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# WaterAid and the Third World – a Partnership in Low-cost Technology

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## ABSTRACT

WATERAID, a registered charity, is working with local partners in Africa and Asia on small-scale primary water supply projects, basic sanitation and hygiene education, for poor Third-World communities. Programmes are aimed at lasting development, not disaster relief. Low-cost technologies are used, preferably including proven local techniques. This, combined with training local staff, increases the probability of replication occurring through WaterAid's local operational partners.

Methods employed fully involve the benefiting community; their participation is of course essential if they are to run and maintain their new supply successfully.

Finally it is expected that poor communities achieving their own protected water supply will gain confidence to tackle other development needs.


*Key words:* Third World; spring protection; wells; sand dams; potable water; local partners; community participation; WaterAid.

## INTRODUCTION

WaterAid was formed in 1981. It is the response of the people and institutions of the British water industry to the United Nations International Drinking Water Supply and Sanitation Decade. It expresses their concern for the 1200 million people who at the start of the Decade had no access to potable water supplies, and for many millions more who had not even the most basic sanitation facilities. The World Health Organization estimates that 80 per cent of disease in developing countries is directly related to inadequate water and sanitation. 30 000 people, most of them children, die every day from these diseases.

So far, rather more than 1 million people have benefited directly from WaterAid projects, completed or in hand. Projects range in size from those dealing with individual villages or schools, to one in the Gambia comprising 100 hand-dug wells, each benefiting on average 150 people.

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WaterAid's income in 1987/88 was £1.8 million, and is expected to exceed £2 million in 1988/89.

UK fundraising and overseas operations are organized by a headquarters paid staff of 11 people supported by numerous part-time unpaid volunteers. Overseas it employs 15 expatriate resident engineers and 2 health educators.

### ENVIRONMENTAL HEALTH

Exposure to disease increases as population densities rise. Traditional water sources become increasingly contaminated with organic pollutants. For many people in Africa supplies are dwindling while demand grows. Land pressure, with accompanying deforestation and overgrazing, exacerbates the problem. In many countries soil and gully erosion is evident: the gullies drain shallow aquifers, and traditional wells become dry. In addition, surface run-off is increased while base flow is reduced, and thus many formerly perennial sources now flow only seasonaaaally. The risks to health are not just in drinking contaminated water, but also in collecting it, e.g. bilharzia (a debilitating parasite) and the excruciatingly painful guinea worm.

Common scourges such as trachoma (causing blindness), scabies and other skin diseases are most prevalent where there is a shortage of water for washing. Under these circumstances many faecal diseases are transmitted directly to the mouth without involving water. Improvements can be achieved by increasing the quantities of water available even if the quality is non-potable.

In order to protect people from the very real dangers in their environment, improvement of water supplies must be accompanied by the promotion of good sanitation and hygiene practice, through health education. Experience has shown that to maximize the impact on health all these elements must be addressed.

### WATER SUPPLY COVERAGE IN AFRICA

Table I shows the estimated levels of water supply and sanitation service coverage in Africa and targets for the end of the Decade. The targets, which fall far short of full coverage, will only be achieved if implementation rates in the late 80s are more than





TABLE I. WATER SUPPLY AND SANITATION SERVICE COVERAGE IN AFRICA*

| | 1980 Millions | 1980 % | 1985 Millions | 1985 % | 1990 (Target) Millions | 1990 (Target) % |
|---|---|---|---|---|---|---|
| Total population estimate (Urban/Rural) | 346 (85/261) | 100 (25/75) | 415 (115/300) | 100 (28/72) | 471 (150/321) | 100 (32/68) |
| Estimated population served or currently planned to be served with water supply (Urban/Rural) | 113 (56/58) | 33 (66/22) | 164 (89/75) | 40 (78/25) | 274 (126/148) | 58 (84/46) |
| Estimated population served or currently planned to be served with sanitation (Urban/Rural) | 98 (46/52) | 28 (54/20) | 159 (84/75) | 38 (73/25) | 290 (123/167) | 62 (82/52) |

*WHO, 1987 'The International Drinking Water Supply and Sanitation Decade: Review of Mid-Decade Progress (as at 1985)', Geneva, Switzerland.

*double those achieved in the first half of the Decade.* The main constraint is funding limitations, although it frequently takes less than £10, and almost always less than £20, per person to fund the projects WaterAid supports.

## WATERAID OVERSEAS

WaterAid's work is exclusively in poor Third-World countries, and its projects are concerned with some of the poorest people in them. Our interest is with lasting development measures and not with disaster relief. We concentrate on domestic water supply, sanitation and associated hygiene education rather than other water needs.

WaterAid does not set up its own autonomous projects but believes in strengthening local initiatives towards self help. This calls for both partnership with a local indigenous organization and the full participation of the benefiting communities.

WaterAid's main areas of operation are in Third-World countries where English is an official language. The majority of our support goes to Africa (Sierra Leone, Ghana, Gambia, Kenya, Ethiopia, Uganda and Tanzania) and in Asia mainly to Nepal and India. We contribute in a smaller way elsewhere.

WaterAid operates from a small head office provided by the Water Authorities Association in London and relies heavily on the part time work of unpaid volunteers. Field work is co-ordinated through the full-time post of Overseas Development Officer and each major overseas programme is overseen by a voluntary Engineering Adviser. The title Engineering Adviser is something of a misnomer because these men, senior engineers, most with backgrounds in the public and private sector of the British water industry, manage all aspects of the work in their country. On average they spend one day a week in WaterAid's head office and visit their allocated country for perhaps two weeks twice a year. They would I think agree that only a small amount of their time with us involves actual engineering.

WaterAid employs 17 expatriates in the field, most of whom are civil engineers with previous experience of overseas development. They usually work on separate programmes, rather than in teams. The fact that their everyday colleagues are local staff allows much opportunity for the mutual transference of ideas, both technical and cultural.

Operationally each country has its own particular structure, reflecting the different social circumstances. It is normal, however, for Resident Engineers to be attached to a local 'partner organization', and to share the support structures of that organization. As these are often inadequate, Resident Engineers carry a heavy administrative burden as well as their project duties. Unlike many agencies, we do not employ separate Field Directors, so many of our Resident Engineers also fill a representational role in relations with local authorities and other agencies.

WaterAid generally operates under a Memorandum of Understanding with government or a local partner ngo (non government organization). Among other things, this provides us, in effect, with a licence to be there, and may provide duty-free status on imported goods. Our projects are normally funded through a local Wateraid bank account.

It is our policy to maximize local in-country purchase, but inevitably we also look to more developed neighbouring countries for a proportion of procurement. If goods cannot be obtained in the region they are normally purchased in the UK and serviced by a second group of technical volunteers, our Country Procurement Officers, who work in a support role to our Engineering Advisers in each country.

In some countries WaterAid does not maintain a continuous field presence but relies on visits from staff members or Engineering Advisers. In these cases we are financing programmes wholly devised and administered by competent indigenous organizations, whose needs are for material support rather than for managerial or technical advice.

### TECHNOLOGY OVERSEAS

The technologies we employ are governed by social, e

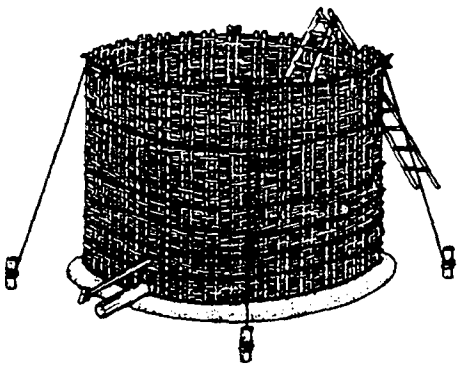

**Fig. 1. 10 000 l rainwater tank before sealing with a cement sand mortar**

Communities must be able to operate and maintain the supply; similarly, they must be able to afford to do so. The system must not rely on imported fuels, chemicals and spare parts unless their supply and distribution are assured.

We seek to use techniques that make full use of locally-available materials. Projects should lend themselves to the maximum participation of the benefiting community, and to encourage replication should involve skills which, if not already present, can be readily acquired through local training.

Preference is given to the simplest possible methods that the context will allow. Among the most effective projects are basic spring protections. If a spring source is in the mountains far from the population, a gravity-fed piped scheme to village standposts may be considered. If surface water is present but polluted, it is usually preferable to consider groundwater rather than to attempt treatment. Hand-dug and hand-drilled wells are usually cheaper than machine-drilled boreholes and can be managed at a more local level. Lifting devices operated by hand are easier to maintain than motor-powered pumps. Where rainfall is sufficiently reliable and occurs more or less throughout the year it may be harvested from roof catchments and stored in tanks (Figs. 1 and 2). The reinforcing for these tanks is based on a stick basket woven locally and normally used to construct food stores. They are sealed with a cement sand mortar. The community choose a 'fundi' to receive training. The first demonstration tank is funded by WaterAid; subsequent tanks are funded collectively through women's groups, who assist each member's household in turn. They provide the basket and unskilled labour, hire the trained 'fundi' and purchase cement and pipes.

In more extreme environments larger artificial storage systems must be considered. Dams and reservoirs in populated areas have attendant health risks. Infiltration galleries, seepage wells or similar secondary constructions which purify the supply must be considered to avoid sophisticated water treatment. In preference to conventional reservoirs, sub-surface sand dams across dry river beds can directly provide potable filtered water, and have other advantages: evaporation loss in a hot climate is avoided; siltation occurring behind the dam wall expands rather than reduces storage; and gully erosion, responsible for the loss of so much top soil, is halted.

In the sanitation sector of our work waterborne sewage is not normally a feasible option. Pit latrines are the most readily constructed alternative. Where the culture dictates the use of water for anal cleansing as in Nepal, pour flush latrines may be constructed. Dry pits are more common in Africa, but in many areas the foul smell and the occurrence of flies inhibit their use; these problems can be overcome by appropriately designed ventilated improved pit latrines (VIPs).

Water or sanitation technology will only be successful if it is acceptable to the users, and the final choice must be reached in consultation with the community.

### General Problems of Working Overseas

Communications are a common difficulty where postal and telephone systems are ineffective. Roads are often not maintained; their poor condition causes hardships that are particularly accentuated in the rainy season, when access to whole districts may be restricted and the transportation of goods and people becomes slow and arduous. Sometimes roads

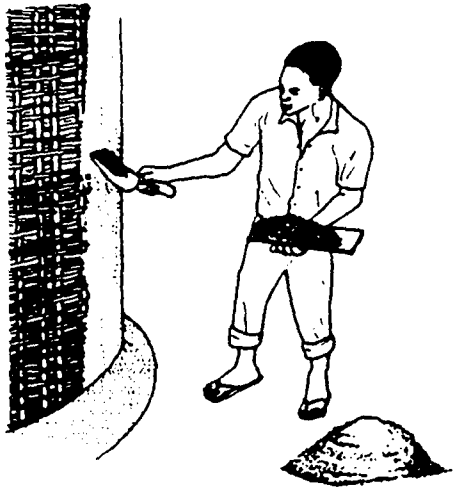

**Fig. 2. Sealing a rainwater tank with a cement sand mortar**





do not exist at all and communities must make a rough access for vehicles before a project can commence in their village. Poor roads take their toll on vehicles and this is compounded by the lack of spare parts to repair them.

Shortages usually extend to all imported goods, due to limited hard currency. This also affects local manufacture whenever some aspect of the process is related to imports. The problem is not confined to luxury goods; essential construction materials, particularly cement, are frequently in short supply.

Power supplies are poor. Most areas are not electrified, and diesel and petrol are not always available for vehicles and plant.

Importing materials is a solution to many problems but creates many of its own. Inadequate physical and bureaucratic facilities can cause delays of weeks if not months, and plenty of hassle for those involved.

In some countries government bureaucracy is renowned for its inefficiency. Much of this can be avoided by working in the non-government sector, but waiting for necessary permits and official decisions can still be frustrating.

Transferring funds to remote foreign bank accounts can often be delayed by poor communications. Internal financial problems such as massive inflation and revaluation cause accounting headaches, and shortages of cash at the banks have caused practical difficulties.

Aside from actual armed conflict, routine road blocks and curfews can be an inconvenience in politically unstable areas. Local security problems involving theft are common, particularly where economies are in crisis, unemployment is high, and people are no longer sustained by traditional farming practice.

WaterAid's preferred methodology is sometimes restricted by government policies. For instance the 'Free Water Policy' of some African countries, set in optimistic years, is no longer practical and only serves to hinder the community taking responsibility for financing its own supplies. Political decisions may lag behind economic realities, although the Decade has done much to change official thinking and to increase acceptance of small-scale, low-cost, user-managed facilities.

Unfortunately WaterAid still encounters some over-funded 'aid' programmes, operating on a 'do-it-all-for-them' basis. They can seriously undermine our self-help approach amongst communities in the same area.

## OPERATIONAL ETHOS

### Local Partners

For real progress to be achieved local organizations and institutions need to be strengthened so that a society may ultimately implement its own goals and objectives.

The local partner is the vehicle through which project replication can occur from one community to the next. Our engineers train counterpart engineers, technicians and artisans attached to this partner, ensuring the skills will continue to be applied after WaterAid has left. It is our intention to provide the minimum intervention required for a programme to be effective; this should diminish with time as the local partner gains ability and confidence.

WaterAid will consider working with any indigenous organization that seriously aims to improve basic facilities amongst poor communities. Partners are chosen for their potential rather than for their performance; the strongest organization is the one in least need of our support. Our partners are frequently local churches or other non-government organizations, but sometimes we work with ministry departments or local government authorities. In all instances the request for assistance comes from the potential partner and we will try to consider it favourably, provided geography and economics allow. Acceptance will depend on the seriousness and integrity of the organization and whether it shares the same self-help development ethos, so important in avoiding conflicts over priorities and methods.

The local partner provides a legal framework for operation, and a basis on which to build a work infrastructure, i.e. project staff, workshop, office, stores, etc. WaterAid provides the technical advice and training as well as equipment, materials and financial support for project implementation.

Many of our partners require strengthening to establish operational structures before they can be effective in the field, particularly during their early days. This may involve strengthening management and administration as well as building up a physical infrastructure and the recruitment of field staff.

It is all too easy to be diverted from the task of helping communities construct water supplies, while institution-building proceeds. Both must be kept in balance; grassroots development can and does proceed with remarkably little supporting infrastructure. This is certainly challenging and often exhausting for field staff, but if field operations and partner organizations grow simultaneously, the organization is more likely to serve the needs of the field. Many of our partners lack adequately trained or experienced technical personnel. On-the-job training is a major part of our engineers' work. It is a sensitive task to be able to provide the necessary training and motivation without adopting a didactic approach.

The colonial image that 'the white man knows best' has to be overcome, and our engineers have to know when to step back so that responsibility can be assumed by their local counterparts.

It is important that we should always respect the 'sovereignty' of our local partner and allow and

encourage local personnel to fill the decision making roles in any programme.

## Community Participation and Development

The key to the success of a water project is its acceptance by the benefiting community and the degree of ownership and responsibility they extend towards it. Experience has clearly shown that this can best be achieved by involving the beneficiaries at every stage, from planning and design, through construction, to the final operation and maintenance.

Community participation, often termed 'self help', is most often seen in the voluntary contribution of labour, local materials and hospitality to visiting technicians. This has greater appeal to donors who see project costs kept to a minimum, and are happy to help those who help themselves. In reality community participation can and should go far beyond this. It is a vital component not just in the development of a water supply, but in the development of the community itself.

The colonial period in Africa was one of dependency on a foreign power. Internal administration reinforced a 'top down' approach. By the time independence arrived, many African peoples had an image of government as an all-provider, and they waited expectantly for centralized systems to deliver – which, of course, they were unable to do. There has been a move since then in some countries to bring decision-making closer to the grassroots. Many communities are taking the initiative to organize themselves, to take action to improve their own condition. In this context water supply is very often seen as their first priority. This can become a reality through their initiative, and a little external support. For this to happen a close working partnership needs to develop between the support agency and the community, where the community is encouraged to assume responsibility for the venture and fully participate at all levels. The community becomes increasingly aware of its own potential through the experience of implementing a successful project. Women in particular may recognize the extension of their role. Charged with new confidence, and released from some of the drudgery in their lives, it is common to see them tackling new needs and finding solutions to other problems. Examples we are aware of include the building of a branch clinic, a market gardening co-operative, a grain mill, poultry rearing, a breeding scheme for better goats, bee keeping and many more. The proceeds of these income-generating projects can contribute towards the maintenance of the water supply.

Fig. 3 attempts to outline the stages of community participation in a fairly typical water supply construction project. The project staff will normally be employees of the local partner, and may or may not include a WaterAid Resident Engineer. The processes will vary slightly depending on the type of project, local cultural considerations etc.

Initially it is important to establish credibility with a community. The first projects in a new area are always the slowest and most difficult to implement, and will necessarily be initiated through route 'c' in Fig. 3. People may have received unfulfilled promises in the past, from unscrupulous politicians and others, and may be suspicious of what motivates strangers to take an interest in them. Until trust is established full co-operation will not be forthcoming. Even after a project commences, rumours may abound and project staff must discover and combat them if the project is to succeed.

Once villages are seen to have benefited from projects, requests from other communities for assistance tend to multiply through routes 'a' and 'b' (Fig. 3), and individual project progress will be quicker. In all instances care and discernment are required to identify or establish the right grassroots structures to work through. This requires an understanding of community dynamics. Male village elders may be the most vociferous members of a community, but they do not collect water, and their information may be surprisingly inaccurate. Women may know much more about the current supply and about the solutions needed, and be more highly motivated to seek improvements, but they will not voice their opinions unless requested to do so. (African men always have a water supply in the home, women walk up to 10 km for theirs.) It is therefore a sound principle not to rely solely on the male hierarchy, but to encourage the formation of a 'water committee' composed of interested and responsible persons, with a strong women's representation.

It is very noticeable how the quality of leadership affects the community's response. Where leadership is poor the supply of local materials or village labour may be inadequate or erratic and hamper progress. Where more than one tribe or group is present in a village all elements must be represented, as disputes may arise over the contributions being made from different sectors of the community. Meetings with the villagers and the work programme itself must both be timetabled to the communities' convenience, giving them sufficient time to tend their crops. At harvest time they may not be able to provide any labour at all. Project staff also need to recognize that there are occasions, such as funerals and festivals, when even the keenest villager will down tools.

The demands on project staff are very high. Community participation takes time and patience to implement. It is hard for staff with heavy supervisory schedules to give sufficient time to village meetings, particularly where travelling is difficult. But it must be done.





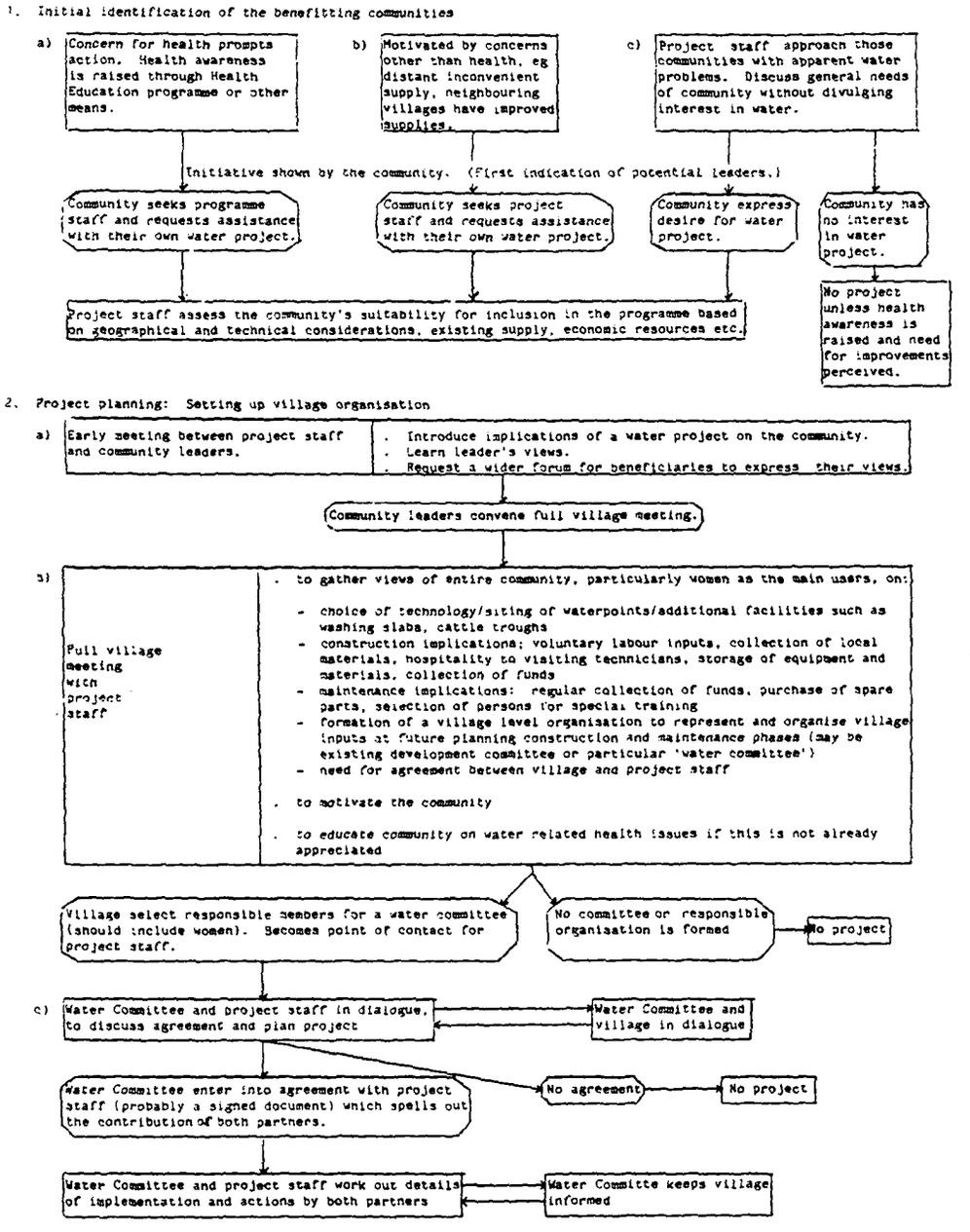


**Fig. 3. Community participation in a rural water supply construction project**
(1. Initial identification. 2. Project planning)

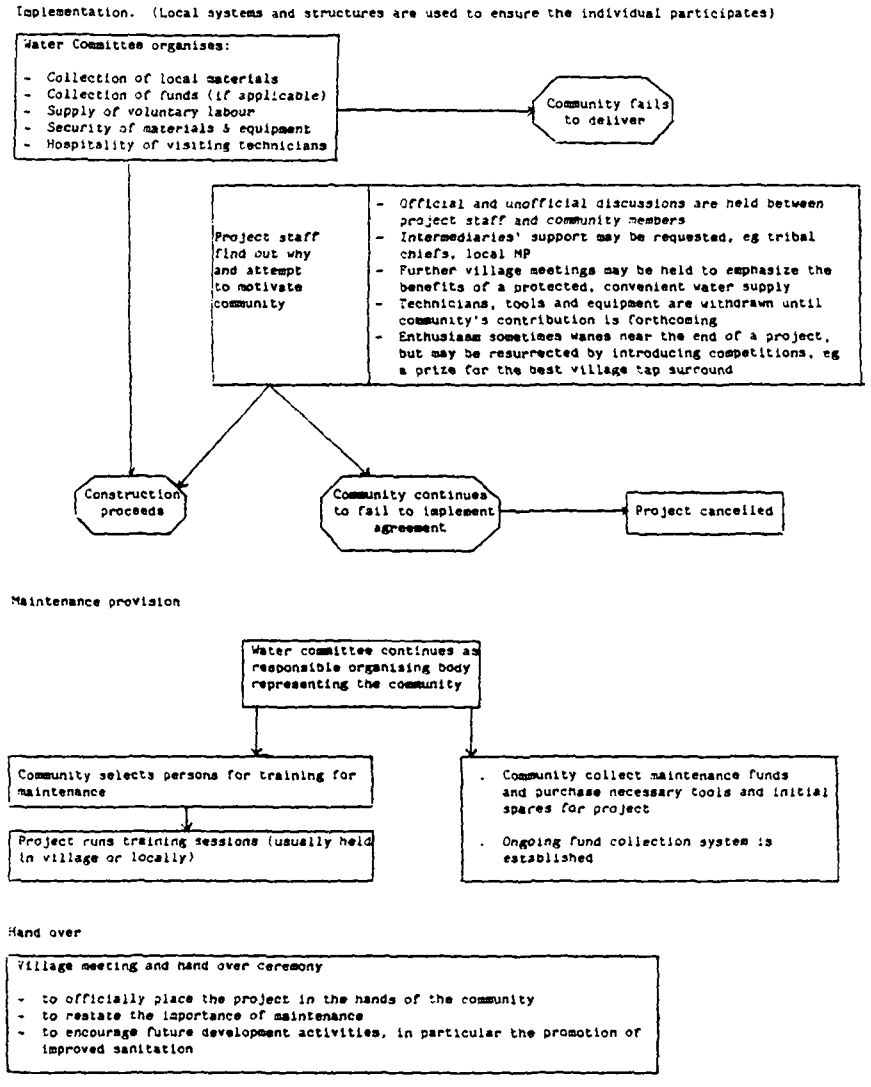


**Fig. 3 (continued). Community participation in a rural water supply construction project.** (3. Implementation. 4. Maintenance provision. 5. Hand-over)

## CONCLUSION

The processes of development challenge us, as engineers and scientists, to devise and apply appropriate technical solutions to the water and sanitary needs of the world's poor. They challenge local communities and peoples to reorganize themselves, to question long-held beliefs and practices and to initiate the improvements they desire.

WaterAid believes that its association with local partner organizations helps to bring these strands together. Their knowledge of the local languages, customs, and cultures, which must be vastly superior to that of any expatriate, are needed in planning effective water and sanitation programmes in dialogue with the benefiting communities. Their staff will be trusted more readily by the people, and will be quicker to understand their problems and requirements; they are not so intimidating as an expatriate, nor an object of spectacle. They are in a better position to carry the lessons learnt from one community to the next, and better placed to organize and motivate their people. The human development process, the 'software', is an integral part of a WaterAid project which could not be conducted without our partners and their staff. WaterAid's technical knowledge and financial resources provide catalysts for the work to proceed to success.





## DISCUSSION

**Ms Richardson**, in introducing the paper, said she believed that the purpose of inviting her to contribute to the conference was to highlight some of the concepts surrounding WaterAid's work overseas. She then referred to some of the points she had made in her paper.

**Mr P. Banks** (ACER John Taylor), in opening the discussion, said that WaterAid had spent some £4 million on benefits for one million people according to its latest leaflet and in doing so had gained valuable experience on diverse projects which would be very valuable to the Institution and its members.

In her introduction the author had said that, in the UK, water was not a women's issue as it was in the rural Third World. In fact, there was a time when it was such an issue in the UK, as the Rural Water Supplies Grants Act of 40 years ago was largely the result of pressure by Women's Institutes on rural local government and central government and had led to the almost complete provision of water supplies to the rural parishes which up to then had been neglected.

Mr Banks thought that what might be termed the sociological objectives of WaterAid that the author had dwelt on in her paper were not perhaps exactly what donors had in mind when contributing towards clean water for the poor of the Third World. He agreed with what might fashionably be termed the holistic approach to rural development that led to supportive projects such as training in better husbandry, health clinics, etc. Single sector projects were seldom all that were needed.

However, Mr Banks thought he detected a slight tone of disparagement towards the International Funding Agencies vis-à-vis self-help schemes. Was the author really saying no self help, no project, as the Decision Flow Chart in Fig. 3 seemed to imply? If so, that seemed to him at least as paternalistic as the colonial systems that the author criticized.

He asked the author to comment on the staff to project ratio and the level of qualification for expatriate field staff that she thought appropriate. In a similar project, his firm had a team led by a water engineer and a hydrogeologist but which included expatriate artisans. This was found to be very effective and had led him to believe that well-trained sixth formers would have been more than adequate reinforcement to teams led by graduates.

Mr Banks asked for more information on the 'partners' referred to in the paper. What sort of organizations were they? Was their staff likely to be at all technically qualified? Did they have to be trained or were they solely local enablers?

The author had said that the sovereignty of local partners had to be respected in decision making. Did this apply to actually spending the project funds?

He asked if it was possible to have more statistics about the number of communities that had benefited from Wateraid's interventions and the rate at which funds were spent. Also information on the ratio between field staff costs and project construction costs would be invaluable in assessing the cost-effectiveness of the intensive time-consuming approach necessary at the level of project that WaterAid was involved in. Mr Banks appreciated that such information had to be carefully qualified, as the relationship between time and results was not a straight line. For example, it had taken 8 years to provide 300 000 people with water supply in a rural Ethiopian project, using a team averaging 2 expatriates, which cost approximately 0.75 million ECU (£0.5 million) to maintain in the field during that time. The project cost, of course, was much more. Nevertheless, such information could be of great value.

The question of whether it was possible to transfer some of the lessons, and indeed principles, of the WaterAid activities to larger-scale projects was one on which Mr Banks said he would value the author's views. The interposition of government executing agencies on larger projects might militate against this, but if there were lessons that were applicable which could make larger projects more effective then he was sure members would like to hear of them.

Finally he asked, had WaterAid much experience yet of follow-up to determine whether the operation and maintenance which was essential to even the simplest technology was being continued after project staff had withdrawn?

**Mr S. J. Hugman** (Overseas Development Administration) said that the paper clearly identified many of the problems to be encountered in sub-Saharan Africa. It summarized well the advantages of providing project aid through non-governmental organizations at community level, and highlighted the importance of human development in water supply projects.

The World Health Organization identified the lack of skilled manpower as being one of the main restraints on achieving the Water Decade targets. Although much had been achieved, the development of human resources continued to be an aspect which remained neglected in some projects. Cases still occurred where new rural and urban supply systems were planned and constructed without adequate study and preparation for their subsequent operation.

A recent estimate[1] had indicated that the training needs in water-specific skills to meet IDWSSD goals were valued at about US$20 billion. Much of this would be met through local resources, but many aspects of the formal training would require international finance, especially when the training was linked to specific investment projects. In countries with few university graduates, and often few

available school leavers with even 6 or 9 years of education, project planning should take into account the lead time needed to train suitable operators and managers.

In terms of cost-effectiveness, the training of a capable engineer or technician could be far more productive than many man-years of expatriate personnel. Unfortunately, it was a result which could be much less visible than a newly constructed well, stand-pipe, or treatment plant.

*Given the declining availability of international finance for achievement of IDWSSD targets, did the author consider that such finance should be concentrated more on local resources than providing for new capital investments.* 'BEYER, M., The Human Factor. *Decade Watch* 7 (1), 1988.

**Mr T. A. Stoker** (Parkman Consultants Ltd) said his experience was that, despite their best intentions, it proved difficult for the larger-scale internationally-funded projects to achieve results at community level. In Uganda, for instance, the need to improve pit-latrines and stand-pipe services for the peri-urban areas had been well-recognized in the early weeks of project studies and had been reported upon and discussed at regular intervals with the local agencies responsible for the location and promotion of demonstration installations. However, after eight years' work and the completion of several water treatment plants and waste stabilization ponds for the urban areas, not one improved pit-latrine had been provided.

*Both ends of the spectrum of water and sanitation* projects were equally important and Mr Stoker wondered whether the author could suggest any mechanisms whereby a joint approach by consulting engineers and WaterAid could achieve a more satisfactory total project result than either could produce separately.

**Mr D. Hammerton** (Clyde River Purification Board) said that it was clear that WaterAid took great care to ensure that its assistance was wanted by the local communities and that schemes were in every way suited to the needs of the people. Mr Hammerton recalled cases, some 20 years ago, where the establishment of permanent boreholes in semi-desert areas in Africa had led to the settlement of nomadic peoples with their cattle around the boreholes with resultant 'desertification' of the surrounding areas. He felt that the care taken by WaterAid would not allow such mistakes to be made, but asked the author what arrangements were made for monitoring of schemes established by WaterAid?

**Mr B. Corbett** (Development Bank of Southern Africa) said that Table 1 in the paper showed a review of progress midway through the International Drinking Water Supply and Sanitation Decade. Analysis showed that, although more people had, or are planned to have, adequate water supply and sanitation in 1985, the number of people without adequate water supply and sanitation in Africa had actually increased. This was due to the high population growth rate.

The Development Bank of Southern Africa's experience was that money was not the limiting factor but rather the implementing capacity of the intended beneficiaries. What could be done to increase the scale of Third World water supply and sanitation projects as well as to reduce the long time needed for each project?

### Author's reply

**Ms Richardson**, in reply to the discussion, said that she would reply to some of Mr Banks' points in her response to other contributors. In reply to his specific questions she confirmed that 'no self-help, no project' was a guiding principle in WaterAid's overseas ethos. To compromise this, in the circumstances where Wateraid works, would undermine self help initiative in neighbouring communities and perpetrate a dependency syndrome.

WaterAid's resident engineer would normally administer a local account for the projects under his management. In some cases a joint account requiring two signatories, WaterAid's and their partners', was used and the bookkeeping aspects were administered by their partner. Occasionally funds were put in an imprest account for particular project expenditures incurred directly by the local partner, e.g. salaries, fuel for vehicles etc. Returns were monitored and the account topped up at agreed intervals. All their partners were non-profit-making organizations committed to humanitarian objectives.

Most of WaterAid's resident engineers cost the charity between £20 000 and £25 000 per year (including salary, air fares, vehicle, accommodation etc). This was out of total project costs ranging from a little under £100 000 to nearly £300 000 per expatriate per year. A local counterpart engineer cost about $^1/_{10}$th of a WaterAid expatriate; artisans and community development workers very much less. All these categories were likely to be employees of their partners. Not all local staff costs were met by WaterAid, but even where they were, they normally amounted to no more than 10 per cent of the overall project costs.

The author felt that it was indeed possible to apply the principles of WaterAid activities to longer-scale projects where that meant an agglomeration of a large number of similar community supplies. Where larger populations were involved community participation was more complex – wealthier citizens might prefer, for instance, to contribute funds while others contributed labour, and the subsequent management systems would have to be more formal.

The author agreed with Mr Hugman that using competent local personnel rather than expatriates was the most cost-effective way of achieving IDWSSD targets. This required persons with both suitable training and experience. It was a sad truth that in many African countries there were large numbers of under-employed engineers and artisans unable to obtain that experience. Most of those 'worked' for governments who could barely fund the pay-roll and had nothing left for transport and materials, so their skills were not fully used. Within that environment, international donors put work through external consultants who could respond in a number of ways. They could choose to retain control of the project and hire expatriate artisans; they could seek secondments from government departments offering some experience to individuals; or they could themselves be seconded to government and work within the local organization with minimum expatriate staff. The pressure to perform effectively from the normal financial and construction point of view could reduce the incentive to provide worthwhile on-the-job experience for local nationals, and unless this objective was specified by the donor, there might be a tendency to follow the first course of action or provide limited experience with no real responsibilities. If the stated objectives included the strengthening of the local government structure, the latter course might be followed. This had been WaterAid's approach in working with the government of Sierra Leone on gravity piped water supplies. It had provided the opportunity to structure a training programme for the workforce that was specific to the ongoing work of that department; it combined relevant workshops and courses with on-the-job experience.

Training personnel without providing job opportunities was of very little value. Graduates and apprentices needed a dynamic work environment to complete their training. This was not available everywhere and a brain drain from Africa and Asia to the Middle East was currently evident. Underfunded governments in the Third World remained the main employer for their nationals. Local non-profit-making organizations, however, were increasingly employing craftsmen, supervisors and even engineers. Commercial consultants and contractors remained remarkably underdeveloped and there might be benefit in UK consultants helping to establish sister firms overseas.

The author agreed training should indeed be linked to all specific investment projects, but that these should in turn be implemented through local organizations with an ongoing interest and involvement in the sector. The skills that were acquired could continue to be directly applied in future.

The author thought Mr Stoker had touched on a common problem. Most communities recognized the need for clean drinking water, but did not perceive the need for sanitation. Education was therefore an essential ingredient and motivating factor in a successful sanitation programme and required indigenous health educators. At government level, health ministries were nearly always better able to respond than technical ministries. They usually had health workers based in the field, not just at district or regional headquarters, and they usually had some responsibility for promoting preventative health care. Many of WaterAid's smaller partners (non-government organizations) had field workers operating in a limited area.

It might be necessary to provide resources to improve training of field workers in hygiene education and to assist with transport and the provision of visual aids for a promotion campaign.

Sanitation was a very sensitive issue in most cultures and it was necessary to understand the views and attitudes of local people before habits could be changed. Large-scale projects might consider employing the right community development specialists or sociologists to plan the approach to the communities in that very difficult area.

Many demonstration latrines failed to be reproduced because they were not affordable and it might be necessary to subsidize materials such as cement so that households could afford to purchase them. Alternatively designs might need to be re-examined and simplified.

In response to Mr Hammerton's question, the author said that monitoring and routine evaluation was carried out by the UK-based engineering adviser responsible for each country's programme during their regular visits. WaterAid had plans to carry out more formal evaluations by multidisciplinary teams who would examine the technical, economic, health and social aspects of a programme. For this exercise an engineer who had had no previous contact with the programme would join the team. An evaluation of this sort was expected to be conducted in Sierra Leone in Spring 89.

Responding to Mr Corbett, the author did not think there was any advantage in cutting down the time it took to complete each project if that then exceeded the communities' capacity to respond. In fact, such an approach was likely to be harmful by reducing the communities' acceptance of the project and sense of ownership and so reduce its benefits and jeopardize its long-term future.

WaterAid preferred to encourage replication through operational groups within their local partners and to act as a catalyst to enable new groups to start similar work in neighbouring areas, often learning from and duplicating the same methods.

A country such as Malawi had a long history of community involvement in water supplies, so that before the 1980s they had already gone a long way in establishing methods that they knew would work. The government was therefore able to make productive use of international finance that became available during the Decade. Elsewhere in Africa, the Decade had served to focus governments' attention on the scale of the problem and had encouraged them to examine their aims and formulate more realistic plans. They were turning towards lower cost, user-operated, primary supplies in preference to household connections with treatment plants and high running costs; pit latrines rather than flushed toilets etc. The involvement of the private sector and non-profit-making organizations was more widely accepted and encouraged where in the past it might have been discouraged. Attention was at last being paid to operation and maintenance requirements, ways of increasing responsibility at user level (one way being to increase community participation at the implementation stage), and the standardization of equipment to simplify the distribution of spare parts to the market through shops or local authorities. These developments were far from complete and in many countries little more than pilot studies had been carried out thus far, but with sustained effort the sector should be capable of achieving more in the next ten years than it did in the last ten.