Community mobilisation should be properly resourced from the beginning.
- The quality of the staff doing mobilisation is key to the success of the project.
- Factors which help the success of community management are a high level of trust within the community, the project is genuinely solving a big problem of the community, the price charged for the water is seen as reasonable, collecting tariffs at the water points works well, there is a good financial recording system, staff get a reasonable salary and are paid regularly.
- The management and maintenance of the whole water system is seen as being of personal benefit and people identify with the system as a whole. This level of unity and awareness was not there at the beginning but was partly the result of constant, regular contact from the community mobilisers. When a critical mass of support is achieved then the whole system will work.
- Taking local concerns into account can prevent conflict. For example, the community that live nearest to the spring felt that other people were taking their water and they were not going to benefit. As well as a tapstand, it was decided that they should receive their water free.
- Hygiene education should not be an add-on, but should be integrated from the beginning of the planning, and should have specific staff allocated from the beginning.
- Hygiene education is an important pre-cursor to raising people's awareness/demand for sanitation.
- As a result of the lack of good hygiene education and sanitation work, the project was unable to show any indications of impact on health.
- Good technical planning is essential but it is hard to allow for external factors, for example, there was an underestimate of the extent of population movements into the area due to political changes.
- It is important to be aware of individual and structural changes within the government system, at all levels.
- Time saved by the installation of water was primarily used for daily housework and family care activities. The use of this time for relaxation was considered the least important use of the time.

- The provision of water had direct economic benefits. Quite a few families became involved in cattle fattening and many new businesses were established in the small towns.
- It is important to involve beneficiaries in analysing the project and the lessons learned.

Shantipura Muddanahalli Parish Society

Shanmuga Paramasivan, Country Representative, WaterAid South India

Outline

The project was for a piped water supply with stand posts to Shantipura and two villages nearby. The outputs comprised the restoration of five handpumps, wastewater disposal and the construction of 30 latrines. The total budget given was Rs. 428,500/= from WaterAid and Rs. 109,193/= from the community. The project was completed in all respects, spending only Rs.405,035/= from WaterAid. The project was approved and commenced on 21 January 1993, and the works were commissioned on 12 December 1993.

This was a project that started as water supply and developed into an integrated project on water, sanitation and hygiene education, finally culminating as a model of community participation and community management.

Various stakeholders involved:

- **Community:** 120 families from Shantipura (two hamlets), Sivapura and Kadu Oddaragudi (two hamlets)
- **People's organisation:** In order to manage the water supply, people formed a committee called Grameena Bada Raitha Sangha
- **Local organisation:** Shantipura Muddanahalli Parish Society headed by Fr. A.G.Menezes
- **AFPRO Bangalore:** Technical support organisation assisting WaterAid in Karnataka
- **WaterAid.**

Looking back, the project evolved over various phases, all of which were not planned.

Phase I: Community seeking support

Shantipura is a small village with 57 families. There are two more villages, Sivapura and Kadu Oddaragudi, with 23 and 40 families respectively. These three villages had five handpumps spread over the entire area. The borewells were of low depth and supply was not sufficient. The people were using the nearby agricultural wells for water collection. All the villages came under the Shantipura Parish and the Parish was a great support to these very poor and remote people.

They wanted a water supply scheme and their request was presented to the Parish organisation 'Shantipura Muddanahalli Parish Society' (SMPS), headed by the Parish priest, Fr. A.G. Menezes, who was actively working for the all-round development of the community. He submitted the request to WaterAid. Though there were only 120 families in the three villages, the settlements were scattered and handpumps would not solve the problem, as families would still have to walk a long way to collect water.

The community wanted a piped water supply. This need was submitted to WaterAid by the Parish Priest who, on behalf of the people, came forward to implement the project. The people's contribution was projected by way of labour and locally available materials. The project also included 30 low-cost latrines and training to people.

Phase II: Community participation and contribution

WaterAid Representative, Mr.S.Paramasivan, Mr.C.U.Paul, Head of AFPRO, Bangalore (who served as the technical support organisation for WaterAid) and Fr.Menezes met the community in August 1992. This visit was for an initial direct appraisal. WaterAid was particularly attracted to this proposal and impressed by their past record of constructing low-cost toilets under the Government supported sanitation programme. In this programme, SMPS had been highly successful, not only in motivating the people to construct the latrines, but also in making them contribute towards it. Mr.S.Paramasivan saw immense potential for enabling the community to participate and take over the complete management of the system.

The request was for an OHT with piped water. The initial idea was to hand over the completed scheme to the Panchayat for further maintenance and management. Mr.Paramasivan mooted the idea that besides the labour and material contribution, there must be some cash contribution from the people, as an evidence of their interest and participation. The people were very poor, the majority of them being agricultural labourers whose weekly earnings were less than Rs.150. There was a long discussion with the people on the topic in order to make them understand the responsibilities of paying for any benefits. Finally, all the families agreed to pay Rs. 300 as their contribution and this was to be deposited in a bank. To manage the funds and make any future decisions on this, they decided to form a sangam (committee). This amount was not to be utilised, but was to be made to a joint account before implementing the scheme.

Phase III: Community awareness generation

During the next visit of Mr.S.Paramasivan to the village in March 1993, he found that the village committee Grameena Bada Raitha Sangha had already been formed. Initial deposits of Rs.300/ family had been collected from 115 families and Rs.34, 500 deposited in the bank. By now, five families had opted out of the scheme for reasons other than finance. (They lived in farm homes and decided that the available water supply was sufficient.)

A meeting was held for the community to present their view that if so much money can be invested in the scheme, then why not convert the plan of 20 stand posts – one each to every street – into individual house connections. The implications on future maintenance costs were explained to people in detail. All items of cost involved in the initial investment and running was worked out. The team actually used a blackboard and it was a real classroom session with additions and multiplication. After prolonged explanations and debates on additional maintenance cost, a decision was made, that over and above the deposit of Rs.300/- already made by each family, Rs.700 more would have to be paid by each family. They felt this was justifiable, considering the additional benefits they would gain. Besides the deposit, families would have to make a contribution towards the length of pipes to the house from the supply line and a water meter, which together were estimated at an average of Rs.700/=.

It was presented before the community that, if so much investment could be paid by them, they would be able take over the future maintenance and management as well. Many examples were cited to people, where massive projects were lying inoperative for lack of funds for maintenance with Panchayat.

The other details shared with them were:

- **Daily requirement of water supply:** 45,000 litres (morning, two hrs 30,000 litres and evening, 1hr 15,000 litres)
- **For the above supply, 5HP submersible pump pumping 6,500 litres/hr will run for 7 hours a day**
- **The monthly costs on running and maintenance were worked out as:**

| | | |
|-------------------|---|---|
| Power expenditure | = | 30 days * 7 hrs/day * 4.5 units/hr * Rs.3.65/unit = Rs.3, 450 |
| Operator | = | Rs.500 |
| Total | = | Rs.4, 295 |

This was the estimate of actuals on maintenance and, if the scheme as such was to be handed over to the Panchayat, in addition to the above, there would be an administrative overhead. A village resident who was also a member of Panchyat shared the information that the annual total revenue of the Panchayat was only Rs.7, 650/ and many of the planned works could not be taken up for want of funds. If the water supply system was handed over to them, there was every possibility that the total funds would be mixed up and the maintenance may be shelved.

The suggestions given as a solution were the additional Rs.700 subscription could also be invested in the bank and the interest from this used towards future maintenance and the pump operator's salary. Besides this, each family would have to pay a monthly charge of Rs.30 towards Power tariff and operator payment. The usage of water could be restricted to 8,400 litres per family. Any additional consumption could be charged appropriately.

The initial enthusiasm did not subside, but this was a huge amount of money for them and most of the people had to think about the possibilities. The idea was left open to the people to consider. At the end of meeting, the community unanimously decided not to hand over the system to the Panchayat and to take up the management. They just wanted time to think about how to do it.

By this time, the borewell had been drilled and all materials had been procured. Mr.Paramasivan requested SMPS to proceed with the construction works, and deferred the decision on stand posts or house connections until his next visit. Though he was very positive about it, he waited for the decision to come from the people.

Phase IV: Community action

Mr.S.Paramasivan visited again on September 6, 1993. It was suggested that those who could not immediately pay, could make small savings, say weekly Rs.5 per family and reach the estimated deposit of Rs.700 in 35 months. The parish priest added that, as they collect their wages on Saturday, they could also make this payment along with the church offerings on Sunday. Now the financial terms were realistic. It was easier for them to think in units than in higher denominations. Even the Rs.30 per month towards electricity charges were through savings of people, they were saving daily Re.1/. This made the amount within their reach. It will be for the management of the sangam to collect the deposit and the monthly charges.

There may not be any need for maintenance for the initial two years, as the first year the pump will be covered under the manufacturer's warranty. Any repair during the next year is expected to be very minimum, as the pump is new. The pumps can be attended by the two youths, Mr.A.Kumar and Mr.Chandrappa from the villages who were given free training in the pump mechanism by the manufacturers. It was also suggested that pump operators could be selected from each of the four

major hamlets, ensuring an equitable opportunity to all settlements in taking care of the system and also one of their youths earning the wages. This will also conserve harmony among the settlements indirectly, by avoiding any impartiality by the operator in water supply!

By October, the weekly collection commenced. The community had agreed to the financial commitment, the village sangam took up the responsibility of collection and management. The parish offered a loan towards water metres and additional pipelines. Though it started with very small savings and loans, contributions came in a much bigger way than anybody expected.

The proposal had envisaged the need for health education. Now the need for good hygiene behaviour was felt, and this was implemented through intensive training to women volunteers. There were already 70 toilets constructed with CAPART support and at *low-cost* with a major amount of peoples contribution. The WaterAid project had planned for 30 more latrines. Together, a village of 120 families now had 100 latrines. The sanagam had initiated the motivation of the 20 families to construct them.

Phase IV: Community autonomy and self-management

When the final visit was made in February 96, the scheme was functioning efficiently. The people's management was more efficient. All dues had been collected and, from the surplus, they had constructed a common grain storehouse and bought some agricultural implements, which are being hired out to the villagers. The village sangam framed a village regulation that there should not be any open defecation and a Rs.5/ fine to be levied on the defaulters. This would go to the common fund.

Lessons learned

What started as a labour and material contribution has gradually developed into an integrated community-managed administration and system. This has been achieved through gradual dissemination of knowledge, followed up with people experimenting on a small scale with their contribution and ability to save and mobilise. What they have achieved was not presented to them immediately, but approached step-by-step where they were also given the opportunity to feel it in practice and, what started as a subsidy for water supply, has bloomed into community development. People's lives were in people's hands.

Using Advisers: The WaterAid Experience

Roy Oakley, WaterAid

This note does not describe a project, but outlines ways in which Advisers have been used to assist in programme and project formulation and management.

Starting up

WaterAid was formed in 1981 with the support and encouragement of the (then) Water Authorities. Initially, it had a minuscule permanent staff – the Director and a secretarial assistant – and relied (and still does to a less degree) on the generous help of voluntary workers. Among these, were some senior engineers (more recently retired, but some giving their spare time and holidays), who, working with the Director, helped to initiate WaterAid's overseas work – holding discussions with Government organisations, identifying local partners and assessing potential projects. These, and later volunteers, became WaterAid's Country Advisers', reporting to the Director and making regular visits to their allotted country to vet proposals, monitor progress, advise field staff and support local partners; other volunteers assisted with procurement and other administrative work and gave general technical advice.

Evolution

As the extent and scale of projects increased, WaterAid developed a more formal management structure. From 1986, field staff, reported to a London-based Head of Overseas Operations and the Country Advisers became in effect assistant managers and, in 1989, a fulltime Procurement Officer was appointed. In the mid 1990's, experienced field staff were appointed as Country Representatives, with considerable delegated authority, and three Regional Managers based in London were appointed to assist the Head of Overseas Operations; the volunteer Country Advisers then relinquished their managerial functions.

The adviser group

This transition of function was crystallised by the formation of a self-managed Adviser Group, whose roles may include, inter-alia:

- support to Regional Managers
- making field trips as requested
- advice on policy and procedure documents
- comment on designs, specifications and agreements
- reviewing research and literature, and assembling best practice statements
- answering technical enquiries
- assisting with recruitment, training and professional qualifications
- representing WaterAid at meetings and functions
- assisting with evaluations.

The group has been functioning for nearly two years. There are 14 Advisers, mostly senior engineers or associated professionals, and a number of specialists who can be consulted as needed. The group meets three or four times a year, together with senior staff, for information, presentations and discussion.

Advantages and disadvantages

The functions of volunteer staff in a charity need to be carefully defined. The quasi-managerial role of Advisers became inappropriate as the scale of WaterAid's work widened, but the quality and experience of group members enables them to support WaterAid in a variety of ways not normally associated with volunteer assistance. It is perhaps too early to say if the present system will best meet WaterAid's needs, but perceived advantages and disadvantages to date are as follows.

Advantages

- 1) Collectively, the group forms a powerful resource, able to give WaterAid technical and managerial advice and support over a wide range of functions, at minimum cost.
- 2) Advice given is independent and unbiased.
- 3) The group is a pool from which evaluators etc. can be selected.

Disadvantages

- 1) Since the group was formed, members have made few field trips, and group members find it difficult to maintain contact with field staff, be familiar with project work and be aware of changes in policy. They feel, therefore, less able to give informed advice and those Advisers who formerly had detailed contact with individual countries find less 'job satisfaction' and motivation.
- 2) These problems may lead to difficulty in recruiting new group members of the necessary quality.
- 3) Conversely, Country Representatives and other field staff are not in close contact with group members and (perhaps because they are reluctant to recognise a need for advice) are not making full use of the resource offered.

Senegal Potable Water Project

Sue Birchmore, Monitoring and Evaluation Manager, World Vision UK

Outline

The WV Senegal water programme began in 1986 in the Louga region, later extending to neighbouring Thiès, a semi-arid area to the North of Senegal. The most prominent element of the programme is drilling boreholes; over 520 wet boreholes have been completed. However, water provision is only the entry point for an integrated programme, including community mobilisation, health education, functional literacy, market gardening and agriculture, natural resource management and small business development for women.

The current (Phase II) area is in the Departement of Kaffrine, east of the Kaolack region, in south central Senegal. In this phase, up to 150 boreholes are to be completed, at a cost of £2,502,467.

Activities

After hydrogeological and socio-economic surveys have been completed, site preparations meetings are held with villages identified as possible participants. A team specialising in community mobilisation (the Water Extension Team or WET) is responsible for this. Before an agreement is signed between the village and WV, the village needs to organise a water committee and a tariff system for collecting financial contributions, select a pump minder and make a commitment to contribute both money and labour towards the borehole. They must also have demonstrated this commitment by setting up a bank account and depositing the first financial contributions in it.

Once an agreement has been signed, a borehole will be drilled, tested and equipped. The village water committee will be helped to organise pump care and maintenance, including functional literacy training for members responsible for bookkeeping. A 'bush technician' will be chosen for a cluster of 6-10 villages; this is a local pump maintenance technician, usually with some relevant experience such as bicycle repair, who is trained in pump repair and maintenance and equipped (as a loan) with tools and spares. They are paid for their services from the community funds. Groups of bush technicians are helped and encouraged to form economic interest groups with the long-term aim of establishing a viable commercial supply of pump spares; some groups in the Louga/Thiès region have already formed co-operatives for buying spares.

Communities are given continuing education on:

- **pump site maintenance** (keeping the area clean, planting a living fence etc.)
- **water management** (safe transfer and storage of water, prevention of contamination, productive uses etc.)
- **causes and prevention of water-borne diseases**
- **basic hygiene** (bathing, washing clothes, use of soap etc.)
- **basic sanitation** (waste management, compound cleanliness, central bathroom and washing facilities etc.).

Complementary projects include health education, functional literacy, market gardening and agriculture, natural resource management and small business development for women. Individual community needs will vary, but each will be involved in a broad range of activities.

Successes and constraints

An evaluation carried out at the end of the first phase of the programme found the following.

Successes

- 92% of boreholes seen during the evaluation were functional and in regular use.
- The target water consumption of 20l per person per day is being met and exceeded, in most cases by a wide margin.
- Bush technicians are working effectively to maintain pumps. Although the average number of pumps per bush technician is higher than in the original objectives, this does not appear to be adversely affecting performance.

Constraints

- The area comprises two geological regimes; quaternary sands to the East, and Lutetian limestone to the West. In the sands, the water is acid, causing corrosion of galvanised iron rising mains. This leads to more frequent lifting of pumps for repairs. In the (relatively rare) cases where pumps are out of service for long periods, damage to screens caused during lifting pumps is the most frequent reason.
- In the limestone area, the water delivered from boreholes shows mineral content comparable to water from traditional wells, and acceptable to the users. In the sand areas, however, chemical attack on galvanised rising mains results in high iron content making the water unpalatable for drinking.
- In the long-term, the supply of spare parts is still a concern, as it has proved difficult to establish sources, which bush technicians can access without help from WV.

Lessons learned

- The bush technician system is sufficiently economically attractive to the technicians to make them provide an effective service but, in the long-term, promoting the commercial supply of spares will be critical.
- Boreholes are well used and valued by communities. However, whether borehole water is used exclusively or in combination with water from traditional sources is very much dependent on the chemical quality of the water (particularly its iron content). Health benefits will be fully realised only where the taste of the borehole water is at least as good as from traditional sources.
- In areas with acid water, replacement of galvanised iron by stainless steel rising mains (unfortunately, an expensive option), along with refresher training for bush technicians on correct lifting techniques, would solve the problems of poor water quality and damage to rising mains.

Kwekwe Water Project, Zimbabwe

Sarah Allen, Programme Funding Officer, PLAN International

Outline

PLAN International began work in Kwekwe, in the Midlands Province in the centre of Zimbabwe, in 1989. The Community Water Supply Project started in 1994 with the aim of assisting local communities in the upgrading of existing potable water facilities and in the provision of new sources. It was implemented in two communal areas, Silobela and Zhombe. Silobela is divided into 11 wards and Zhombe into nine wards, each containing six villages. The total population is 121,600. The aim was to ensure that 75% of the population has access to a permanent source of potable water within one kilometre of their homes by end of 1998 and that each source of potable water serves no more than 250 people.

Activities

Rehabilitation of water points by repairing or replacing handpumps and cleaning, deepening and properly protecting wide wells

Communities undertook an inventory to identify the water points requiring rehabilitation in their respective villages. This list was then verified by a hydrologist who determined the work needed for each water point. A total of 91 malfunctioning boreholes were successfully rehabilitated. A further 10 boreholes were beyond repair, largely due to problems of borehole design which made the extraction of the castings impossible.

Provision of financial and material support for the development of new boreholes, deepwells and shallow wells

A total of 161 boreholes were drilled, of which 15 were dry. The successful boreholes were fitted with handpumps. A total of 84 deep wells were sunk, of which 26 were dry. A total of 99 shallow wells were sunk. 120 women builders were trained for the digging of shallow wells. For the deep wells, community members were recruited and trained. A total of five well sinking teams were set up. In addition, 10 women builders were identified and trained in shallow well upgrading skills.

Training of community Water Point Committees in management, organisational planning and monitoring skills to ensure that once repaired or installed, the water points can be maintained by the community themselves

A Water and Sanitation workshop was held for PLAN and government extension workers in nine wards to enable them to facilitate community training. A Water Point Committee (WPC), made up of four community representatives, one man and three women, was recruited for every water point. Training was subsequently provided to these committees to equip them with the skills to efficiently manage the water points. In addition, workshops were held on Community Based Maintenance for the District Water and Sanitation Ministry (DWS), councillors in the programme area and ward-level extension staff. Awareness campaigns on water-related health issues were conducted for village leaders and Water Point Committees. Twenty-four community-identified, village-based bush pump mechanics were trained in repair and maintenance and equipped with repair tool kits.

The communities participated in the pre-siting of water points and dug the first three metres of the proposed wells. They contributed the locally available materials for the project. Steps were taken to ensure that women could participate fully, for example, training sessions were scheduled at times and venues suitable for women.

Successes

- The maximum of 250 people per water point was not exceeded.
- The training of women builders for shallow well upgrading was a boost to the skill's resource base of the programme area communities and it increased the status of women. Overall participation of women was high.
- The training, which has taken place, has had a significant impact on the capacity of the communities to manage their own development. The training also had a positive impact on the commitment of the community members to the project.
- There have been 11 community-initiated vegetable gardens developed at selected water points and these have improved the participants' nutritional intake.

Constraints

- Health and Hygiene Education was not sufficiently emphasised in the first phase of the project.
- When the National Water Supply Programme of which the project is an integral part started, the main focus was on coverage with the emphasis on installation of facilities. Thus, sustainability occupied a rather peripheral position in the initial project design.
- The target number of water points rehabilitated and new ones sunk was not achieved. This was in part because of initial over-estimation, and also because:
 - an outdated database hampered the rehabilitation programme. The government was reluctant to invest time and personnel to update the information
 - a long material procurement process resulted in delays in implementation of deep well sinking, shallow well upgrading and headwork construction
 - failure to acknowledge the community calendar resulted in communities diverting efforts from the project to agriculture
 - drilling operations and well sinking slowed down due to heavy rains.

Lessons learned

- Consultative meetings should be given more emphasis during the preparatory phase, so that all the information necessary for the implementation of the planned activities is consolidated.
- There is a need to develop realistic and achievable targets. The indicators of success should focus more on the use of water points and the capacity of the structures put in place, as opposed to the number of completed structures.
- Without complementary components, the project will not be sustainable. For example, improving water facilities will make no difference to health if community members are not educated on the benefits of using clean water and maintaining the water systems.

Kidogozero Village Water Supply Scheme, Tanzania

Peter Park, Britain-Tanzania Society

Outline

A piped water supply has been provided for Kidogozero village (Coast Region, Tanzania) and its sub-village Kitonga, (total population c. 4,000), the water being pumped from a ring-well in the bed of the Ruvu River by two AC electric pumps powered by solar (photo-voltaic) arrays through inserters and power-optimiser equipment. The water is distributed to a number of standpipes via some 6km of PVC pipework and a 7m high storage header tank (capacity 135m³ or about 1.5 days' estimated demand).

This is only an interim report, as the scheme has been operative for just some four months and no post-implementation assessment has yet been possible. This paper is restricted to project-planning and implementation stages, together with a few lessons learned on the way.

Background

The Britain-Tanzania Society supports small rural development projects in different parts of Tanzania through its registered charity, the Tanzania Development Trust. In various sectors including water, projects are proposed, on behalf of beneficiaries, by both official and non-governmental organisations. Usually these proposers become partners with BTS and assume responsibility for on-site implementation of the project, while TDT provides a large proportion of the funding and may also input technical expertise as well as processing purchase of equipment not available in Tanzania.

BTS/TDT first worked in Kidogozero more than a decade ago, equipping the village Health Centre. At that time, we were informed of the risks of being taken by crocodiles which women faced when collecting water from the river. As well as providing improved quality of water in the interest of villagers' health *, the project was designed to eliminate these risks. (* Cholera cases occurred in the village just before project implementation).

Location

Kidogozero village, about 70km inland from Dar es Salaam, consists of a number of discrete groups of homesteads, separated by seasonally-flooded land, extending more than 2km along the west bank of the Ruvu River and set back about 0.5km from it. Kitonga sub-village is a nuclear settlement, well away from the river and 2km from Kidogozero. The Ruvu River has permanent water, though seasonal levels vary by about 10m; at its lowest level, water in the main sandy riverbed may be less than 1m deep. It is at this season when crocodiles (which are protected under CITES) present maximum risk.

History

Initially, our partners in the project, the Coast Regional Water Department, proposed a number of shallow ring-wells to serve the groups of homesteads, but it soon became clear that these would only yield brackish water. This was believed to be due, as in other parts of Coast Region, to an overlay of heavily mineralised clay contaminating the water in the aquifers.

A search was, therefore, made along the riverbank for other aquifers, fed directly through the sandy riverbed by water from the river. Eventually, one was located and, in 1996, the ring-well

was installed (with its top higher than maximum flood level) and a handpump was fitted. A supply of good quality water was now available but, because of the disperse layout of the village (the school and the Health Centre are both 2km from this well), it was considered desirable that water should be pumped from the well to two-tap stand-pipes in different parts of the village. This was even more appropriate when Kitonga sub-village joined the scheme, a modification of plan introduced by popular demand of the Kitonga villagers who especially contributed to the labour input when building the header-tank and burying the pipe network.

The option of choosing a diesel pump was considered unattractive because of the on-going cost to the villagers of running and maintaining it. A wind-pump was considered but rejected when limited data on the local annual wind regime suggested that, at certain seasons, useful wind-flow might be very limited. As the capital cost of solar (photo-voltaic) pumping installations is now comparable with wind-pumps, this option was finally selected. A power-optimiser assured full use of lower light intensities during seasons of heavy cloud overcast, as well as at dawn and dusk. A previous experience in Tanzania of solar-pumping (eight years trouble-free) gave us confidence in this selection.

Though the well was previously thought deep enough, drought in 1996-7 lowered the river-level so far that the well dried out. So a second ring-well was built in the riverbed, upstanding sufficiently for the top to be above flood-level and heavily protected with rough stone pitching against damage by floating debris. The electric cables to the two pumps in the well are connected to the solar arrays, installed on a high part of the riverbank, via a small bridge. Effective pumping began in late September 1997.

As theft of solar panels is not unknown in Tanzania, security-fencing has been placed around the installation and a watchman employed by the village, housed on site and financed by a monthly water-charge on all able, working persons. Simple instructions in Kiswahili have been provided to enable him to monitor operation of the installation and advise the authorities of any malfunction.

Data

Photo-voltaic power supply

- Two stationary solar arrays, each of 14 X 75 Wp mono-crystalline panels, supported on a rigid tubular metal framework, complete with two inverters and a flow-optimiser (which includes switch and terminal box) and together with 25m drop cables to connect to the pumps.

Submersible pumps

- Two Grundfos SPA 5A7 multi-stage centrifugal pumps fitted with three-phase stainless steel brushless motors, operated in tandem with a target pumping rate of c. 2.3 litres/sec, or 66 m³/day over a 22m dynamic head, at the worst season of the year (i.e. lowest total insulation during the Rains).

Storage tank

- Reinforced concrete
- 135m³ capacity
- Mounted on a 7m high cruciform column
- Construction of column: high-density concrete blocks on a spread footing hard-core foundation
- Construction of tank: a circular reinforced concrete floor slab, 7m Ø, 150mm thick, with 3.5m walls of concrete blocks, steel reinforced every second course and cement plastered to waterproof, cover slab as floor.

Pipework

- PVC
- Class B
- Rising main: length 570 m, Ø 110mm
- Distribution mains: 5, 760 m, Ø 90mm

Standpipes

- Twin spring-loaded taps (to prevent water wastage) on cement column, standing on a cement base consisting of a shallow basin with drain.

Lessons learned

The project emphasised the needs for the following.

Flexibility

At least three major variations to the original project plan were introduced during implementation (second well, re-designed water tower and addition of Kitonga sub-village – the first and third items adding to the budget while the second led to savings). Additional donor costs during implementation also arose from the need to subsidise adverse effects of economic restructuring on the revenue budget of our Tanzanian partners.

Reliable and enthusiastic partners

We would particularly mention:

- Regional Water Engineer, (Coast Region) and his staff for overall supervision of implementation, re-design of the water-tower etc.
- District Commissioner (Bagamoyo District) for mobilising the villagers
- Institute of Production Innovation, Dar es salaam, for assemblage and testing of solar-pumping installations
- Dulas Ltd, Machyolleth, for technical assistance on solar-pumping equipment.

Improved planning of project assessment

The limited capacity of BTS, as a small NGO, means there has been too little pre-implementation baseline measurement to make full assessment of the benefits (health and other) of the project.

The cost of this project, not including the uncoated labour input of the villagers or the professional services of the Regional Water Department, is around £11 per target beneficiary. This may seem rather high, but we believe the various circumstances described above justify the expenditure. Furthermore, the project is regarded by the Tanzania authorities as a pilot which might be replicated elsewhere. Upgrading the solar pumping installation to serve double the number of people is possible and would be relatively inexpensive, so the cost per head could be significantly less than in this project.

Chapter 4 *Presented papers*

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Overview Report on 1996-1997 JFS Submissions

Michael Smith, WEDC/WELL

Background

This report is based on the appraisal of 18 project proposals out of the 306, which the DFID NGO Unit received, for funding beginning in April 1997. The WELL appraisal itself was principally concerned with technical engineering aspects of proposals, although these could not be considered in isolation. Attention was, therefore, also given to social, health and financial elements, but other reviewers paid greater attention to these aspects, additional information was also provided for some proposals after WELL personnel had appraised them. WELL personnel provided comments and recommendations at an early stage, as one part of the selection process and the final selection of proposals took account of considerations and opinions from other advisers.

It should also be emphasised that the views expressed in this report are those of WELL personnel and are not necessarily representative of the other groups who appraise JFS proposals.

General

The quality of the submissions requesting funding varied considerably, both in quality and length. Each NGO used a different style for writing their proposals, as permitted under the terms of the scheme and there was little evidence of particular house-styles used within individual NGOs. I do not advocate adoption of a particular format for proposals, because some proposals will inevitably be unsuited to a standard format and standardisation could make for dull reading. In addition, a standard format does not guarantee that all relevant information is included, or that irrelevant material is omitted. Rather than have a standard format, I would like to see greater consistency in the amount of detail included in proposals. In terms of the amount of information and detail supplied, some proposals provided little more than general descriptions, while others supplied more detail than necessary, some of which was not directly relevant.

Many proposals would have been much improved if the *'Guidelines and Procedures'* document issued by the DFID had been followed more closely. All of those involved in preparation of proposals should follow the recommendations contained in the *'Guidelines and Procedures'* document, and UK NGOs should, therefore, ensure that partner organisations have access to the document, so that the guidelines are available to both UK and local authors of proposals.

The amount of information provided on social, institutional aspects was generally insufficient. Proposals provided a general description of the project, but failed to provide adequate further details.

When reviewing several proposals, it is helpful to have information presented clearly. A structured report suggests that the proposal has been considered carefully, and that the author of the proposal has a clear focus and a clear idea of what is planned. Less structured reports suggest that the author has a vague idea of what is planned, and that only the broad concept has been considered, with few details decided. Concise proposals are favoured, provided that there are no major omissions of important information. As in all reports, the quality of the material is of greater importance than the quantity. Material on specific topics should all be together in one section of the proposal, rather than being scattered in unexpected places through the report.

Specific comments under headings used for review of individual proposals are provided below, and these are followed by notes that may be helpful to agencies wishing to submit JFS proposals in the future. These could be read in conjunction with the *'Guidelines and Procedures'* document issued by the DFID, which are clear and concise. Many of my comments repeat advice and requirements stated in the *'Guidelines and Procedures'* document, indicating that aspects of the document have been ignored or overlooked by some authors of proposals.

Funding requested

A few proposals did not clearly show either the amount of funding required for the project or what funding was requested from the DFID. This was surprising, in view of the requirements stated in the *'Guidelines and Procedures'* document issued by the DFID, which request that proposals should indicate on the first page *'the total cost of the project and sum being sought from DFID'* and *'costs must be expressed in £ sterling'*. Some project costs were based on specific terms and conditions which differed from those for the JFS scheme, and an explanation of the cost-sharing assumptions is, therefore, necessary.

Overview

A good project summary (such as that provided by Plan International UK for work in Ghana) is desirable, providing a clear concise summary of the scope of the project. Adequate justification is needed for each project, and it is desirable for projects to have a good balance of components, with inputs phased and co-ordinated in order to maximise benefits. The proposals tended to assume that implementation would improve environmental health conditions, yet few made any reference to this implicit assumption or to what improvements could be expected. Mention could be made as to whether each proposal is for new work or for continuation of existing projects, and reference could also be made as to whether the proposal will complement other current or proposed projects.

General quality of submission

Proposals should be concise, yet clarity should not be sacrificed for brevity. It was relatively easy to read and assess proposals that were well-structured and it was frustrating to read through proposals that were vague, rudimentary, or which had information scattered in unexpected places. Inclusion of maps was surprisingly rare, and I appreciated those that included maps, since these helped to link what would otherwise be abstract proposals to specific locations. Few proposals contained diagrams or illustrations, which can be very useful and informative, yet it should be noted that these only serve a useful purpose if they are relevant and legible.

Logical framework

Few proposals included logical frameworks, and I would like all JFS proposals to include a logical framework in future. Inclusion of logical frameworks is, in my opinion, desirable, although I would not like any proposal to be disregarded if there were mistakes in its logical framework. Completing a logical framework is a tedious activity, but I found it very helpful to study the logical frameworks that were submitted. These showed what likely risks and assumptions had been identified and considered, although some risks had not been identified. They also showed the phasing of activities, the logical progression from one stage to the next, and how progress could be monitored. Possible risks should be clearly identified, even if the DFID decide that a logical framework need not be submitted. Similarly, there is a need for clear presentation of other categories in each proposal: purpose, outputs, activities, indicators and assumptions.

Technical

The amount of information was frequently insufficient, and generally more detail was needed in this category. A limited amount of detail makes it impossible to decide whether or not specific proposals are satisfactory. Mention is needed of any important assumptions, with evidence to support whether the assumptions are realistic. In particular, I was disappointed that many proposals included a component to improve water supplies yet lacked any assessment of whether predicted water yields from identified sources exceeded water demands, or whether the water was of satisfactory quality. There may be insufficient water available, or the water may be of unsatisfactory quality. Some proposals made reference to environmental impact and for each proposal the likely environmental impacts, whether positive or negative, should be assessed. This requirement is mentioned in the *'Guidelines and Procedures'* document, yet some proposals omitted this topic. Any local or unusual technical terms should also be explained and evidence should be provided that safety aspects have been considered during construction and maintenance activities where accidents may occur.

Social and institutional

The amount of information in this category was also generally inadequate. Charts showing organisational structures to be adopted during the proposed projects were helpful, demonstrating that relationships between the implementing agency and the beneficiary community had been considered carefully. Many proposals could have provided more information about the beneficiary community, how the community was identified and whether there was demand from within the community for the proposed project. Some project proposals could also have provided more information about the commitment of the community to participation in the project and the composition and duties of local management committees. Such information is especially important when there has been a poor record for management and maintenance of other projects in the area. It appeared that a few proposals had included social and gender issues as a concession and that they would receive little attention during the project. Several proposals made reference to monitoring and evaluation activities, yet the issue of how monitoring and evaluation findings obtained would be used to correct shortcomings or make improvements was neglected.

Financial

Little could be done to check the accuracy and reliability of the cost estimates, but there was little consistency in the formats used for presenting financial estimates. Mention could have been made of what contributions beneficiary communities would make towards the project, in terms of money, materials or labour. Assumed inflation rates varied considerably, yet no justification was provided for the rates assumed and some proposals made no provision for inflation. Similarly, there was no consistency about how provision for project administration charges should be shown in the financial estimates and what staff costs should be included. Assessments could have been included of the cost-effectiveness both of the various proposed interventions and of the entire project, but cost benefit analysis to justify a project is only possible if the implementing agency has adequate skills and resources.

Criteria used for recommendation of acceptance or rejection

Each proposal was judged against several criteria. The two major categories of selection criteria used to determine which proposals were recommended for acceptance were the quality of the submission report and the overall quality of the proposal. Submissions that left major questions unanswered, which did not have a clear focus or which described proposals having uncertain or questionable benefit were not favoured.

Other more specific criteria used for assessment of proposals are listed below.

Is the project balanced?

The project should include relevant associated activities that would complement the main activities. Proposals to improve water supplies, for example, would benefit from project components to improve sanitation and to provide hygiene education. Inclusion of important related activities is likely to maximise potential benefits, while omission is likely to limit the benefits. Mention should be made as to whether the proposed project is in line with government policy.

Is there sufficient justification for the proposed project?

Evidence should be provided to justify the project, showing who will benefit and that the project warrants the likely investment.

Does the proposed project have potential as a demonstration project?

Projects that can serve as good examples for others to follow are generally preferable to those which have little potential for replication.

Is there a clear description of the scope of the project?

Although it seems an obvious requirement that proposals should state the scope and focus of the project, authors of proposals may fail to communicate their ideas effectively. Some proposals submitted appeared to contain inconsistencies, with different sections suggesting differing scopes for the project. Failure to define what is included and excluded from the project may occur accidentally, because the author has not fully formulated the scope of the project, or because the boundaries between the proposed project and other related projects are not clearly defined. It is desirable to include a paragraph providing a clear and concise summary of what is proposed.

Is the project described in sufficient detail?

In addition to the scope of the project, sufficient detailed information should be provided for specific project components, indicating why particular options have been chosen and explaining how future decisions will be made.

Is there demand for the project from the beneficiary community?

It is widely accepted that a major factor that influences the success or failure of a project is whether the beneficiary community has expressed demand for the project inputs. Evidence that the community have expressed a felt need for the project is desirable to show that the project is responding to demand (bottom-up) rather than being imposed on a community (top-down).

Is the beneficiary community clearly defined?

This criterion is closely related to the previous one. Lack of a clearly defined beneficiary community implies that the implementing agency cannot have consulted with the community and that the project is not responding to demand. The method by which beneficiary communities are identified should also be described. Adequate explanation should be provided for situations where surveys indicate demand from the community and specific target groups have yet to be identified within that community.

Are local partner organisations identified?

Where local partner organisations will have involvement in a project, those organisations should be identified, and evidence provided of their ability to work satisfactorily on such projects. This is especially important in countries where 'rogue' indigenous NGOs are known to exist.

Is the project realistic?

Some project proposals have very modest aims, while others are very ambitious. The implementing agency may lack the management and administration resources for some projects. It takes time to mobilise and motivate communities and such work cannot be rushed. Projects need to have realistic aims, assessing what achievements are likely within the scope, staffing, funding and time-frame of the project. Proposals that require activities in several communities are likely to have minimal community involvement and sense of ownership. It is better to spend time working in a few communities than to pay short visits to several communities. Short-term inputs generally result in short-term benefits. Projects should not be driven by technical inputs and achieving specific inputs for installations. Much can be learned from past projects in the area, which can show what problems have been encountered previously.

Will phased timings of inputs for project components be satisfactory?

Evidence should be submitted showing that adequate time is provided for each project component and that timings for different components have been co-ordinated carefully.

Are there assurances of community commitment to the project?

Various assurances are needed to provide evidence that the beneficiary community will have full involvement in all aspects of the project from planning and implementation to long-term management. The project should be a partnership between the implementing agency and the beneficiary community and evidence is required of mutual commitment to the project. Evidence from previous projects in the same area can provide evidence of whether communities have adequately managed and maintained other schemes. While commitment to the project cannot be guaranteed, evidence of intent is desirable and the following assurances are needed.

- To what extent will women be involved in different stages of the project?
- How will the community be involved in different stages of the project?
- What contributions (financial, materials, labour, etc.) will the community make to the project?
- What activities are proposed by the implementing agency for mobilising and motivating the community?
- What training will be provided by the implementing agency for members of the community?
- What will be the agreed long-term arrangements for operation, maintenance and management of facilities?

- How will composition, size and membership of the local management committee be determined?
- What will be the agreed duties of the local management committee?

Are the technical proposals satisfactory?

Suggested technical proposals should be appropriate to the beneficiary community, being affordable, acceptable, functional and suitable for local repair and maintenance. Sufficient detail should be provided to permit the quality and cost-effectiveness of the proposals to be assessed. Mention of specific items such as wells, hygiene education programmes and latrines is not sufficient, because further information is needed to establish whether the proposals are good or bad. Not all wells, for example, are good. Mention should also be made of specific details such as where spare parts can be obtained, what safety measures will be taken during construction and maintenance activities where accidents may occur, and what safety features are included in the design of facilities.

Are assumptions sensible?

It is seldom, if ever, possible to make accurate future predictions, and most projects are based on some assumptions. Such assumptions are frequently so fundamental that they are not stated. Assumptions should, however, be stated, and their validity assessed where possible. Examples include future population projections, and water demands. Several recent proposals included project items to improve water supplies to communities, but provided no estimates of present and future water demands, did not state whether water quality was satisfactory and lacked any assessment of whether yields from local water sources would be sufficient to meet demands.

What proposals are included for monitoring and evaluation?

Progress should be monitored and evaluated both during a project and after completion. In this way, modifications can be made and mistakes corrected at the earliest opportunity. (*'The fleeter and better a racer is, who hath once missed his way, the farther he leaveth it behind.'* Francis Bacon) Details should be included for proposed arrangements for monitoring and evaluation and the evaluation and monitoring teams should include independent assessors and community members in addition to members of the implementing agency. In particular, mention should be made of how the findings of monitoring and evaluation activities will be fed back as lessons learned to improve ongoing and future projects.

Are cost estimates reliable?

Costs included in proposals are inevitably estimates, but some explanation can help to show the likely reliability of the estimates. Arithmetic can be checked relatively easily, yet some recent proposals contained errors. Any inflation rate assumed should be stated, with justification for the inflation rate used. Similarly, the basis of cost estimates, whether these are based on recent project costs or less reliable data, should be explained. The total project costs, and the funding requested from the DFID, should be clearly shown, together with mention of any special funding agreements. Finally, justification should be provided as to whether both the various individual proposed interventions and the entire project are cost-effective.

Summary checklist

(NOTE: This checklist is intended for guidance, and it does not claim to be comprehensive.)

- ***Is the project balanced?***
- ***Is there sufficient justification for the proposed project?***
- ***Does the proposed project have potential as a demonstration project?***
- ***Is there a clear description of the scope of the project?***
 - Include a paragraph providing a clear and concise summary of what is proposed.
- ***Is the project described in sufficient detail?***
- ***Is there demand for the project from the beneficiary community?***
- ***Is the beneficiary community clearly defined?***
- ***Are local partner organisations identified?***
- ***Is the project realistic?***
- ***Will phased timings of inputs for project components be satisfactory?***
- ***Are there assurances of community commitment to the project?***
 - To what extent will women be involved in different stages of the project?
 - How will the community be involved in different stages of the project?
 - What contributions (financial, materials, labour, etc.) will the community make to the project?
 - What activities are proposed by the implementing agency for mobilising and motivating the community?
 - What training will be provided by the implementing agency for members of the community?
 - What will be the agreed long-term arrangements for operation, maintenance and management of facilities?
 - How will composition, size and membership of the local management committee be determined?
 - What will be the agreed duties of the local management committee?
- ***Are the technical proposals satisfactory?***
 - Are sufficient details provided to permit the quality of the proposals to be assessed?
 - Are safety measures considered?

- ***Are assumptions sensible?***
 - Are assumptions stated?
 - Are water supplies of adequate quality?
 - Can water yields satisfy water demands?

- ***What proposals are included for monitoring and evaluation?***
 - When will monitoring and evaluation visits be made?
 - Do evaluation and monitoring teams include independent assessors and community members in addition to members of the implementing agency?
 - How will lessons learned from monitoring and evaluation be fed back into the project?

- ***Are cost estimates reliable?***
 - Is the arithmetic correct?
 - What inflation rate is used, and with what justification?
 - What basis has been used for cost estimates?
 - Is the total funding requested shown clearly, together with mention of the basis used for sharing costs?
 - Are the project and individual components cost-effective?

Findings of the Water and Livelihoods Workshop in Harare, October 1997

Alan Nicol, Save the Children Fund (UK)

Background

The workshop on Water and Livelihoods was organised by Save the Children Fund (UK) in close consultation with ODA (DFID) in London and the British Development Division in Central Africa. The workshop idea was inspired by a water project review undertaken by an external consultant for Save the Children Fund in 1997, which led to a draft policy statement and strategy paper. The consultant identified in particular the need for interventions in the water and sanitation sector which were:

- More focused on contributing to livelihood sustainability
- Linked more closely to developing the participation of women and children
- Better informed about community involvement through operational research.

The purpose of the workshop was to bring together practitioners from a wide variety of NGOs, government departments and donors to exchange experiences of programmes across Africa and to address questions of access to water, water charging and sanitation. In addition, the workshop sought to inject new ideas by seeking the views of policy makers and academics concerned with the future development of the water and sanitation sector.

A major objective was to develop recommendations for action by governments and local and international organisations involved in providing water and sanitation projects in Africa. To facilitate this process, the following specific objectives were set:

- To further understand the relationship between community water development programmes and livelihood security, with a specific emphasis on food security and poverty alleviation.
- To exchange key lessons learnt and best practice adopted by institutions in water and sanitation projects.
- To extend the networking of NGOs government and other organisations working in water projects and concerned with water and livelihood security in Africa.
- To work towards a clear policy framework for future participation in the water and sanitation sector in southern Africa in the light of recent drought threats to the region.

To facilitate the process of developing specific recommendations for policy and practice, the meeting was structured around three key themes:

- Communities and water and sanitation development
- Households and the impact of water and sanitation projects on livelihood security
- Women and children as beneficiaries of, and participants, in water projects.

Participation

The workshop attracted 58 participants from 13 countries in Africa, Asia and Europe. Country participants were drawn from a range of government departments and local and international NGOs and their partner institutions. As well as regional and international development agencies, representatives of donors (World Bank, SIDA and DFID) and academic experts attended the meeting and provided a supra-regional view of the issues.

Workshop structure

The workshop was spread over four days, with the first three days covering the three themes listed above. The final day focused on drawing together recommendations for policy and practice. To encourage the sharing of experience and to generate recommendations, each day's theme was introduced by keynote speakers and the presentation of short programme case studies. Plenary discussions and question sessions were combined with working group activity, and, on Day Four, the lessons learnt during the week were summarised and policy-related output was developed.

Dr Justin Maeda, the UNICEF Resident Representative in Zimbabwe, opened proceedings. The closing address was given by Peter Morgan, a SIDA consultant with considerable experience of rural water supply and sanitation issues in southern Africa.

The range of experience and knowledge about the region demonstrated at the workshop and in the challenging papers given by experts from academia, donors and NGOs helped to stimulate practical recommendations for future action.

Findings of the workshop

Details of the workshop conclusions and recommendations are given in the workshop proceedings. Annex V gives the text of all the keynote papers and case studies presented, and Annex IV the additional background papers prepared for the workshop.

The following recommendations came from the five policy synthesis working groups established on Day Four of the workshop. A short questionnaire distributed to participants on Day Three asked them to identify themes of critical interest for policy and practice to be considered on the final day. By ranking the responses, five groups of recommendations were established. The consensus among participants was that poverty should be the over-arching theme of all the working groups.

1 Building in a livelihoods approach to water and sanitation projects

Understanding the livelihood of a household was regarded as an essential objective of a project development: it is the best way to understand why people are poor and, therefore, how their poverty can best be alleviated. If the definition of livelihood is taken to be 'a system of economic activities which allows people to maintain their quality of life' (a working definition from the group), any approach to building in livelihoods to water and sanitation projects should aim to:

- Acquire the baseline data required to understand the food economy of a household and its linkages with the proposed type of water and sanitation project.
- Evaluate the impact of projects on the whole household economy rather than just narrowly defined indicators within the project itself.

- Develop methods of community self-monitoring to assess the impact of projects on household livelihoods; bear in mind the disruption to the community caused by excessive 'data collection' by agencies and outside researchers; share data more effectively between agencies.

II Drought preparedness

Countries within the region can benefit from better sharing of information between organisations and government. Improving the sharing of information was regarded by the workshop as an essential task to be undertaken by international and local NGOs and government in order to prepare people for drought. Specific recommendations made by the workshop for governments, NGOs and donors were:

- To build community-level and district-level capacity to map existing water points and gather information about the use of existing sources; in addition, to study the impact of past drought experiences by consulting key informants, in order to build upon coping mechanisms previously adopted by communities and households.
- To build on existing community-based approaches to project development rather than adopting a new set of emergency procedures for implementing, monitoring and evaluating, at the same time acknowledging that communities may face difficulties in managing scarce resources; a community-based approach need not preclude assistance to individual households (for example, in well-deepening activities).
- To ensure that emergency responses tackled issues, such as the water needs of essential assets (including holdings of livestock) within the community, at the same time developing a broader-based 'livelihoods' approach to water and sanitation that could bring specific benefits to the poorest; projects should encourage poor households to safeguard assets.

The quality of funding proposals needs to be improved, particularly through the co-ordination of NGOs and the sharing of information at field level.

Information collection and linkages between countries and programmes should begin as soon as possible (that is, before a drought develops) in order to enhance the potential for responding; drought preparedness should become explicit in all project proposals for the region.

III Community-based management and ownership

Community-based management (CBM) was acknowledged during the workshop as providing communities with a sense of ownership. It could also deliver a quick response to community problems and make savings in government expenditure on maintenance and repairs (provided there was not an excessive proliferation of new water points). CBM was acknowledged to have spin-offs, including the generation of community capacity to plan other forms of development activities. However, some of the ambiguities inherent in the concept of ownership were also highlighted, including the issue of when a community effectively owned the water point and in what kind of institution ownership was vested.

The development of national policies on community ownership was considered important; strong political backing would be needed to ensure that they were implemented and enforced. Freedom for communities to choose between various technological options was seen as vitally important, as was the need to provide back-up for the existing supply networks for spare parts (which were frequently unreliable).

The dissemination of information about approaches and lessons learnt between practitioners themselves and between communities and practitioners was regarded as a priority, particularly in view of the widening experience of community-based management in the region.

IV Demand responsive approach: next steps to implementation

Discussion of the Demand-Responsive Approach (DRA), currently being promoted by the World Bank as a way of developing the water and sanitation sector, led to recommendations on how best to adopt such an approach whilst ensuring the poorest communities were not penalised. There should be ways of ensuring that communities are sufficiently well informed to make choices about matters such as technology and to articulate their demands to facilitating agencies.

Before implementing DRA, a detailed knowledge of how effective communities are in assessing their own needs and capacities has to be acquired; communities should be provided with the means to improve their capacity for self-assessment, proposal development and communication with facilitating organisations.

Government extension staff should be given additional training that will provide them with a broader view of community development than their own specific area of expertise permits, and would include an ability to assess communities that are in need of assistance but are incapable of articulating an effective demand; the approach should also examine how to reduce the response time between community demand and project facilitation.

Communication and dissemination of DRA between all actors (government, NGOs, bilateral and multilateral organisations and beneficiary communities) is a necessity both for sensitising them to the approach and for improving networks between facilitators and between communities and government; it has always been acknowledged that the development of DRA would take place in an environment containing many pre-existing systems of provision, some of which would be more conducive to DRA than others.

V Taking forward the participation of women and children: practical measures

Despite some reported successes in developing the participation of women and children in projects, there was a recognised need to improve on 'women on committees' and to understand more fully how their current roles could be supported and enhanced. Care must be taken to ensure that participation was neither tokenistic nor an added burden on those concerned.

Facilitating organisations should act as a bridge between the opinions of women, children and men on the one hand, and policy and technology development on the other hand, to ensure that appropriate and user-friendly technology is adopted; organisations should aim to support women in their positions of authority, whether elected to a water management committee or another management role.

Choosing groups that have achieved a high level of participation in project development should ensure that they are adopted as role models for other groups; gender awareness training was advocated for both men and women; a variety of techniques would have to be used to encourage men, women, boys or girls to express their opinions and experience, which could then be discussed within a wider group.

Schools should be a key resource for training children in the technology of water supply and in approaches to water supply and sanitation (such as community-based management); through such training, they may be able to influence current practice in the family (such as in HESS activities).

Ways should be examined of extending DRA so that it can be used for involving children; in addition, information about the cultures within which organisations worked prior to implementation needs to be shared and fed back.

The implications

Most of the recommendations made by the workshop relate to the overall approach to project development being adopted by agencies and governments in the region. Broadly speaking, this advocates the management of resources at the lowest appropriate level, based on the idea that communities can and, increasingly, should assume responsibility for managing and maintaining their own supplies of water. The central premise of this approach is that community management of resources is more likely to ensure the long-term sustainability of services.

Clearly, not enough is yet known for an effective, long-term shift of emphasis to be made towards the lowest level of appropriate management; the community. The need for clearer information and better quality dissemination and sharing has implications for national government and donor agencies in particular, and applies to water and sanitation projects across the board.

This is not just a case of more effectively disseminating the lessons learnt, but also of developing a greater capacity to:

- map existing resources
- comprehend how changes in resources can affect livelihoods at the household level
- understand the stratification within what are loosely termed 'communities'.

Indeed, if 'communities' are to become their own management unit, a more analytical understanding of their status in different contexts needs to be derived, both from existing data and from that generated by new research. As a result, a longer lead time may be required in project development.

One specific need is to understand the impact on livelihoods of resource development and depletion (either as a long-wave problem, as populations grow and pressure on resources increases, or as a short-wave 'dramatic event' such as a drought). The implications for all concerned are clear; the impact of reduced availability of resources will be greatest on the poorest communities and on the poorest strata within those communities.

The policy implications of pushing ahead with DRA should be considered carefully by all actors, particularly the World Bank. The objectives may include improving social conditions and strengthening weaker sections of society, but the 'willingness' to take responsibility for maintenance and management is likely to be confined to those 'able' to do so. Demand, therefore, will come from those with the necessary assets and skills, which will work largely against the poorer strata of society.

Finally, as communities are given more responsibility, there will be a greater need to understand the impact of interventions. This will require a greater participation of women and children in development, implementation and monitoring. The role of lead agencies in this regard will become increasingly important as the need to improve women's participation, in particular, increases. The contribution of NGOs with a range of experience at international, national, district and community levels will be vital to deepening and widening the understanding of impact. The pooling of experience between NGOs will become a necessity, as will their collaboration on research.

List of workshop documents

Day 1: Communities

Introductory address, Dr Justin Maeda, UNICEF Resident Representative, Harare

Keynotes:

Southern Africa: the wider policy context, Dr Paul Taylor, Institute of Water and Sanitation Development, University of Zimbabwe

A demand-driven approach to community water supply and sanitation: Mvula Trust experiences, Thoko Sigwaza, Mvula Trust, South Africa

Case studies:

The effect of decentralisation in the Zimbabwe water and sanitation sector, Rodwell Samaneka, Save the Children Fund (UK), Zimbabwe

Demand Responsive Approaches to community water supply, Wambui Gichuri, World Bank consultant

Handpump maintenance in Burkina Faso – Community willingness and ability to pay, Tom Skitt, Save the Children Fund (UK), Burkina Faso

Day 2: Households and livelihoods

Keynotes:

Water, food security and livelihoods, Paul Clarke, Save the Children Fund (UK), Food Security Unit, London

Technological options for water and sanitation projects in southern Africa, Peter Morgan, SIDA Consultant, Zimbabwe

Case studies:

An overview of Concern Universal Malawi's water and environmental sanitation programme, Maxwell Chiputala, Concern Universal, Malawi

The WAMMA programme in Dodoma, Tanzania – A case study of community-managed pump and engine water supplies, Herbert Kashililah, Regional Water Department, Dodoma

Collector wells in Zimbabwe, Chris Lovell, Institute of Hydrology, Zimbabwe

The experience of Save the Children Fund in Darfur, Ismail Adam el-Tahir and Abdel-Hamid Rahmatalla, SCF (UK), Sudan

The Ingqalabutho sanitation programme, South Africa, Numfondo Mqadi, Mvula Trust, South Africa

Water and sanitation programme, the case of Malawi, Mercy Shano, John Chimukho and George Chimseu, SCF (UK), Malawi

Day 3: Women and children

Keynotes:

Households economics, gender and water supply, Wambui Gichuri, World Bank consultant, Kenya

Lessons learnt from involving women and children in water projects – Experience from SCF (UK) in Ethiopia, Elizabeth Mekonnen, Asselefech Tesfaye and Rachel Lambert, SCF (UK) Ethiopia

Case studies:

SCF (UK) Environmental Health Project in the Tibet Autonomous Region, People's Republic of China, Jigme WSO and Kate Wedgewood, SCF (UK) China

Project Urban Self-Help (PUSH), Zambia, Cathryn Mwanambwa, Care International, Zambia

Notes on field visit to Juru, Goromonzi District, Mashonaland East Province, David Proudfoot, Mvuramanzi Trust, Zimbabwe

Day 4: Policy synthesis

Action pointers in the context of a drought threat, Anthony Waterkeyn, independent consultant, Zimbabwe

Additional papers prepared for workshop:

Water and households in a conflict zone, Kuria Kihara, SCF (UK), South Sudan Programme

SCF (UK) water sector work in Mozambique, Geert Kroon, SCF (UK) Mozambique

Water projects implemented by SCF Swaziland, Neath Velocity, SCF Swaziland

Water, livelihoods and community management mechanisms: lessons learnt from the Jijiga water project, Somali Region, Ethiopia, Mengistu Berhanu et al, SCF (UK) Ethiopia

Workshop report

Water projects and livelihoods: poverty impact in a draught-prone environment (published by Save the Children, 1998) contains the proceedings of the workshop and the workshop documents

Sources of Information and Networking for WSS Professionals

Darren Saywell, Research Associate, WEDC

Introduction

Information is a tool that can be used to enable education and development in both Northern and Southern nations. Access to such a resource is a critical factor in the development process, but the reality is that information is typically unavailable to users when it is required, or is available in a format which is difficult to interpret and apply to conditions on the ground. When it is available, it may be at a cost that is prohibitive for the user to bear. Additionally, with the explosion of information in recent years, the key challenge for the future is not finding any source of information, but the best or most appropriate source. Mechanisms which permit users to participate in and benefit from information exchange on an equal basis, which are low-cost and which can deliver subject or problem-specific answers need to be identified.

One of the main conclusions of the *Water and NGOs* workshop held in June 1996 was that NGO projects could be improved through better sharing of experience (through existing mechanisms) and dissemination of relevant reports using existing and new media. Information about many of the operational problems that NGOs face in their work already exists, has been developed world-wide and tested by institutions and communities in several locations, yet the knowledge of this information appears not to be globally appreciated. NGOs need to be able to fill, or manage this information void in order to work more effectively. Finding suitable sources of information and being able to draw on the experiences of others is therefore crucial to all sector professionals.

This paper reviews key points in relation to the nature of information needed by NGOs, explores some of the main sources of information which NGOs can use to bridge their information gap and ends with a consideration of networks and networking: what they are for, what networking implies and some examples of how they work.

Information and NGOs: needs, types, access

Information about water and sanitation is not the same as information of professional interest to people working in the water and sanitation sector. In short, not all information will be (i) relevant, (ii) timely, (iii) usable in the format it is disseminated. There is a need, therefore, for NGOs to understand what their particular *information needs* are, to be aware of the different information providers (and intermediaries) which exist and the type of information they can provide. In this way, it is possible to begin to narrow the gap between existing information and the sources which provide that information.

The particular *subject-based* information needs of NGOs would normally be gauged through internal evaluation by the NGO itself (either a formal or informal procedure). However, the *type* of information required by NGOs is more predictable and several main groupings can be identified:

- Awareness of new developments or events in the sector (either subject or geographically-based)
- Technical response about specific problems/issues
- Substantive information about sector experiences: practice, research, lessons learned.

Most NGOs will find they need information falling in one of these categories at some time during their work. Possible sources for these types of information are covered in greater detail in Section 2 of this paper.

Although a variety of information sources, systems and institutions exist in the sector, the ability of any information user to access that information may be restricted by one of three common constraints. Knowledge of these constraints may help the user plan an appropriate strategy of access.

- **Cost:** Information is a commodity, the production and dissemination of which bears costs which are commonly passed on to the consumer in a variety of ways; most obviously through the cover price of documents, but also through subscription fees, database search charges and fees for searching through resource centre libraries. It is interesting to note that the sale of information through database services had doubled over the past decade and that the number of these databases has increased three-fold during the same period (UNEP, 1997). REPIDISCA, a bibliographic database covering water, air and solid waste issues focused on the Latin American region, is one such example, and charges US\$ 50 per search request. Costs are not only those which are levied through purchase; less obviously there are costs associated with the means used to request and receive information such as stamps, telephone, fax and e-mail. The costs for fax and e-mail can be considerable in developing countries.
- **Language:** Many information providers produce information in English only, whereas most of the world's population does not use English as a working language. Results and experiences from projects undertaken in Francophone West Africa, from the Portuguese speaking Lusophone nations and from much of the Spanish speaking world stay within those regions because of the difficulties and expense of translating documentation into different languages. Paying for technical translation can be a prohibitively expensive exercise.
- **Access to information technology:** The advent of the Internet and electronic mail in the information arena has brought significant opportunities for information exchange. However, neither Internet nor e-mail are commonplace in all developing countries (although e-mail is increasingly the norm), and where electronic media are available, costs for access may be high, transfer of information may be slow (due to inadequate telecommunications infrastructure) and the use of information technology may be restricted within an organisation to senior staff. These staff members may not be same people who are the key users/beneficiaries of sector information.

Some or all of these constraints can be applied to the sources identified in the following section, *Existing sources of information*. Furthermore, judgements about the reliability and validity of these sources of information have to be made by the user themselves. Trust and confidence in an information source will often count for a great deal to the end user, and will determine whether that source is used on more than one occasion. In some cases, information intermediaries have attempted to filter and validate sources for the user, but ultimately this is a decision which needs to be made by those who understand their information needs best.

Existing sources of information

This paper does not, nor cannot realistically hope to describe every information source in the sector, so what proceeds is a digest of main information source types, with examples of each as an illustration. The purpose of this section is to demonstrate the availability and range of information which already exists.

Different types of information source will typically provide different types of information, and knowing what your information needs are will help determine which source type to choose. Several key types of information source can be identified, which I have broadly categorised as *Information store*, *Information intermediary* and *Information systems* for convenience and simplicity. It needs to be stressed that, in reality, there is some blurring of distinctions between these categories (i.e., some institutions can act as stores of information, as an intermediary and as an information systems). However, for the purposes of this paper, this general categorisation serves to simplify what is otherwise a complex series of interconnections. The examples given with each sub-section are indicative, not exhaustive.

Information stores

For the terms of this paper, information stores relate to those institutions, resource centres and libraries which are repositories of information to be used by sector professionals. Stores are sources which are passive players in the information arena, collecting, categorising and holding documents without any further processing or analysis of information.

Many established organisations working in the water sector, or in development in general, manage resource centres with small, normally specialist library collections (i.e., Appropriate Health Resources and Technologies Action Group (AHRTAG) stocks titles and a database related to primary health care, disability services and community based rehabilitation in the South; WEDC has an extensive resource centre on WSS sector related subjects). These organisations may provide access to these collections, or limited technical assistance in some cases.

Examples of information stores, which are of relevance to NGOs working in the water sector, include:

- **British Library for Development Studies (BLDS):** Based at the Institute of Development Studies, University of Sussex, the BLDS collection comprises some 250,000 monograph items and an estimated 8,000 serial titles with 25,000 documents added yearly. Collection policy encompasses literature in English and other European languages relating to economic and social development (both urban and rural) while specific subject areas of interest include water and irrigation; waste management/recycling; development (general); climate; desertification and so on. Collection policy prioritises acquisition of publications from developing regions.
- **International Water and Sanitation Centre (IRC):** Working with partners in developing countries, IRC aims to strengthen local capacities by sharing information and experience and developing resource centres. IRC emphasises the introduction of communication, gender, participation, community management and affordable technologies into water and sanitation programmes. IRC is responsible for the *InterWATER Guide to Information Sources* which aims to identify and describe a selection of useful sources of information relating to water supply and sanitation in developing countries. It includes sources available on the Internet as well as those published in conventional formats.

There are also a host of in-country organisations which have developed resource centres of local significance, which fulfil roles as information stores. Examples include the Network for Water and Sanitation International (NETWAS) based in Nairobi, Kenya; Environmental Systems Information Centre (ENSIC) in Thailand; and the Centre Régional pour l'Eau Potable et l'Assainissement à faible coût (CREPA) in Burkina Faso.

Information intermediaries

Intermediaries are responsible for passing on relevant information derived from information systems. Intermediaries may analyse information users needs, and then seek to provide specifically tailored information on that subject/s. The intermediary may provide 'added value' to the raw information from, for example, a database by interpreting how it might apply to local circumstances. Additionally, they play a key role in facilitating contact between suppliers of information and users, thereby allowing partnerships and exchange to occur. Again, the examples listed are not exhaustive but indicative of what is operational:

- **ENSIC (formerly Environmental Sanitation Information Centre):** Aims to provide developing countries with information on water supply, environment and sanitation. Operates an outreach network (Ensicnet) for six Asian countries; in addition to a publications, database and information service.
- **Global Applied Research Network (GARNET):** Aims to facilitate information exchange on applied research between WSS sector professionals through low-cost, decentralised and informal networks (both topic-based and geographically-based). GARNET's structure provides a technical response service through network co-ordinators, information exchange based around subjects or geographical area, and publications (produced by the global network centre) relating to applied research and the sector in general.
- **International Programme for Technology Research in Irrigation and Drainage (IPTRID):** Aims to improve exchange and flow of technical information and research in the irrigation and drainage sector. Provides a bibliographical search service, document delivery, and register of research.
- **Intermediate Technology (technical information):** IT's technical enquiry service handles over 1,300 requests for information per year. It co-operates with other information services and puts enquirers in contact with people having similar interests in their parts of the world. The majority of enquiries come from local organisations and individuals, particularly in Africa.
- **Information and Advisory Service on Appropriate Technology (ISAT):** Developed by the German aid agency, GTZ, to enable the development, adaptation and dissemination of appropriate technology in a range of sectors, one of which is anaerobic treatment of organic wastes and sewage. Services include technical response service, appropriate technology documentation (including grey literature), appropriate technology publications and regional information networks.
- **Water and Environmental Health in London and Loughborough (WELL):** WELL is a resource centre promoting environmental health and well being in developing and transitional countries. WELL provides co-ordinated services for water, sanitation and environmental health programmes to DFID and its partners, including, project design and development, project evaluation and monitoring, immediate technical assistance, technical information, training and workshops. WELL can be used by UK NGOs seeking up to one day's technical assistance or more.
- **Water Supply and Sanitation Collaborative Council (WSSCC):** Aims to enhance collaboration among developing countries and External Support Agencies so as to accelerate the achievement of sustainable water, sanitation, and waste management, with special attention to the poor. The Council provides a forum for the discussion of key issues, alerts members to opportunities for more efficient use of resources, increases awareness of the need to expand water, sanitation and waste management coverage, promotes collaboration at the country level, and stimulates the adoption of harmonious policies and programmes. The Council operates through a number of Working Groups, Networks and Task Forces dealing

with specific issues, topics and tasks concerned with improving water supply and sanitation provision in developing countries and countries of the former Soviet Union.

Information systems

This section encompasses a variety of information sources which can be searched or accessed in a variety of ways, either remotely using electronic forms of communication, or through requesting searches of data (normally for a fee).

On-line databases

Several information stores have developed on-line facilities which permit searching of a variety of sector documents, including journals, periodicals, project reports, and grey literature. Many databases are searched through WWW sites.

Electronic Development Information Service (ELDIS): Managed by the Institute of Development Studies, ELDIS acts as an information gateway, research tool, referral service and training aid. ELDIS operates a number of services and provides data over the Internet, with extensive sections relating to any sphere of social science related activity aimed at understanding the problems of what have traditionally been regarded as the developing regions of the world. ELDIS can provide WWW access to information sources within subject fields of interest for development.

E-mail listserv

Listserv is an automated mechanism by which any subscriber joining a 'list' (on a specific topic) is linked by e-mail to all other subscribers to that list. Whenever a message is posted, it is automatically sent to all other list members. Listserv are used in a variety of ways, typically as an informal technical response service (i.e., '*we did this in these conditions*'), as a way of finding out who is working on what in which field, and as a way of sharing experiences and lessons learnt from projects. Various water and sanitation related listserv's have been established in recent years, dealing with specific subjects in the sector. Not all deal with the situation in developing countries, and this should be determined before joining. Some, which focus specifically on relevant topics in Southern countries, include:

- *Solid-waste-management-recycle* (List for discussion of all aspects of solid waste management recycling in developed and developing countries. Main areas of interest include: recycling, composting, re-use, recovery, the informal sector and organisation of waste management.)
- *Wastewater-management* (List for discussion of all aspects of sustainable wastewater management, including appropriate and affordable collection, treatment and disposal technologies and practices, especially those which encourage conservation, recycling and reuse of resources; as well as issues of planning and regulation.)
- *Lcsewerage* (This list provides a discussion forum for those working in all aspects low-cost sewerage in both industrialised and developing countries. The aim is to facilitate information sharing and to promote collaborative working, joint problem solving and mutual support.)
- *Water-and-san-applied-research* (A list for discussion and information exchange relating to applied research in the water supply and sanitation sector. Intended for those with a research interest in the UK and developing nations, discussion focuses on priorities, funding and a range of multi-sectoral topics in the sector.)
- *Water-distrib-systems* (Information exchange relating to research on water distribution systems)
- *Wsponds* (Waste stabilisation ponds are a low-cost method of wastewater treatment, and this list is to promote WSP as part of the greening of rural wastewater treatment works and to promote the safe reuse of WSP effluents for crop production.)

Prior to subscribing to any listserv, a review of mail archives is recommended to find out the volume of mail traffic and the relevance of message content.

Internet sites

The growth of web authoring and browser software has led to an explosion in World Wide Web (WWW) sites. The water sector has not been slow in producing such sites, though there has been less attention paid to the quality and appropriateness of the site contents to sector professionals. WWW sites can be of good quality, providing substantive information which is freely and conveniently available (the International Development Research Centre (IDRC), International Water and Sanitation Centre (IRC), Global Applied Research Network (GARNET), Environmental Health Project (EHP) and World Bank Group) are all examples. Search engines are the most common way to locate information relating to specific keywords search terms, and any web browser software will include links to these facilities. When considering the WWW as a source of information, attention to the balance between the time (and cost) spent searching for, and the value of information found, needs to be made.

Other...

Newsletters, bulletins and other printed media should not be ignored. Comprehensive listings or collections of these publications would normally be available from the *information stores* listed above, but some sources to highlight include: IRC's Highlights and WATER newsletter (a digest of information in the sector relating to specific sector subjects – published quarterly); DFID Water (a magazine from the Engineering Division of the Department for International Development detailing commissioned research); Waterlines (magazine devoted entirely to low-cost water and sanitation. It is written for professionals – administrators or engineers, project managers or policy makers, trainers or workers in the field. Waterlines is quarterly, published in January, April, July and October.)

Networks

Networking is a recent term that describes an age-old activity: people meeting to exchange information, knowledge and skills which are of mutual benefit. In the water supply and sanitation sector, networking was given considerable impetus by the International Decade which acted as a stimulus for sector professionals to build on the gains made during that period. The development of the Global Applied Research Network (GARNET), the Network for Water and Sanitation International (NETWAS) and the International Training Networks (ITN) are testament to this fact.

The apparent popularity of networking can be explained by examining the benefits that it offers to the sector's key stakeholders. Funders, practitioners and users gain significantly from networking and have an incentive to nurture and encourage its development. Funders advocate their use because it facilitates dissemination across country and regional boundaries and permits resource sharing which may deliver cost savings; practitioners support networks because they reduce professional isolation and deliver insights into the discipline which may otherwise be lost; and users gain from higher quality and more appropriate research.

Networks have much to offer, and the sector can at times seem awash with them. They can prove to be a useful source of information when used correctly. But do we fully understand what they are for, what they mean and where their value lies? In the rush to be part of the latest network, are we sure we know why we are joining and what the likely benefit will be? This section will examine what is meant by 'networking', describes the basic types of networks, and illustrates their use through a brief review of some key water sector networks.

Networking: a brief overview

Networking is difficult to explain simply and clearly. It is frequently used in conjunction with other terms (research -, information exchange -, co-operative -) which may breed confusion about the general purpose of networks. In addition, common usage implies widely divergent meanings – to some it refers to exchanging business cards and talking informally at conferences, for others it is a formal mechanism by which opportunities within a given field can be tapped and exploited. Networking can mean all things to all people – a fact that may have diminished its value as a tool for education and communication.

This lack of clarity is compounded when examining the way in which the concept has been defined. Wesley (1993) sees networking as the transfer, and promoting the transfer of information; Parker (1979) considers networks as the organisational structure which facilitates information resource sharing; whereas Plucknett et al (1990) define networks according to criteria which include participants, purposes and mechanisms. Despite this divergence, certain common features are recognisable. Typically, networks include *associations* (formal/informal; individuals/institutions), who share *a common goal or purpose* (open-ended/task specific); and who *contribute resources or time in two-way exchange or communication*.

Networking typologies

There are three basic typologies of networks:

- 1) **Information exchange:** Rely on the sharing of information between members and a co-ordinator, and are normally either passive or active. With the former, a co-ordinator distributes information to all network members, usually through a newsletter and there is minimal communication between co-ordinator and members. Active information exchange networks attempt to collate comprehensive information from members and encourage frequent communication between members and co-ordinator. Active networks are based on a healthy two-way exchange of information, views and practice. The rise of information technologies, such as electronic mail, the Internet and CD-ROM's, have transformed the experiences of this type of network.
- 2) **Consultation:** Rely on face-to-face meetings of members in order to share information and ideas, normally through workshops or conferences organised periodically. Such networks can be established quickly and are unencumbered by the bureaucracy and hierarchical structures that can hinder the effectiveness of other networks.
- 3) **Collaboration:** Conducts activities that are jointly planned and implemented. Typically, they share resources, participate in design and planning and work together. In developing countries, collaboration networks offer the greatest opportunities for building the capacity of personnel and, as such, are looked on favourably by stakeholders. However, not all networks necessarily evolve into collaborative ventures, nor should they since the degree of co-ordination and management required makes this type of network relatively rare.

In the water supply and sanitation sector, several networks already exist, and more are being established. The majority of these networks aim at exchanging information, though a few seek to bring about periodic consultations and some aim at collaboration. Some selected networks include:

- **IPTRID Network:** IPTRID Network is a part of the IPTRID Program with the objective of improving the exchange and flow of technical information and research results in the irrigation

and drainage sector. This server gives direct access to many of the network services that contain information about irrigation and drainage.

- **Global Applied Research Network (GARNET):** The key elements to GARNET are that it is primarily an active information exchange network, focusing on applied research within the sector. Consultation networks do exist, but are primarily country rather than topic-based. Its purpose is not to function as a general information centre in the sector, since this is a role that several institutions including IRC, ENSIC, CEPIS and CEHANET already possess. GARNET is a mechanism, or an activity which is designed to promote, facilitate and strengthen the modes of information exchange with the aim of supporting the timely exchange of applied research among network members internationally. GARNET operates topic-based networks on specific subjects (i.e., pit latrines, solid waste management, handpumps, institutional development, urban environmental health etc.) and geographical networks (Local networks in Latin America, West Africa and S Asia).
- **Middle East Water Information Network (MEWIN):** MEWIN's purpose is to improve the management and conservation of water resources in the Middle East, to promote the peaceful, co-operative use of this vital resource, motivate sound environmental planning in the region, and to encourage the sharing and exchange of information and data which is deemed essential to the achievement of all of MEWIN's goals.

Networks depend on co-operative activity between members. Membership brings with it certain rights, namely to receive the results of joint effort and to benefit from the services provided by the network, but it also implies certain responsibilities or obligations, especially in respect to the management and maintenance of the network. In short, networks are two-way: all members need to contribute in order to benefit.

Conclusion

Sources of information are many and varied, and this paper reviews some of the most relevant sources for NGOs. Knowing that an information source exists is not enough, however. Information is not a panacea to all ills, and its availability doesn't remove the need to analyse, interpret and draw lessons from that information. Furthermore, NGOs, like any other information user, need to do some planning before sourcing for information. A clear understanding of what is required, and what type of information category this falls into, will help narrow the search.

The use of information goes a step beyond the focus of this paper, but considering what an organisation does with the hard found, and costly information it has searched for goes to the heart of the debate about information and its availability. Information should be treated as a resource, and as with any other resource, maximising its benefit and the potential output from it needs to be examined.

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