IRC
International Reference Centre
for Community Water Supply
and Sanitation

December 1981

Participation and Education in Community Water Supply and Sanitation Programmes

A Literature Review

Second, Revised Edition

IRC was founded in 1968 by an agreement between the World Health Organization (WHO) and the Netherlands' Government. It is an independent foundation. IRC's main purpose is to promote and support the creation of safe drinking water and sanitation facilities in the developing world. IRC works through national institutions, agencies and regional centres in the rural and peri-urban areas of Africa, Asia and Latin America. The Centre cooperates closely with United Nations organizations, such as WHO, the World Bank, UNDP and UNICEF and with other member organizations in the UN Decade Steering Committee. In addition, IRC acts as WHO Collaborating Centre for community water supply and sanitation. It is assisted in its work by these organizations and by bilateral donors and institutions in the industrialized countries.

IRC's major programmes are in the field of: (1) Information Support and Services; (2) Technology Development and Transfer; (3) Manpower Development and Training; (4) Community Education and Participation and (5) Programme Planning and Evaluation. Support is provided by means of guidance and training material, seminars and workshops, research and demonstration projects, as well as by general support to the development of national facilities.

Request for information on IRC, or enquiries on specific problems may be directed to IRC, P.O. Box 5500, 2280 HM Rijswijk, The Netherlands.

INTERNATIONAL REFERENCE CENTRE
FOR
COMMUNITY WATER SUPPLY
AND SANITATION

PARTICIPATION AND EDUCATION IN COMMUNITY WATER SUPPLY AND SANITATION PROGRAMMES

A LITERATURE REVIEW

PREPARED BY CHRISTINE VAN WIJK-SIJBESMA

Technical Paper no. 12
March 1979
Second, Revised Edition, December 1981

I.R.C.
J. C. van Markenlaan 5, Rijswijk, (The Hague) The Netherlands
Postal Address:
P.O. BOX 5500, 2280 HM Rijswijk, The Netherlands

TABLE OF CONTENTS

ANNEXES

When implementing environmental sanitation programmes, villages should be made aware of the need for quality control of their own supply. (photo: WHO)

FOREWORD TO FIRST EDITION, March 1979

In these days of transition of the whole concept of development, there is hardly an idea which has sparked off more discussions and which has been idealized more than that which is usually referred to as community participation. At the same time, few concepts have remained so abstract. In spite of all our general "knowledge" about community participation, it is still largely unknown how to effect it in practice. This has led to a situation where the expression "community participation" is used very frequently to indicate a wide range of ideas and actions, in fact, it has become so fashionable that many people are beginning to feel a certain aversion to it.

This obviously has the danger that the good is rejected with the bad and that the very real importance of dialogue and community involvement is lost sight of. Hence, what is needed is a realistic assessment of the potential of community participation under different conditions, which should lead to the translation of the concept into practical guidelines and clear directives for action. Such an evaluation and action research should be carried out in and by developing countries themselves.

This review has been compiled in order to support national development agencies in the design, testing and implementation of community participation and education strategies in water supply and sanitation programmes. It aims to take stock of data and information on community participation and education which could be obtained from the literature and which seemed relevant for a wider readership. Since much of the literature on the subject and in particular the more detailed case studies are difficult to obtain, an extensive mailing survey preceded the actual study.

Together with this literature review a selected and annotated Bibliography will appear. This Bibliography contains detailed abstracts of the 145 most relevant works on which the review is based and is published as No. 13 in the IRC Bulletin Series. It should be stressed that in this stage the study is presumed neither to be exhaustive, nor final.

It is recognized that additional information and experience is available and should be included in future versions. The reader is therefore invited to provide the IRC with such information, which will be used in any subsequent revision of the work.

In the meantime, it is hoped that the two documents may already serve the purpose they are meant for: namely as a tool for the design, testing and evaluation of community participation components of water supply and sanitation programmes.

Paul Kerkhoven
Programme Officer

FOREWORD TO THE SECOND REVISED EDITION, December 1981

The demand for the literature review on community participation has been so great that IRC is happily obliged to publish this second edition of T.P. 12. This, moreover, allowed for incorporating additional information obtained from the extensive documentation IRC received from many readers of the first edition. The revisions mainly concern the chapters on planning (I) and evaluation (VIII), as well as the sections on economic conditions (II.4), manpower (IV.2), the mass media (VI.2), user education (VII.1), delegation of authority and water rates (VII.3), and on training (IX.3). Also new annexes have been added on topics like educational inputs and manpower aspects of participatory water and sanitation projects.

The basic framework of the document, however, remains unchanged and the first edition remains fully usable next to the present one. Spanish and French versions of the literature review are under preparation and will be published later.

Alastair White
Programme Officer

PREFACE

Three brothers, working on the land, took turns refreshing themselves by drinking from a calabash. When the eldest brother came to drink, the calabash contained beer. When the middle one came, he got milk, but when it was the turn of the youngest to drink he found only water.
Dissatisfied, the youngest brother consulted a ghost, who told him to climb a tree. From there he could observe how an old woman who brewed the local beer filled the calabash just before his eldest brother came to drink. When he had left, a nomad woman passed by, emptied the calabash and filled it with goat milk. His second brother came, drank and left. His place was taken by the village water vendor, who poured out the last bit of milk and filled the calabash with clear spring water.
When the vendor had left, the ghost explained the secret meaning of the three drinks. The oldest brother, who got the beer, would become village chief; the second one, who drank the milk would be rich, but the youngest, who got the fresh water, would grow strong and healthy. Satisfied, the youngest brother returned to his work.

This West African folk tale illustrates the importance of safe and easily available drinking water, a need which has yet to be fulfilled for the greater part of the inhabitants of developing countries.

The most recent survey of community water supply and excreta disposal facilities in developing countries shows that almost 7 out of every 10 persons in the Third World (excluding China) are deprived of safe water, and almost 9 out of 10 have no basic sanitation (WHO, 1976).

The need is most urgent in rural areas, where approximately 70 percent of the population live. Of these people only 22 percent had access to safe water in 1975 as compared with 78 percent of the city population. For sanitation these figures were 15 and 75 percent respectively. Within the cities the need in the fringe and squatter areas is most urgent. These figures indicate that a higher priority for the sector is demanded and that the emphasis first of all should be on implementation programmes in the rural and urban-fringe areas.

A problem which demands as much attention as the increased construction of adequate rural water supply and sanitation facilities is their continued functioning and use. Cairncross et al (1980) estimated the current percentage of non-functioning water systems at 30, while Saunders and Warford (1976) found that in some developing countries, water supplies were actually failing at a more rapid rate than they were being constructed.

An evaluation of the functioning of 197 of the 561 supply schemes constructed in Kenya with WHO/UNICEF assistance from 1960 to 1972 showed that 93 (almost 50 percent) of the surveyed schemes were not working, due to technical failure, construction delay and overlap, and vandalism (Wignot, 1974). In both Bangladesh and Thailand 50 percent of the handpump tube wells are estimated to be out of order at any one time (WHO, 1974). In 1968, 45 percent of the standpipes in the city of Dakar were not functioning (WHO/IRC, 1975). Schemes supplying over 20,000 people have been closed down due to the impossibility of collecting water fees (Harlaut, 1975). Of the 4,000 water points built in Upper Volta, over 2,300 are beyond repair (Institut de Génie de l'Environnement, 1977).
In South-East Asia, it is estimated that there are at present nearly 450,000 handpump tube wells, but reports on their operation give breakdown percentages of 20 to 70 (Gunaratne, 1978).

The relationship between water and disease is widely acknowledged (Déom, 1976; Saunders and Warford, 1976; White et al, 1972; White and Seviour, 1974). Yet water supply and sanitation programmes do not always have the health impact expected from them, not even when planned for this purpose *.

Neither do the potential social and economic benefits always materialize.

An important contribution to the solution of these problems lies in the inclusion of a strong element of community participation and education in water supply and sanitation projects. Although this is a rather general statement which can be interpreted in many ways, the literature provides

---

* Briscoe, 1977; Feachem et al, 1978; Gandhigram Rural Institute, 1977; Kawata, 1978; Levine et al, 1976; Pisharotti, 1978; WHO, 1980.

evidence that some form of participation and education in the various stages of community water supply and sanitation programmes is a condition for success.

If community participation and education are to become routine components of community water supply and sanitation programmes, clear policies and planning guidelines are necessary. A review of the existing experience in this field, resulting in cross-cultural generalizations and planning options, can be a great help for policy makers and programme planners.

Such experience can be observed in a series of case studies (Buckles, 1978; Elmendorf, n.d.; Elmendorf and McGarry, 1978; Mascarenhas and Howell, 1978; Miller and Cone, 1978; Nieves and Farrell, 1978; Salinas and Caceras, 1978; World Bank, 1978). Or it can be registered and analyzed through comparative evaluation research, cross-culturally (Bennell, 1979; Imboden, 1977) or within one country (de la Barra Rowland, 1978).

Alternatively, a comparison can be made of the plans for and implementation of those national community water supply and sanitation programmes which include an explicit education and participation component. Such programmes exist in many Latin American countries, such as Argentina (Rep. of Argentina, n.d.; Rep. of Colombia, n.d.), Colombia (Pineo, 1976d; Mora Ramirez and Salazar Duque, 1979; Mora Ramirez and Lopez Orozco, 1976; Rep. of Colombia, n.d., 1975); the Dominican Republic (Pineo, 1973, 1976a); Guatemala (Agua del Pueblo, n.d.; Mexico (de la Barra Rowland, 1978); Panama (Rep. of Panama, 1977); Paraguay (Cardenas, 1978, 1979); and Peru (Rep. of Colombia, n.d.; Pineo, 1976c; Rep. of Peru, 1977). In Nicaragua a programme has been designed (Zuniga, 1977). An adapted version is presently implemented.

In Africa, a participatory water supply programme for rural areas has been developed by the government of Malawi on a national scale (Bharier, 1978; Glennie, 1979; Rep. of Malawi, 1977), and by the government of Guinea-Bissau on a regional scale (van der Ploeg, 1979, 1980). In Ghana (Hall and Merriman, 1977)and Ethiopia (Gov. of Ethiopia, 1979) such programmes are under development.In Cameroon, health workers are trained to carry out simple water supply and waste disposal improvements with local resources

(Isely, 1979; USAID, 1977). Other departments are responsible for outside interventions in this field with and without local involvement, and an integrated approach is now desired.

In Asia, standardized water supply programmes with community participation exist in South Korea (Haque et al, 1977; Phillips, 1978; Pineo, 1976e), the Philippines (Rep. of Philippines, 1977), Malaysia (Pineo, 1978), and Bangladesh (Islam et al, 1979; Pinèo, 1976b). Pilot projects with the emphasis on participation in operation and maintenance and health education are presently carried out in India (Sandhu et al, 1978; Subramanian et al, 1979).

The object of the present work is to gather and make accessible the existing experiences through a general survey of the literature. A problem here is the fugitive nature of the material. Much of the literature has not been officially published or is difficult to acquire.

Thus information on approaches and experiences that would be useful for other countries often remains inaccessible. The establishment of organized documentation on technical, social and health aspects related to environmental, sanitation improvements facilitates this exchange. This publication is a summary of work in the social and health development fields. But the continuous supply of information and publications from the field is indispensable for carrying on this task.

A second barrier to getting acquainted with projects and programmes in other countries is the language. It is hoped that the publication of the second edition of this review in French and Spanish as well as in English will stimulate feedback and cross-cultural communications from non-anglophone countries.

This volume discusses the material according to subject. References within the text are listed in full in Annex I.

A country and subject index have been added in Annex VI and VII. The general conclusions drawn from the literature are summarized in the next chapter.

SUMMARY AND CONCLUSIONS

The Need for Defining Community Participation

Community participation in water supply and sanitation projects is gaining a wide acceptance. It will have a much greater effect if water agencies explicitly include this element into their planning. This means first of all that community participation is defined and studied as a separate element of drinking water supply and sanitation programmes. Often it is a vague and rhetorically used concept, or serves as a synonym for voluntary labour or cash contributions towards construction only. How community participation is defined will depend upon the objectives of the programme and the needs and possibilities for participation. Take, for example, a water supply programme which has only functional-technical objectives; where drilled wells are installed, a satisfactory maintenance and repair service exists and water is provided free of charge. In such a case, local involvement will mainly take place in the allocation and planning phase, apart from the creation of some feedback channel to assure a continued functioning. A more complex participation and education programme will be needed for specific health objectives and for specific community contributions in cash and manpower during construction, operation, maintenance, and administration.

No matter whether a minimum or maximum community involvement is developed, some central questions will have to be answered and tested in the field: who participates in which phases and decisions, how and to what degree, and what effects are desired for the programme and the community? These questions are not yet generally considered by the agencies solely responsible for the planning and implementation of water supply and sanitation programmes.

A State-of-the Art on Community Participation

Some generalizations can be drawn from experiences in, and publications on, community participation.

Participation in Allocation

Participation in the project allocation phase often takes the form of requests from the community or its leadership to the water agency or to a more general government planning institution, directly to the central level, or through a hierarchical procedure of screening at district, provincial and national levels. These requests are seen as reflecting the perceived need of the communities for improvement in their water supply system. This depends however on who initiated the procedure, and why and how this was done. The request system is also often accompanied by problems of time-lags, overdemand and unequal distribution. Outside initiatives rarely offer a real choice between project acceptance or rejection and replacement by another project with a higher locally felt priority. Involvement in the planning decisions and demonstration of the reasons why the project was deemed necessary will make a difference in the degree of community interest and commitment. In some countries a combination of request and government initiative is used, to ensure the realization of the distribution policy and the optimal use of technical resources.

Participation in Planning and Design

A dialogue between the community and agencies during the planning stage is especially important. A community is more likely to cooperate in the implementation and operation and maintenance of new systems if it has had a say in the preparation of the plans. The planning dialogue usually takes the form of contacts with local authorities and formal leaders, supplemented by one or more general assemblies. Sometimes, formal planning committees are involved. Special provisions may however be necessary to ensure that the interests of weaker socio-economic categories are sufficiently represented such as women, the poor, single households, religious and ethnic minorities. The degree of participation varies from community information and acceptance to consultation, joint decisions. Decisions that are exclusively made by the community are rare but do occur, e.g. on the procedure to get the yearly maintenance sum required by the water agency.

Generally accepted topics for discussion in water projects with the community are local studies, source selection, siting of various works, facilities and pipe alignments, financing and other community contributions in the various stages. Less usual are geographic scope of the project and the administrative consequences, linkage with other improvements, type and design of technologies, level of service and additional facilities.

In waste disposal projects, the importance of an appropriate design is now generally recognized. Siting, financing and labour organization are also subjects for a dialogue. Provisions for the continuity of waste disposal campaigns, including a stimulation of continued use and upkeep, are less usual.

This joint planning by the community and agencies is now more frequently based on an investigation of the local situation. Local cultural and socio-economic conditions are of decisive importance. The scope of such studies will depend on the objectives of the programme, the resources available, the complexity of the local situation and previous experience under similar conditions. A standardized approach can facilitate the collection of such information. Care should be taken however that its collection is not an isolated activity. All information collected should in principle be used, for the dialogue with the community, for planning adaptations and evaluation. Large-scale sociological surveys are now often replaced by less formal methods, such as participatory research and community consultation.

Participation in Construction

The role of self-help activities in the construction phase is an ambiguous one, which calls for further analysis. Some publications mention voluntary labour and contributions in cash or kind as a cost-saving element which increases feelings of local pride and commitment, offers training possibilities and stimulates proper use and maintenance. But other publications suggest that the use of contractors or agency construction teams is more efficient, by avoiding problems of delays, increased costs, overburdening of the community, poor construction leading to frequent breakdowns and a dislike of further contributions towards operation and main-

tenance. On the whole, the scales seem to turn in favour of some kind of active involvement in the construction phase, especially when a number of pitfalls can be avoided through proper planning, education and supervision. In this context more attention should also be paid to possible negative consequences of voluntary labour for the people themselves. Cost-effectiveness studies on various forms of local involvement in the construction phase are needed however, if a clearer answer on the value of participation in this phase is to be given. More monitoring of costsavings and cost-increasing aspects of participatory programmes will therefore be necessary, as well as an evaluation of the later effects on the functioning of the systems.

Participation in Operation, Maintenance and Administration

In addition to participation in the planning phase, the participation of the community in the operation and maintenance of the provisions is of the utmost importance. In many countries the operation and maintenance of the new facilities by agency personnel is the weakest link in the programme chain, thereby jeopardizing the work done by all the other sections.

The community can make a real contribution here: by providing volunteers for training as local operators or caretakers, by paying for operation, maintenance, repairs, replacement and extension, by taking responsibility for the inspection, by problem reporting and through social control as individuals and community. Neither agency nor community can accomplish the satisfactory operation and maintenance of communal facilities on its own: the answer lies in properly arranged teamwork.

There is no unanimity on the degree of flexibility in community level administration. In some publications, a standard administrative system is advocated, with a fixed degree of authority delegated to the local level. According to others, various types of administrative systems should be offered to the community as a basis for ad hoc arrangements. The choice is determined by national policy and by organizational considerations, which will vary from place to place.

When for the sake of practicality and costs a standardized approach is chosen, some flexibility should be possible to take into account the differences of leadership, the position of women versus men, the co-operation between and within villages, and other local relationship patterns. The administrative system or systems, the division of responsibilities, the contact with the agency after construction and the procedures for future adaptations should be placed within a formal, legal framework.

Additional Inputs: Waste Disposal and Community Education

The community water supply can be contaminated and make no change for the health of the people unless proper attention is paid to waste disposal and hygiene. The simultaneous initiation of further environmental sanitation activities, in particular for better waste disposal, is therefore highly emphasized. Inter-agency cooperation and coordination for this purpose should receive more attention. As the adoption of excreta disposal facilities in particular is a culturally more complicated matter, arrangements for a long-term programme must be made. Linkage with organizational arrangements for the operation and administration of water supplies at the village level could therefore be considered. The existence of other local or regional priorities or development plans may demand a further integration or linkage of programmes. The cooperation of all relevant agencies and the coordinated planning and execution of projects are essential conditions for such an integrated approach.

Besides defining community participation for drinking water supply projects, it will also be necessary to determine what educational inputs are necessary to get a successful participatory programme. Unless people understand the relationship between safe water and excreta disposal, they will be reluctant to break with habits which will impair any attempts to improve health conditions. For the participation in allocation, communities will need to be informed about the selection procedure and criteria and the duration of the process. In many cases a quicker procedure and better feedback will be needed to limit the frustration of expectations. For communities that do not fall under national or regional programmes but would like to improve conditions on their own, non-coverage programmes can be considered, consisting mainly of technical extension and some material

support. Once a project has been allocated, special educational programmes will be needed in the various phases. These include project information, general and locally-specific health education, labour instruction and training for delegated tasks. A simplified model for such inputs is given in Annexes II and III.

After the construction has been completed, educational programmes remain indispensable, both for the technical continuity and the impact of environmental health. In general this demands specific organizational arrangements in the community, rather than the mere indication of a need for some kind of health education. A participatory programme is to be preferred over a one-way didactic approach.

The Recognition of the Importance of Evaluation

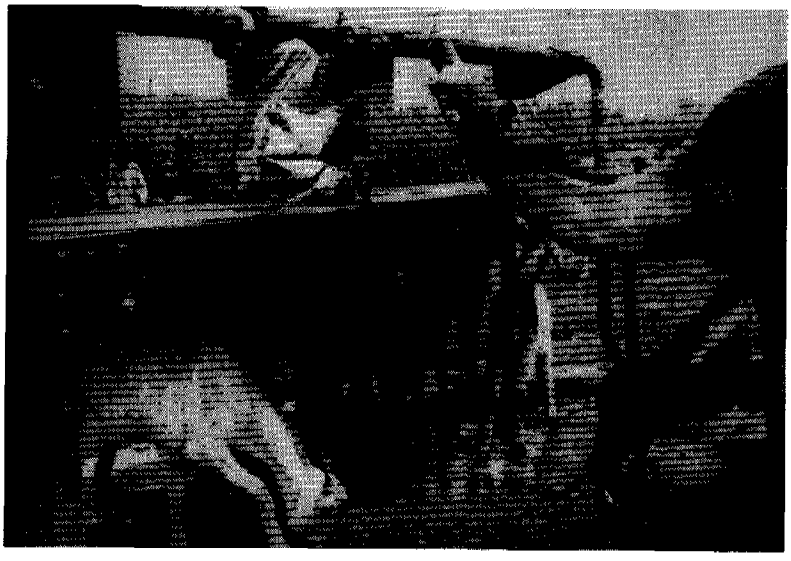
The original function of an evaluation of drinking water supply and sanitation programmes was to show what had been done with the money invested. With so many alarming reports on breakdown and acceptance problems, there is a growing interest for evaluating the effectiveness and impact of completed projects.

With the widening of the concept of evaluation in community water supply and sanitation programmes, the role of community participation is also studied in more detail. Does participation stimulate the acceptance and continuity of the provisions? And what type of participation is the most relevant for a good result? Are special adaptations to local conditions necessary? Can special inputs, e.g. community education, organization and continued supervision, improve the effects of community participation or solve problems in existing projects? Are these inputs worth the extra costs, or is it wiser to spend this money on the strengthening of the water agency at the local level? Do participation and/or education stimulate general, exclusive and correct acceptance of the facilities and a change in related health behaviour necessary for certain health impacts? What are the best methods for this purpose?

Presently most evaluations are by outside agencies on completed projects. But there is increasing recognition that some evaluation should also be built into the regular programmes. Good monitoring systems are a necessity for this purpose. This implies that evaluation is part of the general planning of the programmes. Indicators for evaluation must be selected and methods for their registration determined, with the avoidance of too much bureaucracy. The tasks of analysis and interpretation can be given to a central unit. The importance of regular feedback on ongoing projects and the functioning of completed projects for the programme management is obvious. But the results of an evaluation are not only meant to benefit the agency but also the users themselves. Involvement of the community in the evaluation process can help the agency and the community. Important mechanisms are the regular measurement of user satisfaction, the feedback and discussion of evaluation results and the stimulation of participatory research and self-surveys.

Community Participation and Education in Urban Programmes

About the role of community participation and education in urban programmes much less is known. More investigation into their importance for water and waste programmes for low-income populations is needed. Policies of slum clearance or the installation of minimum water supply services without any participation and solely directed at curbing the risk of epidemics are still common, and waste disposal is greatly neglected. A number of programmes in which the community is actively involved do exist, as a result of local initiatives, agency planning or as a consequence of problems with imposed programmes. Analysis of these will increase our knowledge about the differences with rural programmes and the influence of differences between the various urban areas themselves. Some of the influencing differences are the location, the history and legal status of the settlement, its type of population, the extent in which people move from such a settlement to another and the presence of people who can act as a go-between for the agency and the community.



(photo: courtesy of Dr. B. Mabrook)

(photo: courtesy of Dr. A. van Wijk)

The collection of information about existing village conditions will include the observation and recording of water sources and collection practices.

I PLANNING FOR PARTICIPATION AND EDUCATION IN COMMUNITY WATER SUPPLY AND SANITATION PROGRAMMES

From the available literature four questions emerge as essential to the planning of community participation and education in rural water supply and sanitation programmes. These questions are: is there is a special policy regarding environmental sanitation in rural and urban fringe areas, reflected in national or regional programmes with specified objectives and preferably linking water supply and sanitation? In relation to these objectives, has a clear and officially stated view been developed on the desirability and possibility of community involvement in the various phases of the programme? Do programme integration or linkages exist, such as health education, to optimalize the realization of general development and specified programme objectives? And has an evaluation component been included to determine if these objectives have been realized?

In this chapter are discussed community-based water supply and sanitation programmes and their objectives in relation to community participation. The theoretical models of community participation developed by a number of social scientists can be of help in the much needed definition of community participation as a basis for programme formulation and evaluation. A summary of these studies is given in the second section of this chapter. The question of the integration or linkage of additional programmes is covered generally in the third section of this chapter. A separate chapter (Chapter VI) is dedicated to a very important additional component: sanitation education. In the fourth and final section of this chapter, project allocation is covered as the first phase of a community water supply and sanitation programme. With this phase, activities at the local project level begin, culminating in evaluation which is discussed in Chapter VIII.

Special Programmes for Rural and Urban Fringe Areas

From the WHO survey on water and excreta disposal (Pineo and Subrahmanyam, 1975), it appears that conditions in rural areas are much worse than in urban ones; yet most people live in these rural areas. An exception to the more satisfactory conditions in urban areas is the low-income areas in and around the big cities, where housing conditions are very poor and the risks to public health great. If the inhabitants have access to a piped supply of safe drinking water at public standposts, the average number of persons per standpost may be very high, causing long waiting, overburdening of equipment leading to frequent failures, contamination by waste water and vandalism. Average numbers of 1,200 to 3,300 users per standpost are in practice impossible, so most people will turn to other, more risky or more expensive supplies (WHO/IRC, 1975). Prices paid for water supplied by vendors are often exorbitant; users will spend as much as or more money than a city dweller with a tap which provides a much greater quantity of safer water (A.U. White, 1977).

A recognition of the necessity of special programmes for the rural and urban fringe areas is a first step. A national survey of environmental sanitation conditions in these areas can provide the basic data for the development of such programmes *. A special section on water supply and sanitation for rural and urban fringe areas can be included in the national or regional plans.

Some countries opt for a total area approach in which all or most villages in a selected region are covered, e.g. Guinea-Bissau (van der Ploeg, 1979). Others classify separate communities on a national or regional basis according to their priority and carry out projects in single communities or in clusters of the same priority. (Rep. of Colombia, n.d.; Rep. of Niger, 1965).

---

* WHO and the World Bank have jointly carried out sector studies to assist countries in their investigations of alternative development schemes. WHO also made rapid assessment studies in connection with the International Drinking Water Supply and Sanitation Decade.

An alternative is the design of integrated rural and urban fringe development plans, in which environmental sanitation is but one of the components for more general development (World Bank, 1976b).

The need for special rural programmes is now well recognised, and the increased experience with such programmes has led to a growing insight into the determinants of their success. This is much less the case with urban programmes for low-income populations. Traditionally, urban programmes have been mainly oriented towards the business and administrative centre and the higher income residential areas. But because of urbanisation and the increasing perception of access to safe water as a human right, there is now more attention for the needs of the urban poor.

The approaches chosen are related to the varying settlement of this target group. In a number of countries, site and service projects have been developed in which people are settled on small plots already served by roads, water supply, and electricity (Grimes, 1976; World Bank, 1974-77). Involvement of people in the construction of their houses does not imply however, that they also participate in the planning of the services e.g. in the siting of standposts and design of latrines (Shanawany, 1980). Upgrading of existing services in high density areas is often necessary. A vicious circle of poor service and use, resulting in breakdown and non-payment has to be broken through. Other areas that need a new service are urban fringe squatter areas and rural villages engulfed in the urbanization process. Sometimes this can be done by expanding the existing system. In other cases they need to be treated as separate communities. Central slums usually have some rudimentary service based on public health considerations but this is generally inadequate and functions poorly. An overview of the different hydrological problems associated with the various locations of urban settlements is given by Rew (1979). A summary of alternative technologies and essential social components for such programmes, including a number of case studies, is provided by Etherton (1980).

But it is not just a matter of developing special projects. There is also a need for a much wider discussion on low-income water supply and sanitation policies and their programme consequences. G.F. White (1978) begins such a discussion. Fundamental policy decisions concern the active opposition to urban migration, the passive acceptance of settlement, or its

active regulation. For this regulation, activities can vary from a minimal planning of lay-out and environmental health control, to a stimulation of self-action, to an improvement of existing services and facilities and to an expansion of services. Major issues that have to be considered when making choices include the target populations, the alternative technologies and levels of service, health risks and waste disposal investments, pricing and repayment policies, and institutional arrangements, including community participation and education.

There is a great need for more studies on user preferences, user tax and payment systems, and for more systematic experimentation with alternative approaches. What effect does for instance a planning dialogue with the community or an educational programme have on the extent and manner in which the facilities are used? Inventorization and evaluation of different approaches to community participation and education will assist in determining if such inputs lead to project success and allow generalizations on the essential factors. Cases of different participation and education strategies are for example to be found in the site and service projects assisted by the World Bank (Cameron, 1978)

Nor is much known about the influence the characteristics of the various types of slums have on community participation. Some factors of importance are the location of the settlement and its development status, its demographic characteristics (males/households, relatively high or low migration), its history and the presence of locally-accepted intermediaries for top-down programmes or bottom-up demands (Collier, 1976; Etherton, 1980; van der Linden, 1977). Van der Linden, for example, strongly advocates the involvement of squatter populations in development in the initial stages of settlement. Based on a study of the bustees (slums) of Karachi and the literature on other squatter settlements, he concludes that the capacity and interest to contribute are highest when an area is newly settled and no de facto legalization has developed. In reality, most government activities for slum improvement take place after a considerable period of inactivity or after the failure of other solutions.

An increase in special urban programmes, with explicit technical and social choices and their consequences evaluated, will greatly improve our know-

ledge of the essential elements for successful programmes for the urban poor, a knowledge which at present greatly lags behind that of rural programmes.

The recognition of the need for special rural and urban fringe programmes also implies that a realistic budget is reserved for the various components of these programmes: planning, construction, operation and maintenance, administration, training, evaluation. If a country creates a rural programme with a budget less than half that of the urban programme, while 90 percent of the population lives in the rural areas and only 4 percent of them has a satisfactory access to a safe supply, not much progress can be expected (Howell, 1977). Unfortunately this situation has been the rule rather than the exception. Of 29 African countries, only one, Egypt, spent an equal amount of money per capita on rural and urban water supply in 1970. In all others expenditures for rural people lagged far behind (Howell, 1977).

Programme Objectives

The formulation of objectives is a basic aspect of any environmental sanitation programme, but it is even more important in rural and urban fringe water supply and sanitation programmes. These will usually have broader development objectives than urban programmes in these fields, and this will have consequences for the programme strategy, additional inputs, programme linkages, the degree of community participation, and the planning of evaluation and data collection. A minimal requirement of every programme will be the realization of technical-functional objectives in combination with economic criteria for the optimal use of scarce resources. This will usually imply that those communities are served that demand the lowest investments per capita and offer the best possibilities for direct recovery of expenses. If community participation and education are considered - and this is increasingly the case - minimal inputs in this field are marketing research and activities, and possibly some additional consultation on the technical and social aspects of the project to ensure an optimal acceptance. Voluntary labour and other contributions to construction are demanded when they are thought to have a cost-lowering effect. Also more attention is paid to the positive effect which participation and education may have on the proper operation and maintenance of the service. Such

minimal programmes will be considered successful when continuity and payments are satisfactory, and when supplies are not damaged through misuse or vandalism.

However, most programmes will also have political objectives, and this will greatly affect the allocation strategy and the type of technologies provided. A balanced distribution of projects over the country may be pursued for various ethnic-geographic areas and/or areas of different development level. This will influence the allocation strategy and the system for community involvement. A centralization policy will affect the programme differently than a decentralisation policy which strengthens the local government or which widens grass-roots participation. With decentralisation, opportunities for local participation will usually be greater.

An objective that is very frequently mentioned is the improvement of environmental health. This objective too is usually stated in general terms, however. Sometimes, this objective affects the allocation strategy, when areas with a water and sanitation related health problem are given a higher priority. For a health impact it is necessary to have the general and exclusive acceptance of safe drinking water supply and waste disposal facilities and an optimal use, as well as additional voluntary changes in environmental health behaviour. This implies more participation in the technological project to ensure maximal acceptance and continuity, and more participatory health education for behaviour changes especially when service levels are lower than universal house connections. Evaluation of changes in knowledge and behaviour, of source selection, of water collection and water use patterns and of the incidence of one or more water and sanitation related diseases may reveal the real value of the project in this respect.

Most rural water supply and sanitation programmes have also some economic development objectives, but they are often formulated in vague terms. It is said that more water and its reliable supply will stimulate agriculture, stock-keeping and small scale industries. In addition, it is often asserted that more water of a better quality, easier access to it and better

sanitation will decrease health costs and improve labour productivity and school attendance. Such developments greatly depend on local conditions and patterns of use. Adverse effects such as overgrazing and widening of the local socio-economic gaps also occur as a result of water supply installation. Additional inputs and process evaluation are therefore often necessary, while the measurement of the impact of the project as such will be difficult. When more direct economic effects are measured, the emphasis is on time gains and water use studies and the economic use of water and wastes. In most countries, women and children are responsible for the collection of water, and the time and effort saving effect of water supply projects for them is nearly always mentioned as a beneficial consequence. Nevertheless this is rarely an explicit objective, and so little evaluation of the true benefits has taken place. This deficiency also applies to the objective of social benefits, such as increased time for social activities or relaxaton, or a change in status and position of women and the poor.

With a wider range of objectives it is not always possible to maintain a programme with a good internal consistency. It will be difficult, for example, to achieve a system which is financially self-sufficient and stimulates economic development, such as livestock productivity, while at the same time realizing a general public health impact and assuring a fair distribution of benefits to the poor. A thorough consideration of all possible objectives, and a clear formulation of the ones selected as the basis for consistency, would therefore be a useful exercise. These should precede discussion on what roles community education and participation can play in realizing the selected objectives.

2. THE MEANING OF COMMUNITY PARTICIPATION

Different objectives lead to different forms of community participation. But this concept itself is not always sufficiently defined within the context of community water supply and sanitation programmes.
Commmunity participation is often a fashionable concept the meaning of which is thought to be obvious. It is either used as too general a catch-

word or in a very narrow sense, referring only to the contribution of voluntary labour or of cash. Mail surveys of actual service projects confirm this preoccupancy with participation in the implementation phase (APHA, 1977; D.C. Miller, 1978).

Let us therefore look at a number of definitions of community participation in the various stages of local development projects in general and in water and sanitation projects in particular.

Mbithi (1974) makes a distinction between local participation and self-help. He defines local participation as the involvement of representatives of all modern and traditional groupings and low-level government staff in the planning and implementation of government-directed projects. Self-help is different; it is the autonomous identification of needs, local level mobilization of resources and local implementation. Major weaknesses of this self-help are a waste of resources through poor project selection and coordination, disregard for official programmes, political manipulation and overtaxation of the poor.

To incorporate the positive aspects of self-help into government projects, a type of local participation has been introduced in them, but the same community enthusiasm has not yet been mobilized. Mbithi attributes this to the lack of a proper strategy.

A similar distinction between self-help and participation is made by Howell (1977, 1979). She also distinguishes in the degree of involvement in each phase of the project. This results in an 8-item scale of participation. At one end of the scale is 'independent self-help'. The community controls the choice, construction and maintenance of its supply, without any external assistance. This is a general rule for traditional supplies. The same is possible for improved supplies, but is much less common and failure occurs when the project is beyond local capacities. She also rejects the other extreme, 'external control' projects, with no participation at all. Rather, some kind of cooperation between communities and outside agencies should take place. Howell distinguishes three degrees of participation or 'shared control' in such joint projects. A high degree means that the community initiates, constructs and runs the supply, but gets outside assistance for

planning and design. A lower degree means that also material support is given by the outside agency. The lowest degree means agency initiative and assistance in design and construction. The community accepts the plan and owns and runs the supply. The author calls 'partial self-help' outside initiation, planning and design, and joint construction, financing and ownership without management responsibilities. 'Low self-help' implies that the community contributes voluntary labour and that the agency can employ a local resident as operator.

Howell, too, finds evidence of a divergence between the government policies on participation and the actual strategy in the field. No attention is paid to the question of who participates in the various phases.

A scale of community participation in water supply projects is also developed by A.T. White (1978). Here, however 'self-help' is defined in terms of labour participation in construction only. The term 'self-reliance' is used to denote self-generation of ideas, community control and the maximum use of community resources and expertise. The degree of participation here depends both on the phase in which participation takes place and on the number and types of people involved. Consultation with community leaders in the planning phase is classified as the lowest degree of participation. Consultation with other members of the community, especially the poor, rates slightly higher. Participation in the form of self-help labour, and the delegation of specialised tasks to trained members of the community is a medium degree. Autonomous project generation is a high degree of participation on the 10-item scale.

This scale is worked out in another publication (A.T. White, 1981). The author describes each form of participation in detail, including underlying reasons, appropriate conditions, possible problems and factors determining the choice of a participation strategy by the agencies concerned. The result is a very basic discussion of possible methods and strategies of community participation and education in community water supply and sanitation programmes.

Cameron (1978) summarizes experiences with local involvement in World Bank assisted projects in urban development including water supply. She discusses when people should participate, why, who and how. She concludes that participation is necessary throughout the project cycle, and should at least consist of an explicit discussion to promote local understanding and commitment. Local government officials should only be involved when they represent the local residents and are interested in meeting local needs rather than realizing higher-level policies only. Participation in construction gets most attention, and she says there is a growing insight into its do's and don'ts. Participation in planning and management are less frequent and still a delicate issue. It is advised that participation become an explicit element of project identification and appraisal studies, and a short checklist is added for this purpose.

According to D.C. Miller (1978), self-help takes place at the micro-level: individuals or households helping themselves on a small scale and in spontaneous, time-limited actions. Popular participation, in contrast, is at a larger scale and based on group interests. Other theoretical differences according to Miller are the larger or longer term goals and the relationship with higher level planning. In his view, participation also includes joint decision making and implementation and an equitable distribution of burdens and benefits.

In practice, however, he says that the term participation often denotes informal contacts with elites and the demand for local contributions to lower the construction costs. A redefinition should therefore take place, with a higher degree of participation in all stages of a water system life cycle. In a model for such participation Miller indicates when people should participate, which aspects should be the responsibility of the community, and which should be realised through outside interventions. Somewhat confusingly, these responsibilities are also listed under the heading 'self-help'.

No mention is made in this model of who should be involved in these tasks, to what degree, to what effect and how. These questions are raised by Simmons and Phillips (1978). They distinguish first of all between the

phases of participation (planning, implementation, benefits and evaluation) and the type of participation in each phase (e.g. resource contributions and administration in the implementation phase). Secondly, they distinguish between types of participants and their socio-economic characteristics (e.g. local residents, leaders, government staff and socio-economic categories based on sex, income, land tenure, length of residence etc.). In the participation process itself, Simmons and Phillips distinguish between initiation from above and below; motivation for participation (from voluntary to forced) and form of participation (individual/collective; formal/informal; direct/indirect). The duration of this process can vary, as well as the range of activities. Another aspect the authors mention is the intended effects of the particular participation process and the characteristics of the people benefitting from them. The authors also demand attention for the relationship between the physical, socio-economical, cultural, political and historical environment and participation. Finally the authors discuss four modes of participation: cooperation, training of selected local people for development tasks, grass-root participation in government projects and mass campaigns.

The nature and scope of community participation will vary with the culture and politics of the system as well as with the local possibilities for it. Its definition by planners and policy makers will also reflect such variations, because the cultural background and social characteristics of those defining the concept will also play a role.

In Thailand, for example, a series of workshops was held to train government health personnel of various levels for participatory handpump projects. Examples of community participation from India were not considered by participants. And no unanimity could be reached among the three government levels present about which projects were participatory and which were not (Gov. of Thailand/UNICEF, 1979).

One thing is very obvious: community participation is not the simple, clear-to-all concept that it may first seem. Answers are needed to questions like who participates when and in what, how and to what degree, and to what effect. Many variations are possible, depending on political

factors, the types of technology used, the availability of community resources and agency manpower and the scale of the programmes. Substantial socio-economic and cultural differences in a country will demand a higher flexibility when a national strategy is decided upon.

For the successful use of community participation in drinking water supply and sanitation programmes it will therefore be necessary to define its meaning more closely. Such a definition could be based on present practices and on an evaluation of existing experiences, objectives and resources. This should result in a strategy of community participation and education with sufficient flexibility to allow for local adaptation when necessary.

Various approaches can be chosen (A.T. White, 1981). One option is the development of special social sections responsible for community participation, for example the promotion sections in Latin America and Guinea-Bissau (see Chapter IV). Another option is the training of technical manpower for such tasks and testing in a limited area, as was done in Malawi (see Chapter IV). Other alternatives are the gradual adaptation of existing procedures and the development of a national comprehensive community participation and education plan where a sufficient earlier experience exists. Evaluation plans and field strategies are an integral part of such a planning exercise.

3. INTEGRATED PROGRAMME DEVELOPMENT

The most important objectives of community water supply and sanitation programmes are the acceptance and the continued and proper use and maintenance of the technological facilities. In this, participation of the community in the various phases of the projects can play an important role. In many cases implementing of the community participation strategy will call for the linkage of various agencies for manpower, programme development, manpower training, etc.

Further linkages will be demanded for the educational component, a necessary complement. In Annex II, various corresponding educational

programmes have been summarized. Such educational programmes can involve a number of other institutions and organizations. For a general programme information component, this includes the various mass media and communication networks of government officials and national institutions such as political parties, churches and voluntary organizations for farmers, women and youth. For the other components, other contacts will be needed, depending upon the target groups and the most suitable channels and methods. An overview of these aspects is given in Annex III.

In addition to acceptance and continuity objectives, there are public health goals. These goals demand that acceptance of improved facilities be universal, exclusive and continuous, and include improved environmental health behaviour. Regular evaluations and continued health education will contribute to this.

A second condition for an optimal health impact is the integration of the various technological aspects in the overall environmental sanitation programme. When an improved water supply system is successfully adopted, but no attempts are made to improve other environmental sanitation conditions and behaviour, other routes of infection will remain. Such improvements include excreta and other wastes disposal, food hygiene, vector control, drainage, etc. A package approach to environmental health is therefore advisable including at least water supply, waste disposal and health education.

The integration of water supply and waste disposal programmes and the incorporation of community participation and education programmes are already major tasks. Yet there may still be other seriously felt needs or problems that could possibly be integrated in or linked to environmental sanitation programmes. Links can, for example, be made with an improved health care system (e.g. a rural health clinic or dispensary with local health workers (Rodriguez, 1978), a nutrition programme (Van der Ploeg, 1979) or other local health programmes. Such an integration of drinking water and sanitation with other preventive and curative health activities at the grass-roots level is indeed the goal of the primary health care approach accepted by 150 governments. For this purpose, special guidelines

have been developed by the UNICEF-WHO Joint Committee on Health Policy (1979).

Other economic uses for water can be found in the fields of animal husbandry, horticulture, aquaculture and small-scale, water-related industries such as brick-making, brewing and tanning. Additional educational and material inputs will usually be needed for such programmes.
Sometimes special coordinated development is required, e.g. where cattle and people depend on the same water sources. Plans for cattle development such as a milk collection and processing scheme can affect the design of a drinking water programme as well as requiring some kind of grazing control from another agency.

Other objectives, such as a decrease in urban migration or the settlement of dispersed populations, also call for more integrated programmes. Lack of coordination between water and settlement programmes in the Tanzanian rural development policy has led to serious supply shortages (Bantje, 1978). Soil erosion due to concentrated settlement around improved water supplies in nomadic areas is another example (Heijnen and Conyers, 1971; Howell, 1977).

When different agencies are to be involved in the community participation and education components, an inter-agency cooperation at all levels will be essential right from the start. Early links with agencies and departments engaged in fields in which spin-offs are possible, or desired, should also be made. The importance of cooperation, coordination and communication between the various agencies and departments is further discussed in Chapter IX.

4. PROJECT ALLOCATION

Allocation Strategies

The formulation of objectives is closely related to the project allocation strategy. In general a distinction can be made between growth-point and worst-first strategies. Communities and areas with the highest economic growth potential are favoured in growth-point strategies. Worst-first ones begin with areas and communities with the greatest need e.g. semi-arid regions and areas with a high incidence of water-related diseases.

Sometimes national or regional surveys are used as a special tool within this national strategy (Rep. of Niger, 1965; Taen and Speckmann, 1975). A number of water supply and socio-economic variables of the communities are then weighted according to a standardized procedure to make a scale of priority categories for project allocation. The variables included and the weighting procedure used will determine whether emphasis will be on need or growth criteria. In the period that the studies referred to above were carried out, the emphasis was more on growth than on need.

A growth-point strategy may lead to a growing gap between better-off and poorer areas unless water rates become a means of income redistribution. In that case, rates increase with area level of development, and some of the surplus revenue subsidizes water and sanitation programmes in poorer areas. The World Bank (1976b) for example, suggests the development of payment levels according to village size or potential income, provided the villagers accept the rates as equitable.

This discrimination on behalf of the poorer areas does not prevent the development of inequity within the area or the community. Padfield (1971) criticizes the distinction between 'poor' and 'rich' areas, or 'high' and 'low' potential, stating that in both there will be micro strata of inequality, i.e. poorest, poor, and less poor. The chance exists that with insufficient attention to these local differences, the ones who are a little bit better off will be the ones who profit most.

New supplies can increase inequality. For example, from a new piped supply system, a former water hauler and a farmer who used to employ him may both get 10 gallons per day. The farmer saves the cost of wages, while the hauler exchanges his wages for unemployment. The chances are, moreover, that the farmer will get much more water at a relatively lower cost. This he can put to a better use, so that the old differentials in the distribution of income still prevail, and even widen.

Evidence of such developments is provided by Chege et al (1976), Etherton (1980) and Briscoe (1977b). Chege finds an increase in farm water supplies from 21 percent in 1970 to 50 percent in 1973 for the most progressive farmers in the Tetu district of Kenya; for the least progressive of the farmers, these figures are 4 and 10 percent respectively. The lagging farmer may get discouraged, sell to the prosperous one and join the ranks of the unemployed in the big cities (Jakobsen et al, 1971). In Jakarta, the poorest inhabitants could not afford the upgraded services and moved to squatter settlements at the outskirts (Etherton, 1980). Briscoe (1977b) points out that the owners of gobar gas (biogas) plants in the Indian subcontinent belong only to the highest socio-economic strata. The excreta from the cattle of the rich, a raw material for the plant, used to be a free and basic fuel for the poor, but has now become an organic resource with an economic value for its legal owners *.

G.F. White (1974) therefore advocates a distinction between water as an economic good and water as a human right. The policy of 'water as a right' would make subsidies possible in health hazardous areas, allow flexible arrangements for rural areas, and facilitate community participation in planning, construction, operation and maintenance.

---

* Although the construction of latrines and other private waste disposal facilities does not have such direct economic consequences, it is nevertheless remarkable that their adoption is often associated with a high socio-economic and educational level. This indicates that the groups with a higher health risk due to their already poorer conditions are reached later by waste disposal programmes (Chen, 1969; PRAI, 1968; Roberts, 1961; Roy, 1968; Sandhu et al, 1977; Srivastara, 1969; Thorat, 1969; Tiglao, 1963).

In Guatemala, for example, the proportion of community contributions in construction and operation costs ranges from nothing to the entire cost (G.F. White, 1974).

Padfield (1971) and Jakobsen et al (1971) go one step further. They suggest that a project area be studied in terms of socio-economic classes and economic categories based on water (e.g. haulers for self, haulers for others and employers of haulers, etc.). A repayment, a welfare or combined scheme, or any combination of the two could be chosen from a typology of financing systems.

With such a system, the richer communities can subsidize the water supply of the poorer ones, while within the community higher socio-economic classes can subsidise the lowest income groups. Water supply systems as a tool for the redistribution of income demand a flexible national policy. It can vary from a repayment system with progressive rates for quality supplies in the inner cities to a combination of welfare and repayment schemes in rural areas. A welfare scheme in urban slum areas could reduce the health hazard to an acceptable minimum.

Similarly, the larger users in the inner city should pay a progressive water rate for such amenities as bathing (instead of showering), toilet flushing, car washing and lawn watering, all of which can be viewed as taxable luxuries. The revenue surplus can then be used to help finance minimal supplies to peripheral and rural areas. Similar combinations of welfare and repayment schemes can be made within rural areas and communities (G.F. White, 1974; Warford and Rosenfield, 1978).

Selection Criteria

The number of selection criteria will reflect the degree of flexibility in policy for the allocation and recovery of funds for environmental sanitation programmes. Four sets of criteria can be distinguished:

Need Criteria In this category fall evaluations of the existing water supply and sanitation: number of sources, distance, reliability, quantity and quality, general environmental sanitation conditions; socio-demograph-

ical data: type of settlement, clustering of villages, population density and its increase; and economic and health criteria; socio-economic stratification (e.g. special provisions for ethnic minorities) and high health risks.

Economic Potential Criteria Most commonly used are growth potential and the existence of other socio-economic development plans or programmes.

Technical-Economical Feasibility Criteria These include: estimated costs of various schemes, number of people served per unit of expenditure, the need to import materials, village accessibility and means of communication. These criteria also play a part in determining priorities, but flexible standards for quality and quantity may have an important influence on the relative weight of the various priority categories. (As these criteria fall outside of the scope of this publication they will not be discussed any further).

Social Feasibility Criteria

A felt need for or interest in the development of environmental sanitation programmes is essential for their success. In most Latin American and Caribbean countries, "willingness of the community to participate" was the second highest criterion as reported in the 1972 WHO survey. In tropical Africa however, this criterion was mentioned least of all (Pineo and Subrahmanyam, 1975).

This willingness must extend beyond financial and organizational contributions in the construction phase and include the operation and maintenance phase. But this is not always made clear enough. Once a community has contributed towards a government-initiated social service, they can consider the government responsible for keeping up this service, and therefore be less willing to contribute towards recurrent costs of management and maintenance. Feachem et al (1978) call this the expectancy of a once-and-for-all payment.

Secondly, for optimal health benefits, there must be a willingness to stimulate a change in public and private sanitary behaviour. Communities should know what is expected of them by the government (Padfield, 1971).

An enumeration can be part of the general or specific information programme (see Annex III).

As indicator of the interest and willingness of the community to contribute some form of participation in the allocaton process is often used. This may have some adverse consequences, however. But a system of outside imposition or invitation also has its drawbacks. In the next section on participation in allocation, more attention is paid to the various options for these indicators.

A second criterion of social and economic feasibility is the community's capacity to contribute. Population density, for example, may also be a condition for the availability of voluntary labour (Glennie, 1979). Other similar criteria are the percentage of wage labour in an area (Mexico: Whyte, pers. comm.), the number and types of local organizations (Rep. of Colombia, n.d.) or a record of previous development activities. A high degree of socio-cultural homogeneity also contributes to project success (Morss et al, 1975; UNICEF/WHO Joint Committee on Health Policy, 1977a).

Demanding evidence of such community capacities may contribute to project success, but also to the overall inequity effect of the programmes. But not paying attention to such differences in capacities may have the same effect. When one invites community requests for projects or allocates funds to be spent by the communities themselves, the more able communities are likely to make the best use of such opportunities. Experiences with the Regional Development Fund in Tanzania for example showed that the more prosperous regions, with their more competent staff, better infrastructure and better services, were more effective in organizing projects, while some of the more remote and backward regions returned large sums unspent (Chambers and Belshaw, 1973).

To avoid such inequity, special provisions can be considered. In Colombia, for instance, local capacities for financial and organizational contributions to water supply projects are investigated through a community study and may result in the adaptation of the project in terms of the duration of loans and leadership training*.

---

* (Rep. of Colombia, n.d., 1975; Mora Ramirez and Lopez Orozco, 1976). Another possibility is to widen the range of choices for the households: e.g. standposts, group connections, and house connections with a varying supply capacity.

In South Korea, all rural communities were categorized into basic or low-capacity villages, self-help or medium-capacity villages or high capacity villages; those villages with the lowest capacities received special projects and training (Phillips, 1978; Youl-mo-Dong, 1977; Haque et al, 1977). And in Guinea-Bissau, communities that do not have enough people for voluntary labour for well construction can get a loan from the water agency to get a paid labour team and pay the loan at the next harvest (Van der Ploeg, pers.comm.).

Participation in Allocation

Quite often, rural communities directly participate in the allocation process by sending in requests to government administrative institutions or water agencies at varying levels. These requests are screened at one or more levels: some are accepted and others rejected or retained. This system is preferred as the request is thought to reflect locally felt needs and willingness to contribute. This, however, depends on who has initiated the request, why and in how far it reflects the opinion of the whole community. Was the initiator a local politician or a health inspector who requested the project for political or professional reasons ? Is he a generally respected community leader ? Was the community consulted beforehand ?

In Malawi, for instance, requests are initiated by a strong and accepted traditional and party leadership, whose participation is a sufficient guarantee for local interest and capacity, particularly since no financial contributions to construction or operation and maintenance are demanded (Glennie, 1979).

Cardenas (1978), however, distinguishes three types of requests in Paraguay: communities where water supply and sanitation problems are perceived a) by the entire village; b) only by the leaders; and c) only by the sanitarian. This results in the establishment of very flexible programmes, which in the first case (a) are limited to assistance in community organization and joint programme initiation. In (b) the leaders are supported with all available means, including a locally planned sanitation

education programme in primary schools, to motivate the other villagers. In (c), the most difficult and time-consuming case, various surveys are carried out with the involvement of the villagers, a motivation and education campaign is set up, and assistance is provided in solving other acute village problems.

Community requests often cause an overdemand resulting in considerable time-lags between requests and allocation, and allocation and initiation. Time-lags in India for example were up to 16 months (PRAI, 1968), up to 26 months in Kenya (Scotney, 1976) and up to 4 years in Peru (Pineo, 1976c).

This may be influenced by the insufficiency of or ignorance about selection criteria, so that non-eligible communities will also apply, or because more eligible communities apply than can be handled by those responsible for allocation and initiation.

A clear definition of and more information about selection criteria is needed to overcome this ignorance. For the problem of over-demand there are several possible alternatives: more resources and decentralization of the programmes; a routine check against the selection criteria upon arrival for a preliminary allocation; the screening of requests at lower levels; smaller target areas based on priority ranking; and adaptation of selection criteria.

In the Philippines, for instance, where the limited ability to respond to the overwhelming popular demand is a serious problem, a phased and stepwise selection procedure has been set up, with fixed deadlines for every step. Local councils send in their requests to the Municipal Capital Improvement Committees. In June of each year, decisions are taken on the allocation, relegation and rejection of requests, with a further review of the cases in the first two categories at provincial level in September. Priorities are given based on pre-feasibility studies, available funds and a comparison with other projects. In October of the same year, the Annual Implementation Plan with all selected projects is submitted to the Department of Local Government and Community Development, where the final decisions are taken by November, and results in the notification of all levels concerned (Rep. of the Philippines, 1977).

A third consequence of community requests to be considered is the possibility that the requests received reflect insufficiently the official allocation strategy. Requests may be channeled through district development committees for instance, which do not function equally well in the various parts of the country (Widstrand, 1976). Inequitable distribution may be the consequence of the chosen policy. It can also be the result of vague, unrealistic or contradictory formulations; e.g. a goal of developing organizational capacities in backward areas which clashes with a demand of local initiatives for allocation and opportunities for manipulation (Cairncross et al, 1980). The allocation policy is a political decision of the country concerned, and the danger of manipulation exists in any allocation system, but internal inconsistencies, lack of information, complicated application procedures and unrealistic demands can be corrected.

Sometimes the request takes the form of an advance payment of community contributions, as a token of village interest. An overdemand then results in a great deal of money tied up for long periods between request and final initiation. In Lesotho, 227 villages had already paid subscriptions for an improved supply, but only about 30 of these could be served per year (Feachem et al, 1978). Sometimes even a competitive element is introduced. In some Latin American countries villages vie with one another to make the maximum contribution to receive a higher priority in the programme (World Bank, 1976b). Apart from the question if actual deposits should be involved, guarantees for a proportionate share in contributions from the various socio-economic strata in the community may be necessary, as well as regulations to limit the effect of differences in level of development and social organization.

Financial deposits need not be collected until the community has spoken out in favour of a project. Other guarantees of community commitment can be asked instead, such as an offer to provide local labour, materials and cash (Donaldson, 1976; Pineo, 1976a, c); or land and housing (Agua del Pueblo, n.d.; Arole and Arole, 1972; BURGEAP, 1974); expressing the intention to assume responsibilities for the administration (Pineo, 1976c); and a successful history of supply promotion (BURGEAP, 1974).

In urban programmes for low-income populations, projects may be allocated as a result of community action, but no institutionalized procedures are known to exist. Sometimes, allocation is the result of a demonstration of self-development capacities e.g. in Douala, Cameroon, but usually communities have to struggle for the legalization of settlement and the provision of services, and are not accepted as initiators of and partners in their own development (Etherton, 1980).

The opposite approach is to allocate projects from above. This may take the form of imposing a project on a community or area without any consultation at all, or allocating the project with some kind of consultation or motivation procedure.

Initiation from above has the advantages of an easier matching of the planning and implementation to the national policy and capacities, but outside and local views on whether a project is needed may differ considerably. Some type of consultation and motivation is therefore advisable, although this usually does not mean a real choice between acceptance or rejection. But this will be less of a problem when further participation in planning decisions is possible.

Consultation and motivation can have many forms. Usually, the local authorities are contacted and sometimes other types of local leadership as well. The consultation of categories that are less well organized or represented in the formal leadership structure, e.g. the women and the poor, is less usual however. Also, special interest groups such as water vendors are not always considered. As a rule, a general assembly is consequently held, during which the project is explained and accepted by the community. Feedback possibilities may vary considerably. The approval can be registered in a formal agreement on construction, financing and management, which may have the form of a legal contract or contracts.

The investigation of local attitudes to the project may form part of the local feasibility studies, and lead to adaptations in project motivation and planning (Misra, 1975). In Niger, consultation of the village chief on the felt need of the villagers for a new well was part of the national

survey that was the basis on which priorities were allocated. In general, these opinions had a high correlation with the data on well capacity collected by the interview team (Republic of Niger, 1965).

Combinations of project allocations based on outside and local initiative are also found. In Malawi, community requests are channeled through the district development committees, but government initiatives are also possible for an equitable and efficient project distribution. A government project initiation in selected focal areas is also preferred to start off a general demand in neighbouring areas and to serve as a natural extension process, showing people what will be expected from them and what they will get in return (Glennie, 1979).

In Guinea-Bissau, such government invitations are the general rule. Promotors visit the communities, contact local authorities and ask them to call a general meeting. The project is explained and the communities are left to make up their mind, and will later inform the promotors of their decision. Rejections are very rare, but have occurred. In addition, a special fund, consisting of 10 percent of the total budget has been created for emergency cases in other areas. Communities which face an acute shortage can send in requests for priority assistance through their political leaders (Van der Ploeg and Van Wijk, 1980).

Programme Information

From the above it is clear that careful consideration and clear definition of the allocation policy and strategy are necessary. More programme information is needed to make the communities more knowledgeable on the programme selection procedure and criteria; the duration of the process; the priority categories identified; and health and other development aspects. Similarly, after the allocation decision, all communities concerned will have to be informed on the next steps, additional conditions, reasons for rejection, etc. To offer an alternative to communities that are rejected or not yet considered, A.T. White (1981) suggested the development of non-coverage programmes, taking the form of government encouragement and support for largely self-reliant action, through funds,

physical resources such as cement, and the most essential outside expertise for simple technological improvements. An example of such a programme is the health education programme in South Cameroon, where promotors attached to health centres assist village health committees to carry out simple environmental sanitation improvements, such as spring protection and latrine construction (Isely and Martin, 1977; Isely, 1978; Isely, Sanwogou and Martin, 1979). Another case, of village well construction in Ghana, is described by Yeboah (1979). Here, the village leaders can request assistance from the Ghana Water and Sewerage Corporation for surveying and well sinking. Interest in such 'simple' technologies is limited, however, as long as communities think that they qualify for programmes with a more sophisticated technology. Referral to such alternatives for community action can be part of the programme information package developed as part of the national drinking water supply and sanitation programmes.

MINISTERIO DE SALUD

INSTITUTO NACIONAL DE SALUD

PROGRAMA NACIONAL DE SANEAMIENTO BASICO RURAL

It is important to "translate" the country's policy on community water supply and sanitation programmes into conceivable terms for all concerned. (Brochure: Instituto Nacional de Salud, Bogota, Colombia)

II INFORMATION ABOUT THE COMMUNITY

The success of a rural or urban-fringe water and sanitation programme will depend on the activities at the local level. At the beginning of a local project the agency will need background information about the community. At the same time, the community needs information about the project and its consequences. A period of a fairly intensive two-way communication between the community and the agency should therefore precede the design or construction activities.

This exchange of information can have a quadruple function. It can provide the information necessary for detailed planning. It can create a community awareness and understanding of the project and its participatory approach. Data collected during the information gathering process can serve as a baseline to evaluate the impact of the projects. Finally, local studies sometimes serve as an additional means of selection for project allocation.

In this and the next chapter, possible topics for this exchange of information are brought together. Not all these subjects will be relevant in every case, however. A minimum programme can often rely on more informal methods for gathering information while a more complex programme will usually demand more formal methods.

In some cases relatively little information exchange is required: when goals are mainly operational, the agency has some experience with similar projects in the same area and when the community is interested and has a clear idea of the nature of the project.

A more extensive study and dialogue are needed when the village structure is complex, wider development goals are pursued, the need for improved water and sanitation is not seen by all, or a relatively high degree of participation is demanded. But this type of study requires skilled manpower for its execution.

In some programmes of this size (Colombia, Peru, Guinea-Bissau) sociologists have developed standardized procedures for this process. Other social scientists (Segaar, 1979; A.T. White, 1981) hold that at this level formal methods of information collection are not necessary. They can be replaced by consulting representatives or members of all relevant groups on their views about the existing situation and the proposed project.

A maximum effort will be necessary when research goals are to be realized. When one wants to indicate the health impact of the programme, for example, it will be useful to establish baseline data on: the quality of traditionally-used sources; the water-use patterns; the presence, condition, and use of other environmental sanitation facilities; the general environmental health knowledge and behaviour; the health care system and its activities relevant to the study; and the incidence of one or more water and sanitation related diseases.

Thus, the actual scope and methods of information collection and diffusion can vary considerably. They need careful consideration to make sure that a balance is struck between the need for information and its actual use.

1. GENERAL VILLAGE CHARACTERISTICS

Delimitation of the Village Area

It may be necessary to pay special attention to geographical or administrative divisions. In Nigeria, extended villages are found with a central village surrounded by its satellite-hamlets (Röling, pers. comm.).
In India, the Harijans and tribals usually live in separate hamlets. Misunderstandings about the administrative status of such settlements can debar them from technology improvements (pers. obs.).

In Brazil the prefeitura, rather than the community, is the administrative centre at the local level (Oberg and Rios, 1955; Rogers et al, 1970). Such an administrative set-up may call for a separate study on the need for decentralization of certain management arrangements.

Community subdivisions are also useful for the organization of the community. In Tanzania, villages are subdivided into ten-house cells (Hall, 1978; Kreysler, 1970; Van der Laak, 1969). In a Japanese demonstration project on community health, one of the lines of community organization followed was the use of the traditional division into ten burakus, of which the community was a conglomeration (Miyasaka, 1971). Scotney (1976) stresses the importance of the local path network as a source of information on community subdivisions.

Socio-Demographic and Cultural Composition

Knowledge of the socio-economic and demographic structure and cultural variability of the community is very important. Socio-cultural divisions may exist according to caste, ethnic or tribal groups (which may include linguistic differences), political and religious affiliations, and socio-economic class based on income, material wealth, land tenure and education. Household composition and age structure may vary considerably. Such information will be very important for programme planning and implementation, for the drawing of stratified samples when these are used in further data collection (Curtis, 1977 a), and for the analysis of differential impacts.

Village Leadership

Another important topic for investigation is village leadership. That the village authorities can and have to play an important role in the various phases of the programme is self-evident. In addition, leaders of voluntary associations can also make contributions to the adoption and continued use of communal and individual environmental sanitation facilities. Such groups include religious and political associations, farmers', women's and youth groups, and even very specific organizations, such as funeral societies (Messing, 1968), school leavers' unions and home-town associations in the city (Cardenas, 1978; Lovel, 1978; A.T. White, 1978).

Finally there may be special opinion leaders for matters of health, water, village technology, or community affairs, who may or may not overlap with

the previous leader categories*. Holmberg (1952), for example, found that one of the factors contributing to the failure of a water supply project in Peru had been the neglect to consult an important farmer in the area, who happened to be the local well digging expert. Amsyari and Katamsi (1978) found that the inhabitants of East Java, Indonesia, distinguished between key persons in direct health affairs and in environmental health. When asked about their advice seeking behaviour, the respondents replied that, in matters of house construction, excreta and sewage disposal and insect-rodent control, the local administrator was consulted. His knowledge on these matters, however, was found to be below that of local health personnel and teachers, and his staff had the lowest scores of all key persons identified. A similar distinction between opinion leaders in health and in community affairs was found by Tiglao (1963), when she evaluated a ten-year public health programme in the Philippines.

Village Power Structure

An essential factor in the success, or failure, of village development programmes is the way in which they can be fitted into the existing power structure of the community, without the risk of an uneven distribution of benefits among the population, or of the programmes being used as a weapon in intra-village conflicts.

The case studies of Feachem et al (1978) in six villages in Lesotho clearly show the importance of a well-established and generally accepted leadership without open or latent conflict between individual authorities, factions, classes or even sexes **.

---

* In general, the number of opinion leaders who are accepted as an authority on a variety of topics (polymorphism) (Merton, 1957) increases with the growing modernity of the village; in the more traditional villages, different opinion leaders are found on different issues (Bhatnagar, 1972; Rogers and Shoemaker, 1971).

** In two Lesotho villages controversies between men and women interfered with water supply management and maintenance arrangements (Feachem et al, 1978). In Tonga, the request of male family heads not to involve the women led to an initial failure of a sanitation education project. Although the men were formally leaders of the family, the women had a very high status and decision-making power within the family (Fanamanu and Vaipulu, 1966).

Not only may the acquisition of control over the water source, waste treatment plant or water distribution system become the objective of the various parties, but the very project may become a political weapon, even with such apparently neutral activities as latrine construction and sanitation education. Akhauri (1958) described how a village cleaning campaign, set up by an enthusiastic school teacher, failed because all school functions were dominated by either of the two village factions.

Timing may be important; Patnaik (1961) described how the organization of well-digging parties occurred at the time of the elections for the village council, and became one of the issues for the election contest.

Early knowledge of such coincidences may prevent unnecessary project failures. It is better to suspend any material inputs until organizational problems, caused by local controversies or conflicts, have been solved.

Extension Workers

The cooperation and coordination of the various types of extension workers, both government and non-government, in many different fields are very important to the realization of the objective of either 'progressive' or 'self-sustaining' development. These include health and health education (nutrition, family planning, mother and child health care, school health education, health inspection); adult education; community development; home economics; and agriculture (veterinary health, rural composting and biogas, etc.). Messages should be coordinated to reach various target groups, and one should avoid overburdening the community in terms of finance, labour and time. A knowledge of local persons and organizations active in these fields, and of the ongoing and planned programmes, may therefore be useful when no linkage or coordination has taken place at a higher level.

Marginal Groups

Finally, some special attention may be needed for the identification of any marginal classes, groups or families in the community. Rogers (1962)

categorized the adopters of new products, installations, ideas and behaviour as innovators (2.5 percent) early adopters (13.5 percent); early majority (34 percent); late majority (34 percent); and laggards (16 percent). Identification of these categories in the community (for example by contacting the local teacher) and adaptation of the programmes to their situation by involving them in planning, implementation and evaluation may limit any inequity effects the project may have.

2. ENVIRONMENTAL SANITATION CONDITIONS

Water Supply Conditions and Practices

Choice of Sources The number and characteristics of available and used sources will affect the allocation, the design and the acceptability of a new project. In rural areas people usually have the choice of a number of alternative supplies, especially in areas with sufficient rainfall. These will fluctuate in areas with distinctive dry and rainy seasons. Local knowledge can be useful for the selection and appraisal of new water sources. Thus, well construction teams can select the most probable places for establishing shallow wells in consultation with local people and get additional information from them on the seasonal variation of the groundwater table.

The degree of acceptance of the new source will be greatly affected by the number of alternative sources and their perceived appropriateness. This acceptance will, in turn, affect the public health impact of the new supply and may also have financial consequences. The number of alternatives may be considerable. G.F. White et al (1972) found that the perceived range of choice in East Africa was up to 5 sources, with a mean of 2.3. The actual number as recorded by the interviewers, could be as high as 16 sources per square mile. Through the individual decision-making process, for which the author developed a model*, many sources are rejected, but decisions may

---

* A new model for this decision making process has been developed by Briscoe et al (1978). This gives the water agency insight into the various criteria guiding the choice of various sources for various purposes. With this insight, the agency can then better predict the acceptability of yet another alternative: an improved supply.

change over the course of time. With the provision of an improved supply, the perceived range of alternatives may simply be extended, unless the new supply is recognized as superior. Only then does a distance farther than the nearest puddle and/or payment for safe water become acceptable.

Distribution of Access Various types of access will influence the allocation, the design, the use and consequently the impact and the distribution of benefits of a new water supply. First, there is geographical access (Curtis, 1977 a), determined by the area whose inhabitants will use the supply. This provides an indication of the minimum number of water-points which will ensure all users reasonable access to the improved supply. Secondly, there is physical access or the efforts and technical means necessary to get at the water (G.F. White et al, 1972). A third type is social access (Curtis, 1977 a; Patnaik, 1961), such as problems in the sharing of a village water point by higher and lower castes.

Water Collection at Source Great national, regional and local differences may exist in water collection patterns. The following information will be useful for the design of the new facilities, for the more detailed planning and in the evaluation of the programme: the volume of the water collected by the various user categories; the type of containers used; the frequency and time of collection; the waiting time; the sex and age of the collectors; and the transport facilities used.
When children are frequently involved in water collection, for example, this will have consequences for the design of standposts and pumps. Collection practices that allow safe water to become polluted once it is drawn from the tap will necessitate a health education programme. An increase in quantity of water used can lead to a decrease of water-washed diseases and to productive uses of water. This characteristic can therefore become an intermediate variable for determining the impact of a supply (Curtis, 1977; Cairncross et al, 1980).
In addition, the information collected on these topics may also serve as a correction or reinforcement of the community's perception of the situation.

Water Journey Great differences may also be found in the water collection distance and the time needed to cover this distance (e.g. in hilly country). In the dry season, up to four hours were needed for water transport in Ethiopia (Kebede, 1978). In East Africa, the mean time spent daily on collection was 61 minutes in hilly areas and 27 minutes in more even country (G.F. White et al, 1972). Such information can be relevant for allocation priorities and the determination of project benefits.

Technical Evaluation of the Supplies This includes water quantity, quality and reliability of the supply. For water quality, it may be useful, from a health education and health impact point of view, to include tests of water sampled at various points between the actual supply and the point of consumption, where pollution or contamination may occur. These include water around the source and in containers used for transport and storage (Feachem, 1977). Heijnen and Conyers (1971) reported that Kreysler (1969) found acceptable concentrations of coliforms at improved water supplies in Ismani, Tanzania, but that the water from the overflow, which was also used for drinking water, was very heavily polluted. Coliform counts of water from the supply carried home in debes (kerosene tins) also indicated a significant increase. Similar experiences occurred when measuring pollution in collection and storage vessels in other countries (Feachem et al, 1978; Degoma et al, 1978; Norwood and Hughes, 1979; Pisharotti, 1978; Ghandhigram Rural Institute, 1977). Feachem et al (1978) found that storage in separate vessels increased the degree of pollution, since they were rarely cleaned, while collection buckets were rinsed at every trip.

Water Use The quantity of water used for various purposes can affect the design capacity and the need for additional provisions (e.g. cattle watering, laundry). Observation and discussion of water use is also important for the accompanying health education programme. In addition, water use can be a part of the evaluation of the effect of a water supply project. Measurement of water use may take into account the single and multiple use of a load; the volume used directly and the volume stored; storage provisions; primary and secondary use, e.g. for washing and watering of vegetables; and the feasibility of a division in consumption and working water (Cairncross et al, 1980; Curtis, 1977 a).

Traditional Supply Organization In some cases patterns of social organization may exist in relation to water control and distribution (Whyte, 1976). Knowledge of these patterns can be useful in the planning and implementation of construction, operation, maintenance and administration of the new supply, and may also help to avoid negative impacts, such as loss of employment for water haulers.

Sometimes customary laws exist on source protection, water use rights and responsibilities for maintenance. In some cases, the households concerned may take the initiative to carry out periodic clean-ups. In other instances users are forced to comply with community norms on pollution and maintenance by comments and group discussions at the source (McCullough et al, 1969; G.F. White et al, 1972).

Customary methods may exist for the management of fish ponds or small irrigation systems, or communal property may be endowed to a village institution like a temple or church (Feachem et al, 1978). Lees (1973) found many local variations in such provisions for small scale irrigation, reflecting local circumstances. Knowledge of existing social forms for the care of other communal facilities, such as a palm oil press (Obibuaku, 1967) or a market (Jackson, 1956) may also be helpful.

The existence of any local experts in water supply and waste disposal as well as in general technical matters can also be ascertained (Holmberg, 1952; Dubey, 1968). These include the identification of special opinion leaders.

Water Practices Finally, an investigation into the occurrence of specific water practices may provide useful entry points for a sanitation education programme. These include covering the top of the container with leaves or rushes to limit the spilling of water during the journey (Jahn, 1980; G.F. White et al, 1972), using a communal dipping vessel (Scotney, 1976), and habits of bathing, swimming, clothes washing and cattle watering. Positive practices may also exist, such as digging a hole near the river bed and using the sand as a natural filter (Dobyns, 1952; Scotney, 1976; G.F. White et al, 1972) or washing of hands before meals and after work (Messing et al, 1964). A classification of water and sanitation habits into good, neutral and bad may also prove useful (Holmes, 1964; Vervoorn, 1972; Widstrand, 1979).

Waste Disposal Conditions and Practices

In addition, information on the waste disposal situation may be collected, to assess the need for additional inputs or programme linkages, to facilitate detailed planning, and to establish a baseline for evaluation. Topics for study are, for example, the number, condition and place of refuse pits and compost heaps, drainage at water sources and in village streets, the number and types of latrines, the quality of their superstructure (permanent or provisory, covered top and seat, ventilation and water, rat-proofness, etc.).

The actual use of the facilities may show great variations . After all, latrines may be easily converted into maize stores or hen coops, just as in the past Dutch bathroom showers were often used for storing coal.

Skoda et al (1977) reported a 59.9 percent use of latrines (46.2 percent open type) for adults (usually women) in 120 villages in Bangladesh, but only 12.8 percent for children. Of the 525 latrines installed under the Gorakhpur Environmental Sanitation Project in India which served 11 percent of the households, 23 percent had covered seats and 20 percent had water stored near the latrine. More females used the latrines than males, and children's faeces were thrown on garbage heaps also used by older children to perform their natural functions (PRAI, 1968). The incidence of intestinal parasites in school children in a Philippine barrio was the only one of seventeen health indices which had not improved after a ten-year rural public health programme. This was attributed to unsatisfactory water supply conditions and latrine use (Tiglao, 1963).

Occupational differences may also influence the use of latrines: shopkeepers saw greater advantages in them than farmers (PRAI, 1968). Information on the occurrence of regular patterns for excreta disposal in the field (Kochar et al, 1976; Kochar, 1977) may be useful for adapting the programme to the needs of farmers; this was omitted in latrine building programmes against worm infestations in Egypt (Sandbach, 1975; Allen Scott and Barlow, 1938). Defecation habits in the field may also point to informal uses of excreta for productive purposes. These practices were found to exist in various forms in Latin America, although they were less universal and more taboo than in Asia. Nevertheless, such informal and individual practices could be used as a starting point for the introduction

of productive waste disposal systems (World Bank, 1978). Other practices, such as the disposal of garbage, the protection of food and ablution (Muhondwa, 1976; Hauk et al, 1956) can suggest adaptations to the technology, reveal other channels for transmission of water and sanitation related diseases and suggest fields for stimulative or corrective health education.

3. PUBLIC HEALTH

Existing Health Conditions

A study of the existing health conditions should survey the distribution of diseases in the area, morbidity and mortality patterns in general, and the incidence of water and sanitation related diseases in particular (Feachem, 1977a). Such information may already have led to project allocation. It will also affect the choices of technology and level of service. Only house connections and a regular supply will guarantee a general, continuous and exclusive use. For other solutions, health education combined with regular evaluation of use and feedback will be needed. In some cases nutrition may demand specific attention, so that special inputs are called for, such as food-for-work programmes during the construction of the facilities, or additional agriculture or nutrition projects (improved agricultural seeds, vegetable gardening, school feeding, etc.).

Primary Health Care Organization

In section 1 on village characteristics the link with programmes for preventive health has already been mentioned. But some aspects may need some special attention: the Primary Health Care (PHC) system's potential for registering public health impacts; the presence and functioning, or intended formation of village health committees (Isely and Martin, 1977); and the existence of health education as a subject in the local primary and secondary school curriculum.

Information on these last two topics can be relevant for organizational arrangements for continuous sanitation education and other ongoing activities in the field of environmental health. Such arrangements can

increase the chance that the project has an impact on public health. The demonstration of such an impact is difficult however. Assessment of the potential of the existing PHC organization to provide some assistance can facilitate the design of operational research projects.

Health Knowledge, Attitudes and Beliefs

The investigation of water and sanitation practices has already been mentioned in Section 2. In addition, information should be collected on underlying health and sanitation beliefs and attitudes as well as on the degree of knowledge of the relation between water, sanitation and disease. This information can be used in the sanitation education programme.

Specific beliefs may include: the idea that running water is always safe (G.F. White, 1974); that fermentation makes home-brewed beer safe regardless of the quality of the water used (Messing, 1970); that the faeces of children are harmless (PRAI, 1968); that the faeces of people or fathers and daughters should not be mixed (Hall, 1978; Yeboah, 1979); that cattle do not pollute water (Messing et al, 1964); that washing with cold water causes disease (Scotney, 1976); that bad smells cause disease (Messing, 1970); and that using an outdoor spot as latrine is more hygienic (Chandra, 1964; Hall, 1978). Such beliefs can set very strict norms for behaviour especially when they are part of a whole system of ordering and classification (Douglas, 1966; Whyte, 1976).
In addition, more general attitudes may exist on the causes of disease in general, and water-related diseases in particular, on their seriousness and on their avoidability (Bennett et al, 1964; Chen, 1970, 1971; Dube, 1956; Gould, 1965; Lindenbaum, 1968; Mann, 1967).
In Latin America and the Indian subcontinent many cultures classify diseases into hot and cold, which leads to a totally different interpretation of the relation between disease, food, drinks and medicine (Logan, 1973; Lozoff et al, 1975). Wellin (1955, 1975) described the problems of a rural health worker in a Peruvian village when introducing the use of the boiled water which was culturally linked with illness in the village. Some people may have sufficient knowledge of the relation between water, sani-

tation and diseases *, but do not think these diseases serious, or say that they have a natural immunity, or that they will not be exposed to them (Kar, 1970; Vertinsky et al, 1972; Scotney, 1980). In other cases, particularly in areas with a high incidence of these diseases, they may be considered inescapable. When 250 inhabitants of Ibadan, Nigeria were interviewed during an outbreak of cholera, 98.9 percent were aware of the epidemic, and over 80 percent knew how the disease was spread, but 70.8 percent accepted cholera as a local disease (Adeniyi, 1972). Nevertheless, previous experiences of an outbreak of a highly infectious, water-related disease in the area or in a neighbouring district may serve as a special entry point for a water and sanitation action programme (de Guzman, 1977; Medis and Fernando, 1977; Scotney, 1976).

Perceived Health Benefits

Improvements in personal and family health may not be among the first of the advantages of an environmental sanitation project as seen by villagers. For example, appreciation of a rural composting project was mainly economic; despite extensive health education, health improvement was rarely mentioned spontaneously as a reason for adoption (PRAI, 1970; Srivastara, 1969). Adopters of latrines in Gorakhpur, India, appreciated privacy and convenience more than a decrease in disease (32, 21 and 11 percent respectively). Health advantages were acknowledged even less by non-adopters (PRAI, 1968). In the same project, adopters of handpumps saw the benefits of pollution-free water most of all (61 percent). Non-adopters, however, named convenience as the greatest benefit (83 percent).

Belcher and Calcerrada (1972) also found a relative unimportance of health considerations in comparison with esthetic and economic reasons for environmental sanitation practices.

---

* This knowledge may vary considerably for the particular diseases. In a latrine adoption programme in 15 Indian villages, knowledge about the symptoms of dysentery and cholera was much higher than about typhoid or hookworm; only cholera was recognized as an infectious disease (PRAI, 1968)

In four case studies on improved water supplies in Kenya, the felt benefits for personal and family health were much lower than those for farming and cleanliness (Whiting and Krystall, n.d.). These and other data (Feachem et al, 1978) suggest that, without health education, no link may be seen between safe water, good sanitation and a better hygiene on the one hand, and improved family health on the other.

4. ECONOMIC CONDITIONS

Migration

The existence of (seasonal) migration may influence the allocation policy; the design of the supply; the feasibility and timing of participation in construction; the feasibility of participation in operation and maintenance; the environmental impact; the distribution of benefits and the willingness to pay and the payment system chosen.

When studying the differences in latrine adoption in a Brazilian village, Oberg and Rios (1955) found that the heads of the poorer families were either dead, ill, gone away or were migrant agricultural workers living in rented houses, and that neither tenants nor owners were interested in any house improvements.

Training of local caretakers for handpump maintenance in Shinyanga, Tanzania, was unsuccessful partly because the villages were permanent, but the population was not (Bonnier, pers. com.). Similar situations of a high transmigration exist in many low-income urban areas (G.F. White, 1978). High male migration may also mean that women, rather than men, should be trained as operators and administrators (Feachem et al, 1978).

Streefland and Streefkerk (1980) warn against the environmental effect of a decrease in seasonal migration, as a result of better water supplies in Gujarat, India.

Households in Botswana have three separate locations: village, cattle post and farming plot. This limits the health and economic impact an improved village supply will have. The greatest benefit of a piped supply goes to

the permanently settled inhabitants: the administrators and the business class. Moreover, migrating villagers resented paying the same amount as non-migrants for benefits they do not get the year round. And the tendency of permanent migration to the land versus a policy of water supplies for concentrated settlements only further limits the distribution of benefits to the non-farming population (Harlaut and Hansen, 1978).

However, migrants to urban communities often are willing to contribute to improvements in their home village (Cardenas, 1979; Müller, 1978). This may even go so far that they refuse to pay for improvements in the urban community where they temporarily reside (Müller, 1978).

Ability to Contribute

What can the community contribute economically to the project in cash, local materials, labour, transport and services? Is there a labour surplus in the area ? What are its characteristics ? Has the community participated in similar projects before ? What are the possibilities for the role of women? What are the payment histories for water (e.g. through vendors), schools, clinics and similar services ? (Curtis, 1977 a; Scotney, 1976)

The capacity to pay will affect the solutions possible and/or the financing system; the variation in the payment capacity of groups within the community may affect service levels, construction contributions and rates. Where a labour surplus exists, labour intensive construction methods can be used with voluntary or paid unskilled labour, leading to lower construction costs or short-term employment benefits.

Information on the spread of income over the months of the year can also be useful for later arrangements on the frequency and timing of water-rate payments. They can, for example, be linked to the harvesting and marketing season for cash crops.

Vested Interests

When existing supply organizations and water journeys are studied, the information on source ownership and professional water/waste collection should be analyzed, as they may play a positive or a negative role in the local socio-economic situation and can lead to willful damage. The use of a source for drinking water supply may affect irrigation of nearby farms (Segaar, 1979). Professional water/waste collection may be seriously affected. Jacobsen et al (1971) found that in the control area of a water supply study 30 percent of the farmers and 12 percent of the villagers employed water haulers. But in an area with a piped supply, this percentage had dropped to 10 percent of the farmers and none of the villagers. Similarly, local sweepers may find themselves out of a job with the installation of latrines which are connected to disposal, decomposition, or sewage systems, instead of being cleaned by more labour-intensive methods (Streefland, 1977).

These redundant people can be employed in the new supply organization as operators or as water kiosk attendants such as in Kenya (Perrett, 1980), or given occupational training and compensation (WHO, 1978). In other instances, there is more a need for the improvement rather than the replacement of the service. Examples of such an approach are night soil collection in Shanghai and garbage collection in Medellin, Colombia (Etherton, 1980).

The challenging of vested interests may also be a positive aspect of a project. In the Philippines, people frequently spent one-eighth of their income on drinking water alone (Rep. of the Philippines, 1977). The cost of water delivered by a vendor can be as high as US $2.5 per m^3; the same amount from a house connection in the same town costs 0.1 US$ (A.U. White, 1977). The profits for an employer of water vendors and/or night-soil collectors can be considerable. Etherton (1980) records how a boy employed by a landlord in Kabel could serve three to four houses every 20-30 days for a payment of US$ 0.25-1.25. This sum went to the landlord who also used or sold the night soil collected by the boy as manure. In return the boy's family was paid one kharva of wheat per year.

Perceived Socio-Economic Impacts

Topics for impact studies are the use of wastes, time-gains, increased water quantity, access and reliability, and decreased health costs.

G.F. White et al (1972) have attempted to measure the economic impact of water supply improvements in terms of health costs and time and daily energy gains through shorter water journeys. Curtis (1977a) and Feachem et al (1978) used time budgets, or the relative amount of time spent on productive, domestic, social and leisure activities in a woman's day during the peak agricultural season. In Thailand, it is estimated that 100,000 tons of rice are lost each year to ascariasis alone. People have to eat that much more food just to compensate for what is taken by worms (WHO/IRC, 1978).

Jakobsen et al (1971) found more participation in women's groups, co-operative societies, local councils, school boards and church groups in a central Kenyan water scheme area than in a control area. They attribute this to the reduced water collection time in the project area. Such socio-economic impacts may be perceived as positive by the community members, as in four other Kenyan villages which ranked the following in order of importance: general farming benefits; household benefits; and social benefits in the form of more time for the attendance of meetings and adult education classes (Whiting and Krystall, n.d.).

An investigation of the perceptions of various local categories on such impacts may well reveal useful information. There may be specific constraints to otherwise possible productive uses of water or time gains, such as a lack of vegetable seeds or lack of adult education provision. People may intend to use water for purposes which have not been foreseen by the agency.

If the supply is expected to serve productive purposes, like vegetable gardening and dairy cattle production, or even to be used for fire protection, larger water quantities and better access may be necessary, which may have consequences for the design and the siting of the supplies.

The presence of grade cattle, in particular, can contribute considerably to the appreciation of the economic value of an improved supply provided the design and management have been adapted to it* (Fenwick, n.d.; Jakobsen et al, 1971; Vierstra, 1977; Whiting and Krystall, n.d.).

Where such expectations on secondary uses of a supply are frustrated, negative attitutes towards maintenance can follow. The prohibition of irrigation and cattle watering in water supply schemes in Embu and Kitui, Kenya, was one of the factors identified by Scotney (1976) as contributing to their poor record of damages and non-payment of water rates. Similarly, the acceptance of the use of waste for composting or biogas may require adaptations in designs and programmes (World Bank, 1978). These will include provisions to make the adoption profitable for all, such as an attractive pricing policy and a market mechanism for organic waste (McMichael, 1976).

General Economic Conditions

The production situation in the community may be such that additional stimuli are necessary before people can optimally profit from the improved circumstances. A more detailed study may sometimes be necessary of the general economic conditions, such as sources of income, division and size of land holdings, farm implements, labour division etc. (Kebede, 1978) A rigid division of labour may increase rather than alleviate the workload of the rural women. From four case studies on improved water supply in Kenya, it emerged that water carrying by housewives, as the only water carriers in the family, increased as the distance to be covered by them decreased (Whiting and Krystall, n.d.). A similar situation was found in Guatemala (World Bank, 1978).

* People may not want additional uses if they have to pay more for the water necessary. But if flat rates are applied, larger cattle owners will profit excessively. A careful pricing policy for inputs and outputs will thus be important.

In West Africa, time and energy gains of women will often be spent on the husbands' cashcrops from which women do not benefit to the same extent. When a woman is able to spend such gains on her own crop and produces a marketable surplus, her husband may refuse to give her money for school fees and clothes, claiming that she herself is now earning money for these purposes (Müller, 1978).

The economic conditions of some groups may also be a barrier to the improvement of sanitary behaviour. There can for example be factors which prevent the regular buying of soap, the acquisition of hygienic water containers and filters and the boiling of water (Wellin, 1955, 1975). Such conditions demand special adaptations within the programme, such as changing the sanitation education messages or developing local solutions (see Chapter VI).

5. ENVIRONMENTAL SANITATION PROGRAMME PERCEPTIONS

In the preceding categories, the perceptions of the economic and health benefits of many environmental sanitation improvements have already been mentioned. The collection of more detailed information about such perceptions can be valuable since such perceptions will greatly influence the use and maintenance of the completed facilities.

Perceived Problems and Priorities

The condition for the successful adoption of innovations that "they should answer a felt need" is a rather vague one, because there are many unsatisfactory conditions in rural communities, and any offer to improve one of them may immediately make it a priority on the list of village problems. Nevertheless, other village problems than water and environmental sanitation may have a higher priority in the eyes of the people. This may necessitate more motivation and may even affect its feasibility.

Perception, by the villagers themselves, of specific water supply and sanitation problems will also provide some background knowledge on how

people feel about their situation, and thus help to shape the list of topics for discussion with the community. These problems include those studied under the existing health and environmental sanitation conditions: reliability of the supply, including drought experiences (Versteeg, 1977); taste and appearance of the water; time and effort needed for water collection and smell, fly, rat and safety problems of waste disposal facilities.

Even when community representatives have taken the initiative to request an environmental sanitation programme, it may be necessary to find out whether this was done because the community, as a whole, realized its desirability on health grounds, or whether the initiators requested the programmme for other reasons, political (the local member of legislature, for example) or professional (the local health inspector). Such factors will have considerable consequences for the intensity of the community participation and education programme (Cardenas, 1978; Chen, 1968).

Additional Perceived Benefits

There may be many perceived positive impacts of a water and sanitation programme other than just economic and health benefits. People may favour adoption of the facilities as such, without any accompanying changes in hygienic behaviour or increased development in other fields. Educational programmes which stress the intended benefits as well as the perceived ones will be needed, to achieve all the objectives of the agencies, and not just the adoption of the innovation itself.

Favour for the adoption of a household latrine may find its origin in its compatibility with value systems demanding privacy and seclusion for women, its convenience for the sick, the aged and for those people with a profession which ties them to the house (Kanungo, 1957; PRAI, 1968). The latrine may also become a status symbol (AFSC, 1959; Chen, 1969; Feliciano and Flavier, 1967; Kanungo, 1957; Kar, 1969; Krishna, 1967; PRAI, 1968). The opposite may also occur, however.

De Winter (1972) mentioned Hopper (1967) who described how villagers in Malawi were ordered to construct latrines during the colonial days. This resulted in a large number of latrines being built, but not used. Latrines became associated with the idea of colonial power so that, after independence, not to have a latrine was considered to be a sign of political integrity rather than of poor hygiene. Similar experiences with a compulsory construction programme were noted in Guatemala (World Bank, 1978). Nearly half of the families of the three highest castes in an Indian village rejected latrines, because they could afford to hire the services of a sweeper, as befitting their prestigeous position (Chandra, 1964).

Similarly, other environmental sanitation facilities may be accepted, for reasons of convenience, to raise the status of the family, or of the village in inter-village competitiveness, or simply to comply with government wishes (Dube, 1956).

Constraints to Improvements

Not every improvement introduced in the community will be acceptable for all the villagers. Of the 6,266 sample households interviewed in Athoor, Tamil Nadu, India, only 7.7 percent had latrines; 64.4 percent said they had no space for such a facility (Subburaman and Muthiah, 1976). Special adaptations in design, service level or siting are then called for (WHO, 1978), taking into account such consequences as maintenance and limitations for use by women and children. Other constraints can necessitate adaptations to the motivation and information programmes, or to organizational and administrative arrangements.

Some people may fear a negative impact on the traditional role of education for women and children (Dube, 1956; Misra, 1975; Versteeg, 1977). Others may object to losing a much valued gathering place for women or courting youngsters when a new water supply or latrines are introduced (Foster, 1962, 1973; Kanungo, 1957; La Platt, 1973; Whyte, 1976).

But the perceived necessity for social contacts through such common facilities may also be overrated. G.F. White et al (1972) found that East

African women preferred to use private water sources instead of communal ones. This finding was also reported for a number of Latin American countries (World Bank, 1978).

People may doubt whether an improved supply will alleviate the problems of the old one, e.g. in matters of pollution (Misra, 1975), and of reliability (Misra, 1975; Twumasi et al, 1977). They may mistrust government intentions or technicians (Ademuwagun, 1975; BURGEAP, 1974; Derryberry, 1954; Dube, 1956; Messing et al, 1965; Misra, 1975; G.F. White et al, 1972). They may doubt the facilities' ease of operation (Kar, 1970), or have a highly unrealistic expectation about the impact of the project, such as the disappearance of all intestinal diseases.

Others may lack the willingness to walk a longer distance than the next rainwater pool to reach a better quality supply. In highly rural areas of East Africa, over 50 percent of the respondents were against payment for water (G.F. White et al, 1972) which is not surprising since water has usually been a free commodity in those areas. Misra (1975) and Chandra (1964) also found expected payment for a water or filtration service a constraint to the adoption of an improved supply. Such information is suitable content in the dialogue with the community. This in turn will suggest adaptation of the message, for example, that the water itself is still free but that payment is required for better quality, quantity and reliability.

Finally, the villages may vary in their willingness to cooperate within the community or with neighbouring communities, especially when facilities have to be shared, or when the scope of the project is extended.

When investigating these perceptions, it may be necessary to pay special attention to those groups which are potential stumbling blocks in the adoption process, such as village authorities and leaders of the various subdivisions, traditional medical practitioners, local water and sanitation experts, and water vendors, etc.

Underlying Value Systems

In its paper on health education, the Eastern Mediterranean Office of WHO (1977) stressed the importance of building education on basic values. The value of children is a universal one which fits very well into a health education programme, but other values can also be used. Emphasis can be put on the prosperity, well-being, and prestige of the family or kin group (Dube, 1956). Unity of the village may be a value despite an obvious lack of cooperativeness (Foster, 1973; F.C. Miller, 1965; World Bank, 1978). Making provisions 'for the future' was little valued by Navajo Indians in a dam building project; voluntary labour was not given until the project was translated into terms of bargain and obligation (Hall, 1964). In the Philippines, use was made of the hiya complex, whereby a person loses face when he does not fulfill a public commitment (Feliciano and Flavier, 1967). Links with religious and traditional concepts and practices of hygiene may also be helpful (Ademuwagun, 1975; Foster, 1973; Gupta, 1970; Khare, 1962; Kochar et al, 1976; Kochar, 1977; Singh, 1966).

6. COMMUNICATION PATTERNS AND ADOPTION OF INNOVATIONS

Communication Channels

For an effective extension approach, some information on existing and potential community communication channels will be very useful for the adoption of new technologies and behaviour. Within the community there are key persons, key occasions and locations. Examples are the weekly market (Tomic et al, 1977); post-office (Morfitt et al, 1969); after-service church meetings (Pacey, 1977); evening gatherings under the village tree (Misra, 1975); fairs (Courtejoie et al, 1978); religious festivals (Holmberg, 1952); coffeehouses, threshing floors and bakeries (Derryberry, 1954); and the water collection sites.

Some gathering places and occasions such as annual fairs (Derryberry, 1954) and clinic waiting rooms will be less suitable, as people's minds will often be too preoccupied with other matters (Locketz, 1976). The absence of common meeting places may require the creation of special public gatherings (Gumperz, 1964).

An inventory of the modern and traditional, national and local communication media, in use as well as potentially useful, may also suggest ways for local involvement in the diffusion of information. Examples are: radio (with regional or tribal programmes); radio forums (Hall, 1974, 1978; Hall and Dodds, 1974); newspapers, posters, banners (Medis and Fernando, 1977); puppet shows, folk opera, street and radio-car announcers (Derryberry, 1954; Lin and Burt, 1973); local singers and storytellers (Gumperz, 1964; Patnaik, 1961); song and dance groups (Dube, 1967); and local drama groups (Kidd and Byram, 1978).

The role of professional extension workers has already been mentioned (section 1). It will be necessary, however, to pay some attention to the perceived credibility of these sources. Rogers (1972) reported research by Ramos (1966) and Herzog (1968) which showed that a high degree of government control of the media had a negative influence on its perceived trustworthiness and competence. Oyugi (1973) and Martens (1966) described the negative attitude to meetings with government officers based on earlier unfavourable experiences. Kidd and Byram (1978) developed their popular theatre campaign because interest in village meetings as a tool for village development was found to be steadily declining.

Decision-Making Patterns

Decision-making patterns for community and individual affairs may differ from situation to situation. Cultural differences may exist in the role of women (Fanamanu and Vaipulu, 1966; Kebede, 1978, Michelwait et al, 1976). A village consensus may be reached in many ways, through authoritarian leadership, informal consultation or public confrontation (Fathi, 1965; Guggenheim and Fanale, 1979; Whyte, 1976; World Bank, 1978). Consensus may also result from the acceptance of the majority's stand with the opponents either withdrawing or keeping silent (Dobyns, 1952).

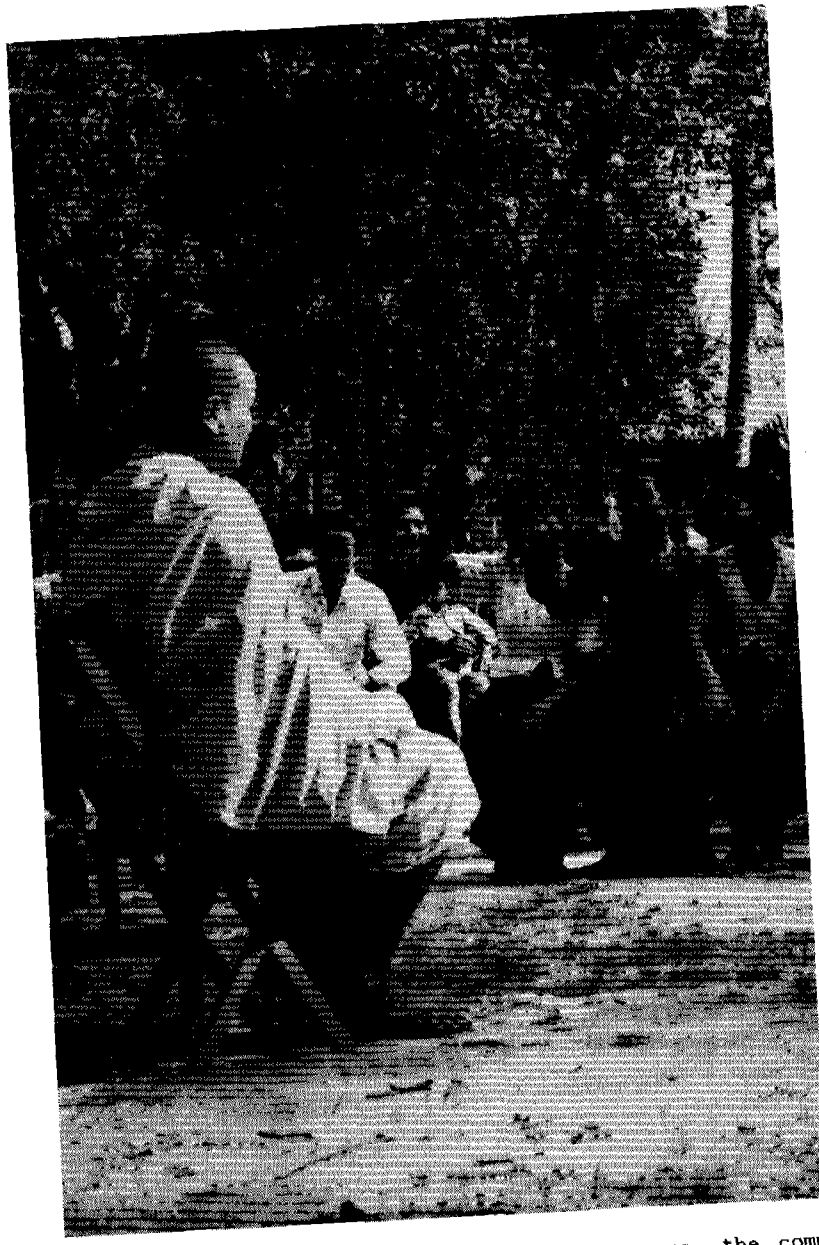
Patterns of advice-seeking behaviour, before any individual decisions are taken, may also show a varied picture (Amsyari and Katamsi, 1978; PRAI, 1968). Some background knowledge about such patterns will facilitate the proper organization of community participation in project decisions, as well as the identification of key figures and target groups in the motivational and educational programme.

Intra- and Inter-Village Rivalries

The existence of intra- and inter-village rivalries may constitute a constraint to the successful adoption and continuation of a project. This is especially so when the design calls for a combined use of the facilities (Fanamanu and Vaipulu, 1966; Khare, 1964; Patnaik, 1961; Scotney, 1976). But such rivalries may also become stimulants, because the various parties compete in the construction (Foster, 1962, 1973; Patnaik, 1961) or because the successful completion becomes a challenge (Holmes, 1964; Jakobsen et al, 1971; Van der Laak, 1969; Vierstra, 1977).

Adoption and Cooperation History

Fields in which information can be collected are the history of the successful adoption rejection or discontinuation of previous innovations; a progressive and a conservative division on the adoption of innovations; and experience with development programmes of outside agencies (Morfitt et al, 1969). Traditional and modern cooperative patterns could be analyzed, like the dokpwe system in West Africa; the combite system in Haiti (Foster, 1973); shramdan in India (Dube, 1956); tequio in Mexico (Lees, 1973; Whyte, 1976); harambee in East Africa; letsoma in Lesotho (Feachem et al, 1978); and traditional cooperatives in southern Ethiopia (Messing, 1968). This knowledge will be useful for community involvement in the construction phase. It may also reveal possibilities for the shared use and maintenance of private environmental sanitation facilities. The extended family and clan system, for example, favoured the adoption of comfort stations in Nigeria (Ademuwagun, 1976; Adeniyi, 1973; Pineo and Subrahmanyam, 1975). In Latin America a willingness to share latrines was found among those with whom a day-to-day working relationship already existed (World Bank, 1978). Formal arrangements for maintenance will, however, still be necessary in most cases, such as special attendants or a roster system, with explicit rules and regulations.



To participate purposefully in the decision process, the community needs to be well informed about the project. (photo: UN)

III INFORMATION FOR THE COMMUNITY

The field studies, necessary for the collection of information on topics discussed in the previous chapter, may in themselves spark off the interest of the community, as has been observed by G.F. White et al (1972). They wrote: "We were careful to avoid suggesting that the study would result in any direct action by public or private agencies and we guarded against raising false hopes, but we did not avoid stirring up local discussions of sources and their quality. Such discussions could hardly lead to anything but improvement, for they widened the range of choice in many instances and caused people to think about what could be done locally".

No less important, however, is the flow of information from the agency to the community, through which the community receives an answer to its verbalized and non-verbalized questions resulting in further discussion and dialogue.

1. THE NEED FOR ENVIRONMENTAL SANITATION PROGRAMMES

Environmental health conditions and disease transmission

The picture emerging from the agency's investigation of the sanitation and health conditions will have to be shared with the community (Cardenas, 1978; Fanamanu and Vaipulu, 1966; de Guzman, 1977; Kreysler, 1970). If this shows an insufficient realization of the need for a better water quality, quantity, accessibility and reliability, these aspects should receive special emphasis. One should demonstrate the link between poor water quality (whether at the source or between collection and consumption) and the prevalence of certain diseases and their hidden costs.

Similarly, the health advantages of hygienic waste disposal should be stressed. Additional advantages can also be discussed, like a decrease in

smell, fly and rat problems; increased attractiveness of village and house; cleanliness as a village and household status symbol; greater household conveniences and privacy; and use of waste for composting.

Links with socio-economic development

Although an improvement in local health conditions will usually be the major objective of the programme, its socio-economic impacts and connections with other development activities may also be discussed, such as rural composting, livestock breeding and husbandry, nutrition and family welfare. These topics become imperative when there are specific problems or planned or ongoing programmes in such related fields. Cooperation between the various extension workers and coordination of their messages and approach is essential.

2. THE CHOICE OF SYSTEM

The presentation of potential solution

There will be various solutions by which the sanitary goals can be achieved. Many authors stress the importance of presenting the community with the various feasible technological solutions, ranging from simple source protection and pit latrines to multiple house-connections and other higher levels of service (Feachem, 1976; Versteeg, 1977; G.F. White et al, 1972; Derryberry 1954; Vierstra 1977, WHO/IRC 1978; World Bank 1976b; Whyte 1976; and Whyte and Burton 1977).

Failure to discuss alternatives may lead to the ultimate failure of the project, if the service provided does not correspond with the expectations of the community. Saunders and Warford (1976) reported how a water supply scheme for 400 villages in Latin America failed because it provided public fountains instead of the desired house connections. Poor maintenance of the standposts and rate-paying problems led to an extension of the scheme. A number of house connections were then added but this caused economization on the construction costs in order to meet the construction target. The poor quality of the final supply systems resulted in frequent breakdowns, further problems in community contributions, and the ultimate abandonment of the scheme.

In small-scale projects a direct involvement of the community in the choice of technology and level of service will be more feasible than in large-scale programmes. In the latter, knowledge of the socio-economic and cultural background of the communities (i.e. their supply, alternatives, preferences and practices) will facilitate the selection of the socially most appropriate technologies. Perrett (1980) therefore advocates the routine linkage of social information about the target groups to the usual technical-economical study. The preliminary choice of the agency can then be presented to the individual communities for a discussion of local adaptations.

Kates (1973) and Whyte and Burton (1977) pointed out that this community choice should include the possibility of rejection of any immediate source improvement such as when the village prefers to wait until house connections for all can be afforded. Postponement will mean that improvements in environmental health will depend on individual water and sanitation practices, like water boiling and personal hygiene. A programme of health education and village commitment to behaviour change can then replace any more direct improvements in the environmental sanitation system.

Although this may seem a negative outcome, the authors argued that each community applies its own criteria and its perceptions may differ considerably from those of the agency. Besides, community choices will ensure a greater commitment than solutions presented from outside.

Consequences for the community

Presentation by the agency of potential solutions, and their technical suitability, should include the consequences that they have for the community.

The geographical scope of the technologies can vary considerably. Some groundwater sources and rainwater collectors serve individual households or small groups, other projects consist of multi-village piped water supply schemes. This will have consequences for the cooperation within and between villages. In West Java the way in which the engineer had grouped the

households for the joint use of rainwater storage tanks in a project was unacceptable for the villagers (Segaar, 1979). Villages in Tonga and Cameroon objected to the sharing of a supply with hostile neighbours (Fanamanu and Vaipulu, 1966; Müller, 1978).

Possible consequences for the socio-economic position of the various village categories should also be considered. The lump sum demanded for the installation of Unicef tube-well handpumps in Bangladesh made them affordable only for the rich. (Chowdhury, 1978). The shallow wells left for use by the poor ran dry when too many tubewells were later installed.

In a piped supply system, a combination of private house connections and public standposts is often found. When too many cheap or free standposts are provided, few people will accept a house connection. This is especially the case when the health advantages of a house connection are not realized. A husband will then consider a house connection a luxury which he provides for his wife to relieve her of one of her traditional tasks. Thus, the agency can be tempted to limit its number of public standposts to a token number, to stimulate the adoption of house connections. As a result many of the poorer people who cannot afford this service will continue using contaminated sources.

There will also be financial consequences which the community should know about in advance such as the varying installation costs and the proportion of them it is expected to bear. Some technologies will have greater potential for self-help labour and use of local materials than others, and their use may have a cost-reducing effect. Recurrent costs will vary, and a greater role in operation, maintenance and administration by members of the community may also cut down expenses.

Early information on the specific cost-reducing effects of high-quality voluntary labour for the community may provide a stimulus to contributions and performance. Carruthers (1973), for example, suggested that the agency translate the financial value of this labour into the dispensation of water rates for a certain period for the whole village. In Colombia, each family that contributes labour is compensated in the form of a reduction in subsequent water rates in proportion to the value of the work done (WHO/IRC, 1978).

The community must be made to realize that the system that is the cheapest to build is not always the best bargain. As a source for a piped supply in Funta, Tanzania, two wells were available. The first well was situated downhill, at a distance of one kilometer from the village. The second well was uphill at a distance of three kilometers. It had a smaller flow than the first well so that a night storage tank was necessary. The construction of the tank and the longer pipeline made the use of this source initially more expensive. At first the villagers therefore opted for the use of the downhill well. But the agency was able to demonstrate that the pump for this downhill well would entail more problems of operation and maintenance, including recurring petrol costs. In the long run the second solution would therefore be cheaper. Moreover, the costs of the tank would be brought down by the use of local labour and materials (Matango and Mayerle, 1971).

The costs for the installation and operation of improved environmental sanitation facilities can be compared with the costs of other improvements (like a hospital) which may be perceived needs in the community (Adeniyi, 1973; Misra, 1975; G.F. White et al, 1972).

The various designs may also have consequences for further development, such as the impact of water on agriculture and livestock and the recovery and recycling of waste products.

The complexity of the design will usually correspond to the complexity of organizational arrangements. With a simple design, a caretaker may suffice for the regular maintenance and simple repairs and to ensure proper user practices. Caretakers can be given additional sanitation education tasks within the health education system. More complex designs will demand increasingly complex arrangements for operation, maintenance and administration; the training of more voluntary or paid community members will be required.

Through a discussion of such consequences of the various technical possibilities, the community will go beyond its first interest, which is often limited to the direct costs and the level of service. A better motivated choice, made by the agency and community together, can then be expected.

3. AGENCY EXPECTATIONS OF COMMUNITY ROLES

Conditions for implementation

In some cases conditions have been laid down by the agency to test the community's willingness to participate actively in the programme.

A frequent condition is the financing of part of the construction costs. The problems of such a condition as part of the selection procedure have already been discussed. Collection of payments can take place after the preliminary allocation of the project. Adaptation of the amount to the financial capacity of the community is necessary. In some cases, e.g. Colombia, a socio-economic survey is carried out to determine this capacity. In Andhra Pradesh, the average gross income of the village council over the last three years is used as an indicator. Another important aspect is the determination of the household contributions to this total amount. People must know how much they will have to contribute and on what criteria this decision is based. This topic is worked out in more detail when the responsibilities of the local organisation are discussed.

Other conditions for final allocation can be the removal of public dung hills and rubbish heaps (Funck, 1976; Holmes, 1964); site and access road preparation when no siting problems have to be solved; the construction of animal enclosures; the construction and use of latrines (Buckles, 1978; Goyder, 1977); the building of concrete platforms before installation of a handpump (Raman, 1962); the stocking of local materials; and (re-) forestation of the catchment area (Agua del Pueblo, n.d.), etc. A discussion of these conditions and their fulfillment by the community will of course be necessary. Deadlines for the minimal payments will also have to be drawn up, as it is difficult to collect these once construction has started.

Participation in the planning and execution of the installation

After participating in the choice of the system, the community can be expected to contribute in the actual installation of the facilities. This

contribution may take many forms, from physical labour to the housing of the construction team. Although most details will have to be arranged at a later stage, the community will have to know whether it is expected to contribute labour, cash, service or materials, and what responsibilities it will have in the organization of these contributions.

In Jamaica for instance, the construction of new water supplies is the full responsibility of the national water authority (Lawson, pers. comm.). In Bangladesh and India, contractors are used (Pineo, 1976 b; Sandhu, pers. comm.) and in the Dominican Republic a combination of self-help labour and contractors (Pineo, 1973, 1976 a).

Other possibilities are a food-for-work programme, the use of local labour hired by the agency or by the community itself, the use of voluntary labour, or any combination of these approaches (Patnaik, 1961).

Participation in operation, maintenance and administration

The community should have a clear view of its role after the completion of the system, and of the increased public health risk when an improved supply is not properly maintained and used.

As mentioned above, the community may have to provide local people to serve as caretakers for the supply, or to be trained in operation, maintenance and administration. Occasional voluntary labour may be needed for some maintenance or repair tasks, which may or may not be compensated for in some form.

In most cases water rates are necessary to repay construction loans, pay operation, maintenance and administration costs, and prepare the way for future extensions, possibly environmental sanitation improvements in other communities. It may be useful to stress here that rates have to be paid by all users, and that penalties should be attached to non-payment. Rates which pay no regard to the varying distances to the nearest supply point or to the volume used may influence the willingness to pay. Both Chandra (1964) and Scotney (1976) found that people living farther from an improved supply were less willing to pay the full rates.

Whether rates should be flat or weighted, will depend on many circumstances but early discussion of this topic will help prevent payment problems later on. Rates can be weighted according to the water volume consumed; to the walking distance involved; or to the income of the users, perhaps even in the form of levies on cash crops (A.T. White, 1978).

Finally there is the matter of community representation. There are many options for the components of such a local body; including local authorities, councils, development committees, traditional bodies, cooperatives, women societies, the local party structure and newly formed (sub)committees. Two basic opinions have been voiced in the literature reviewed.

Feachem et al (1978) advocate a standardized approach: that the agency should choose the most appropriate overall system for village-level management of water supplies. They developed a typology for such a choice, advising the use of democratically chosen committees (see chapter VII). Curtis (1977 a) developed three administrative models: direct administration, self-help and controlled self-help. Such a standard approach does exist in many Latin American countries, e.g. Argentina (Rep. of Argentina, n.d.), Colombia (Rep. of Colombia, 1975), Dominican Republic (Pineo, 1973 a, b, 1976 a), Ecuador (I.E.O.S., 1980), Guatemala (Agua del Pueblo, n.d.; Buckles et al, 1978), Nicaragua (Zuniga, 1977), Paraguay (Cardenas, 1978, 1979). Some flexibility may exist, e.g. in the size of the administrative committee (Republic of Peru, 1977). A standard approach with considerable flexibility is also followed in the Malawi piped water supply programme (Glennie, 1979).

Whyte and Burton (1977), however, criticized the notion of a standardized approach. They stated that the standardization of community participation schemes in patterns of cooperatives, or elected committees, does not allow scope for the finer nuances of community organization and social differences.

They pointed out that, even within a confined and homogeneous area, subtle differences may exist. In a study of 22 villages in the Oaxaca Valley in Mexico, a compact unit with few ecological and socio-cultural differences,

a great variability was found in arrangements for maintenance and administration of the irrigation system, including water allotments and water rates (Lees, 1973).

Perrett (1980) also favours ad hoc arrangements based on the particular organizational situation in each community. She developed a checklist to determine the capacities of the existing community organizations. With the help of this list, the agency can assess the effect of the involvement of such organizations on the project efficiency, effectiveness and distribution of benefits.

Such an ad hoc approach will be easier to realize in an individual project than in a large-scale programme. Even when a standardized approach is chosen, it is possible to take local conditions into account, however. It just means following a more gradual and flexible approach and allowing more time to make a final decision. Where the programme demands the election of a new committee, this additional time can be used to work out the committee's relationship with the existing authorities to avoid competition. Where an existing organization is involved, this time can serve to look at the representativeness and prestige of this organisation for the purpose of a drinking water supply or sanitation project.

Public and private sanitary behaviour

When the community realizes the need for environmental sanitation programmes, it should also understand that its health objectives in particular cannot be reached without changes in the behaviour of the people. Water that is safe at the point of supply often gets contaminated through unhygienic collection, storage and water drawing. This is clearly shown by E.coli counts at the source and/or in storage vessels. (Browne, 1974; Degoma et al, 1978; Gandhigram Rural Institute, 1977; Kreysler, 1969; Norwood and Hughes, 1979).

When evaluating village water supplies in Lesotho, Feachem et al (1978) found no differences in the water-health relationship for villages with and without an improved supply. They concluded that a package of environmental

sanitation facilities should be provided, including pit latrines, provisions for bathing and clothes washing, and better curative services, and that a programme of health education directed at specific unhygienic practices was necessary.

Similarly, Levine et al (1976) found that tubewell users in Bangladesh did not have a lower incidence of cholera and other diarrhoeic infections than non-users, but that families with a high socio-economic status had a lower incidence, whether they used tubewells or not. They suggested that factors like personal hygiene, nutrition and the degree of crowding are responsible for these differences, and stressed the importance of health education.

Health education and the availability of safe water and waste disposal facilities should be coupled with an optimal prevention of wastage and damage to equipment. Vandalism and wastage in public places, as well as pollution of a source and its surroundings, can sometimes be curtailed by sanctions.

Very often, however, the point of view of the villagers is quite understandable. When the pipeline of a water supply system is exposed near a dried-up cattle watering hole, it is not surprising when the pipe is found to have burst "spontaneously" one day. When the pipes are buried at an inadequate depth, and the course of these pipes is not generally known, they can be easily damaged. (Scotney, 1976). The opening and closing of various types of taps may be less easy than it seems for people who have little experience with modern technology, and may be a source of curiosity and an invitation to experimentation to youngsters (Matango and Mayerle, 1971). Erosion of the soil because of an increase in cattle is a logical consequence of improved cattle watering in pastoral areas without ranching schemes adapted to the local culture (Heynen and Conyers, 1971; Talbot, 1972). Neither is it surprising that people wash and bathe under a running tap, when one realizes that this was formerly done in a stream or spring (Scotney, 1976). Perhaps a more effective way of dealing with the problem of damage to public facilities, rather than by the threat of punishment, would be through a combination of community participation and education, starting with the consultation of the community in the planning phase. This

will include the identification of various interest groups in the project area; the consideration of measures to protect any fair interests and to stop others from making problems; agreement on responsibilities for material and equipment during construction and operation; joint determination of user regulations. Some programmes also give user education (see Chapter VII).

The health education programme for users can be directed at the change of negative practices, with active involvement of the target groups (e.g. through role playing and group discussion at the site). Where necessary, arrangements for supervision should be made.

Some of the ways in which this can be done have been discussed in a separate chapter (Chapter VI). A first step towards the necessary changes will be the generation of a community understanding of the need for adaptations in public and private behaviour, and of a willingness to participate in special activities to realize these adaptations.

4. ANSWERING COMMUNITY QUESTIONS ABOUT THE PROGRAMME

Information on the consequences of the programme for the community such as water rates, labour contributions and cash deposits will have answered many village questions. But care should be taken that unrealistic village expectations are corrected. Problems were encountered, for example, with the expectation of compensation for labour (Pacey, 1977), and the secondary uses of water (Scotney, 1976, 1979; Vierstra, 1977; World Bank, 1978). Other topics for discussion are the use of discharge and drainage water, the provision of additional facilities, such as cattle troughs and wash and shower places, and overly optimistic views about the complete disappearance of water-related diseases. The information given by the agency can also be adapted to overcome barriers, identified in the community analysis, such as mistrust of government intentions and perceived inability to pay water rates. Messages can be used that are especially designed to counteract the various types of opposition. (Misra, 1975; Morfitt et al, 1969).

Visits to prototypes or demonstration projects can spark off discussions on the suitability of the innovation, e.g. on its ease of operation by the various user-categories. (photo: IRC)

IV OPERATIONALISATION FOR PROGRAMME DEVELOPMENT

1. METHODOLOGY

We have discussed what information the community and the operating agencies may need to develop an environmental sanitation programme with optimal community involvement. The next question is how this process of mutual discovery can be realized. As Whyte (1977) said, this is achieved by using one's faculties of sight, speech and hearing. In the case of environmental sanitation, even the sense of smell will play a role.

For extension and health education, it is now fully accepted that there should be a continuous two-way communication. The best way of providing this two-way flow is through community participation in the process of education itself (WHO/IRC, 1978). This is easier to accept for the information to the community, where the old didactic approach has long been rejected - at least in theory - than for the information about the community. Participation in the collection of this information will of course depend on the sophistication of the methods and techniques chosen, and the capabilities of village members. But as early as 1954 Derryberry stated that: "It is not necessary or desirable for the sanitarian to gather all the information himself. Instead, considerable impetus will be given to the educational programme if, through their own efforts or study, the people discover for themselves answers to many of the questions".

Curtis (1977 a) designed a number of before-after studies on the socio-economic aspects of a water supply programme, using observation, questioning (both in formal census and informal interviews), and measurements and records. He remarked that several of these studies can be carried out by an intelligent enumerator under the direction of a study supervisor.

Hall (1978 b) greatly emphasized the role of participatory research in identifying community needs and promoting increased awareness and commitment. Formal surveys often give a static picture of what members of a community, as individuals and not as a group, think. The individuals respond to fixed questions, a process which may often force them to choose one definite answer where they may feel there is not just one. For example, an enquiry into habits of sterilizing clothes in a case of diarrhoea may elicit an answer that the boiling of water and the use of detergent are the accepted practices since these are recognized as the ideal; in reality a shortage of firewood, or lack of money for detergent, may prevent people from doing so.

Messing (1976) concluded that such motivational surveys only measure ideal culture. This conclusion was based on an extensive study on public health in Ethiopia, which made use of questionnaires on health knowledge, practices and beliefs together with environmental and medical surveys and analyses of records and health centre functions (Spruyt et al, 1967).

A World Bank Study in eight Latin American countries also rejected the formal sociological survey approach if it is not supplemented by qualitative research. Observation, oral history and projective techniques will place survey answers in their right perspective and are alternatives for questions to which no direct answers can be obtained (World Bank, 1978).

Another advantage of participatory research will be that, right from the start, the community will appreciate the nature of the approach advocated for the rest of the programme. This may help villagers to overcome suspicions concerning government intentions as to slum clearance (Messing et al, 1965), taxation (Dube, 1956; G.F. White et al, 1972) and eviction (World Bank, 1978).

In the following general outline, some suggestions for community involvement in information exchange have been included*.

---

* A more detailed discussion of participatory research methods and their use in an environmental sanitation project is given by Jackson (1979).

Observation

Some information can be collected through direct observations, e.g. of the number of sources available and used, the frequency of use, pollution around the supply, observable water practices and type of containers etc. One example of involving the community in the use of this method is by organizing an "environmental sanitation walk", as a variation of the "urban walk" (Whyte, 1977).

Indirect observation can also be used to collect information about the community. The width and the wear of paths may sometimes provide an index for latrine use, while the presence of a cake of soap in the house is an index of personal hygiene (Messing and Prince, 1966). Sometimes an investigator from outside the village may live for a longer period in the community to collect information. By participating in the daily village life, he can gain much insight into its less accessible aspects like factionalism and village resources.

Checklists may be helpful in observation and in the less formal methods of questioning discussed below, as well as in informing the community and discussing further planning. Several such checklists were found in the literature reviewed: on village organization suitable to be involved in planning and administration (Perrett, 1980); on community participation and diagnosis, health education, higher-level support and evaluation (Lovel, 1978); on a strategy for community participation, water-related disease transmission and the tasks of the extension agents (A.T. White, 1978); and on sanitary conditions in the home, (Miyasaka, pers. comm.).

Conversation

Questioning. The most familiar way in which social information is collected is through interviews. These may be unstructured interviews in which no standardized questions are asked. This method is often used with key persons, like provincial and district water supply officers and operators, health staff personnel, extension workers, village authorities and other formal village leaders. They may also be necessary in interviews on a

larger scale, e.g. when the use of printed forms makes people reluctant to answer questions, or when questions need to be worded differently on each occasion in order to be understood (Lees, 1973).

When questionnaires are used, the interview can resemble a conversation. In the Delhi Pilot project in Urban Community Development only six questions were asked to find out which problems needed urgent attention, as well as the willingness to do something about them, experiences in social and self-help activities, and local leadership (Clinard, 1966).

The interviews can be personal, using a sample of people or even a house-to-house approach. They may also be group interviews, in which neighbourhood and women groups and others are questioned, e.g. those working in the field or lining up for water.

From the above it is clear that formal sociological surveys are not the only approach. They are still frequently used, however. Usually the person interviewed is the head of the household, although in the case of environmental sanitation, interviews with both male and female heads of families are desirable.

Men should be interviewed because they will be asked to contribute to the project and may hold the power of decision-making. Women should be interviewed because they are usually the ones who carry the water and can contribute most to the health impact. Twumasi et al (1977) and Wright et al (1977) even interviewed children on water and toilet use. Whether these interviews with the various members of a family are to take place jointly or separately will depend on the culture in the area and the social class.

Kebede (1978) found that collective interviews produced more reliable data in an Ethiopian study area. This reliability may be different when respectively perceptions and knowledge are measured, as in a series of Latin American case studies (World Bank, 1978).

Sociometric questions can be used, by which people are asked to indicate who serve as their opinion leaders in such matters as preventive health,

environmental sanitation and community affairs (Amsyari and Katamsi, 1978; Rogers et al, 1970)

Projective questions have also been used. Here, people are invited to comment freely on photographs of local conditions (Ademuwagun, 1975; Quesada et al, 1975), or, stories of imaginary yet locally possible happenings (A.T. White, 1978). In this way one can register attitudes and perceptions.

Although these questioning methods are in the first place meant for the collection of information about the community, they can also have a stimulating function by awakening interest in environmental sanitation (G.F. White et al, 1972).

The less structured interviews also afford a better chance of passing on to the "discussion" phase, and of obtaining genuine, instead of only "polite" answers, e.g. on village cooperativeness (Ascroft, 1974; A.T. White, 1978).

Discussion. With the acceptance of community participation in as many phases of the project as is feasible, discussions with various people and groups in the community will be an important method for the education of the community, as well as for the collection of information about perceived problems, constraints to pollution control, village expectations etc. In Cameroon, for example, information on decision-making patterns and village communication was gathered in informal village conversations by the mobile field workers responsible for the organization of village health committees (Isely and Martin, 1977).

Such group discussion could vary from personal dialogues with male and female heads of households and with the village leaders separately to discussions with small and medium-size groups. These groups may, for example, consist of the joint family leadership, the whole household, the family, formal and informal village leaders, health and extension workers, consultative groups or committees on environmental sanitation and village development and neighbourhood groups and voluntary associations.

In Tanzania, special study groups were formed which, after listening to a series of radio broadcasts on preventive health and environmental sanitation, discussed the contents of the broadcast and their consequences for individual and group action, under the direction of trained group leaders from the village (Hall, 1974; Hall and Dodds, 1974; Hall, 1978).

Informal discussions of small groups of women proved a successful addition to a mass media and community organization approach to environmental sanitation in Durban, South Africa (Steuart et al, 1962). Similarly, the community health education programme of the Brazilian Adult Literacy Movement operates mainly by engaging the inhabitants of the communities in the discussion of their own health problems. After this discussion programme monitors, who are members of the community, serve as coordinators of the community's efforts to solve their own problems (Backheuser et al, 1978).

Demonstration visits to testing sites of environmental technologies (Adeniyi, 1973; Obibuaku, 1967) or to other communities with environmental sanitation projects (Holmes, 1964) could also spark off discussions.

Such an approach can also be used as a follow-up activity with larger gatherings, ranging from whole communities to wards and larger associations like churches, sects and political parties. They are first addressed by extension workers and figures of authority (village leaders, medical officers, etc.), or they attend film shows (Matango and Mayerle, 1971), puppet shows or other traditional drama forms (Kidd and Byram, 1978).

In such meetings it is also possible to use the sociometric techniques mentioned above (Kar, 1969), as well as projective techniques (Freire, 1971; USAID, n.d.; A.T. White, 1978).

Community self-survey

A more ambitious method for the collection of information, which is at the same time an educational tool, is the community self-survey. With the collaboration of the extension agents, a group or groups within the community draw up a series of questions to which an answer is sought by

various methods, such as through household and other interviews, observations, and the study of records.

Information can thus be collected by members of the community on facilities, behaviour, beliefs and attitudes (A.T. White, 1978), or on water and hygiene related diseases, time-budget and water use (Lovel, 1978). No high scientific standard can be expected from such information, however. Two self-surveys were carried out in the course of a demonstration project in community health in Japan. The first survey was on fly breeding places and toilet facilities by "Pupils' Health Groups" consisting of upper grade primary school and secondary school students. For the second survey, each household was presented with a sanitary improvement card, on which they could record conditions and changes. The households were assisted in the survey by "Health Members" (Miyasaka, 1971). Similar surveys were carried out by upper grade primary school students in a Mexican village (World Bank, 1978). A self-survey on the area characteristics, facilities, and conditions, as well as on the socio-economical and attitudinal characteristics of the inhabitants, is one of three village studies implemented by members of the community in the initial stages of a rural water supply and sanitation programme in Paraguay (Cardenas, 1978, 1979). Such activities have also been reported in two case studies in Guatemala (World Bank, 1978). An outline for such a survey based on experiences in the USA and the Netherlands is provided by Van der Lest (1962).

Test and measurements

Laboratory tests are frequently made to obtain data, e.g. on water quality and parasitic infections. Field laboratories enable us to use these tests in the educational process, with a discussion of their results serving as an initiation for water supply programmes (Kreysler, 1970; Misra, 1975; G.F. White, 1974) or latrine construction programme (Feliciano and Flavier, 1967; Kipuyo, 1969). In one project, the helminths found in the stool survey were kept alive in a container to serve as an additional educational aid, together with microscope demonstrations and flannel board explanations.

Other measurements, such as of the distance to the supply, and of water collection patterns might even be carried out by enumerators from the community. Training and supervision, however, may be necessary to ensure the acquisition of reliable data. Warner (1969) reported how the villagers in Kipora, Tanzania, stated an average travelling distance of 0.65 miles to a water supply in May, and an average of 0.16 miles for the same supply in September; actual measurements gave an average of 0.43 miles.

But such local participation may help in allaying fears of taxation (Curtis, 1977 a; G.F. White et al, 1972). The latter researches reported that, in one area, the interviewer had to be widely seen in the company of a subchief before people were comfortable about revealing their water sources to him.

Records and documents

We can also use existing records, such as those concerning other projects and research in the area, or on water sales (Browne, 1974). To measure impacts on public health and health costs, mortality and morbidity records in hospitals, vital statistics (Levine et al, 1976; Misra, 1975; G.F. White et al, 1972), and attendance records (Curtis, 1977a) can be used. Records on the adoption of previous health innovations helped to identify those categories needing special attention for a better distribution of benefits (Kar, 1969; Arango, 1973).

Since the number of records available and the information provided through them will undoubtedly be insufficient, Whyte (1976) has suggested the compilation of village books in each community, in which demographic and water supply data are recorded as well as personal accounts and pictures of village life, traditional concepts and practices, and the forms that village organization and social interaction take. Such a book could be compiled by the village teacher, who could involve parents in it as a school project and display it in a central place. Thus, it could serve as a source of information for various development schemes, as a learning experience in self-studies, and as a sign of the importance of local structures and cultures.

Documentation by the agency may also be an aid to community information. Scotney (1976) found that in western Kenya there was a real need for informational sheets in the local language, e.g. for informing villagers of the possibility of group connections. Information on hygienic practices to improve health as well as on wastage and spillage could easily be added. Although such pamphlets should not be considered sufficient in themselves, they can be useful in the initial information phase, and members of the community could be involved in adapting the information and suggestions to local circumstances.

2. MANPOWER

An important question when discussing the process of studying the community and involving it in the planning of the project, is the question of manpower. Various types of manpower can be used in these initial tasks and for further guidance in the later phases of the project. Important categories mentioned in the literature are:

Multidisciplinary teams of experts

A multidisciplinary team of experts, including social scientists, which conducts field studies of the existing conditions and/or develops rural water supply and sanitation programmes on a community basis, is recommended by Holmberg (1952), McGarry (1977), Messing et al (1965), Oberg and Rios (1952), Scotney (1976), Segaar (1979), Stromberg (1978) and Whyte (1976). Scotney and Segaar also stressed the importance of including female social experts in such teams. Experiences in eight case studies in Latin America confirm this necessity (World Bank, 1978).

One task of the social scientist would be the investigation of the existing social structures, and their suitability for adaptation to water supply administration. Such investigations could result in a reference catalogue of management systems, from which standardized organizational components could be combined - in consultation with the villagers - into an administrative system that is adapted to the particular circumstances and potentials of the community (Perrett, 1980; Whyte, 1976).

Highly qualified people will also be necessary for some aspects of a baseline study for impact evaluation, e.g. water quality and water related health conditions. However, it may be too expensive and time consuming to use such a team of experts regularly at the local level. The social distance between outside experts and members of the community may also limit their effectiveness in developing local programmes directly with the members of the community.

The tasks of social and public health experts could therefore be limited to: the formulation of socio-economic and health objectives for water supply and sanitation programmes and projects; the undertaking of general need assessment and social feasibility studies; the sensitizing of the technical staff towards socio-economic and behavioural aspects of the technical programmes; the design and development of community participation and education models and strategies; the identification and training of field workers for various socio-educational tasks; the design of monitoring systems and assistance in special experiments and evaluation studies; and the coordination with other agencies. The actual fieldwork can then be assigned to lower level workers, with the continued assistance and supervision of the expert.

Such field tasks can be assigned to a special service within one of the institutions involved in rural environmental sanitation programmes, to environmental health personnel already working in rural water supplies and sanitation, and to other extension workers and/or to community members remaining in their community.

Special services

In Latin American countries in particular, the task of initiating a rural water supply programme with community participation is assigned to a special promotion service within the central, or regional offices of the water agency. Promotors are responsible for community study and organization and also have a health education task. Within this general approach, varying organizational arrangements have been made, according to the tasks or stages of the programme (see Annex VI). (Donaldson, 1976; Pineo, 1973,

1976c, 1976d; Mora Ramirez and Lopez Orozco, 1976; Republic of Colombia, n.d., 1975; Republic of Peru, 1977; Zuniga, 1977).

In Peru, the promotor is assisted by auxiliary promotors who are usually selected from the community and paid from the project construction funds (Pineo, 1976c). These auxiliary promotors carry out the socio-economic and population survey of the community, using two standard questionnaires. They also identify the premises suitable for house connections, motivate the community and assist in the election and the work of the administrative committee, before, during and immediately after the construction (Republic of Peru, 1977).

In Algeria, too, an intervention team is formed for consultation with the village leaders on matters of water supply (Funck, 1976), but no mention is made of any health education programme or arrangements for administration, operation and maintenance after the construction of the supplies.

In Guinea-Bissau the promotion section of the water agency uses teams of both a male and a female promotor. They are trained to carry out investigation, organization, education and evaluation tasks in the area of their own origin. The use of female promotors stimulates the involvement of women. It also facilitates health education for optimal water use patterns and a better nutrition (van der Ploeg and van Wijk, 1980).

The above examples all concern the attachment of a social services field staff to technical agencies. An alternative or supplement to such an approach is the delegation of technical tasks for simple improvements to the existing health education services.

In Malaysia, rural health supervisors are trained for nine months in health education, minor water supplies and various types of waste disposal. They are then assigned to 10-12 villages, to organise water supply action committees and design simple systems. The Public Works Department also constructs systems, as part of the Federal Land Development Association Schemes, but without community participation. Coordination between both programmes takes place (Pineo, 1978).

In Cameroon, mobile health workers are now trained to assist villagers in the protection of their springs, the construction of latrines etc. All projects are carried out with the community's own resources. This training project is the result of an earlier pilot project (Isely, 1978; Isely and Martin, 1977; Isely et al, 1979; USAID, 1977). A permanent structure, as in Malaysia, has not yet been created, however. More sophisticated projects are carried out by the departments of community development and public works, with and without community participation respectively (Franklin, pers.com.; Müller, 1978).

Environmental health personnel

Derryberry (1954), Pisharotti (1975), Raman (1977) and Scotney (1976) stressed the importance of training sanitarians and technical staff in health education and community organization. In the planning and implementation of environmental sanitation programmes, these aspects cannot be ignored. It is to be doubted, however, whether this staff can be made fully responsible for promotional and educational activities, even with a revision of their work load by the agency. An exception to this may occur when they are stationed at the local level, and can get an intimate knowledge of the community, as was the case in Guatemala (Buckles et al, 1978). Through their authority they can play an important supporting role, however.

Training for such socio-educational tasks is especially important. In Malawi technical assistants get on-the-job training in community motivation and organization. They do not stay on in the communities, but start work from a pilot project in one area, so they get to know it well. Under their guidance, the communities are involved in planning, construction and some maintenance. Through this approach construction costs are lowered considerably, without affecting the quality and progress of the work. The service is free and the operation and maintenance responsibility is in general retained by the agency, so no village administration is necessary. No health education is included however. (Bharier, 1978; Glennie, 1979; Rep. of Malawi, 1977; Tinker, 1980).

In Ghana it is recommended that a special mobile service is set up for health education and the formation of village health committees in the water project areas. Meanwhile, the existing technical team can take care of the participation of the community in the well construction process. Actual strategies for these two components are to be developed by experts in community development and education (Hall and Merriman, 1977).

Existing village services

Instead of creating a special service within the departments, existing services at the village level can also be used. Special training could be provided to local health workers, and in particular to the primary health worker (McGarry, 1977; A.T. White, 1978; Scotney, 1980; Unicef/WHO, 1979). This training can teach health workers how to organize simple improvements and prepare them for their tasks in the context of a drinking water supply and sanitation project.

In Canada, water supply projects, including maintenance and storage, were the first activities of Indian and Eskimo community health workers (Martens, 1966). Additional training and outside assistance for the organizational aspects of the technology programme were necessary.

Where a special community development worker is present in the community, he could team up with the health worker. In Guatemala, special village workers for rural water supplies and excreta disposal are presently being trained. These rural water technicians are responsible for the technical work as well as for the organization of the community, before and during the construction phase, and for the maintenance of the system after the installation. The health educational component is carried out in co-operation with the village health promotor (Buckles et al, 1978).

In Ethiopia, the combination of village health agents and a mobile promotion service has been planned for a regional water supply programme (Gov. of Ethiopia, 1979). The role of the primary health workers in the Indian rural water supply programmes is under consideration (CPHEEO, pers.comm.).

Other community workers will usually have a supporting role e.g. in nutrition, adult education, agricultural extension, home economics, family welfare and school health education. They may reach - slightly - different audiences, reinforce messages, and discuss the links with their own programmes. Care should be taken that such workers are involved from the planning stage onward, that they have a clear view of their responsibilities, and that they get from their own agencies the higher level support necessary for their cooperation in the programme (PRAI, 1969).

Members of the community

Some suggestions for, and experiences with, the involvement of local people in the analysis and education of the community, have already been given. The possibility of training certain members of the community for specific tasks in the process could be considered, although its success will depend greatly on the capacities available in the community, and on the training and supervision resources of the agencies.

Morfitt et al (1969) recommended the selection of community surveyors and a village communication representative, who through progressive training can be prepared for later administrative functions. The authors consider this important, as it will ensure their continued employment, and improve the continuity of the programme. The use of local auxiliary promotors for such tasks in Peru has already been mentioned, as was the involvement of members of the community in the data collection for rural water supply programmes in Paraguay. In this country the informing and motivating of the community are also carried out by some of its own members, organized in a subcommittee of the elected water board and assisted by the local sanitarian (Cardenas, 1978).

A common educational approach in francophone Africa is rural animation. Elected representatives of the village are trained as "grass roots extension workers" to initiate development projects in their village with the assistance of the service. This approach is also used in water supply projects (Bridger and De Soissons, 1970; BURGEAP, 1974; Hima, 1976). In Sri Lanka, elected community members are trained for nutrition, education and

environmental sanitation tasks by a voluntary organization. This organization now covers 13 percent of all villages (Ariyaratne, 1979).

The use of a primary health worker, as mentioned before, is another example of the combination of short and long-term tasks in local hands, since in contrast to most other village service workers, he, or she, has long been a member of the community, and is expected to continue working there.

Village authorities, leaders and committee members are the community members who are most often involved in the preparatory stages; but usually their tasks are limited to consultation and motivation. A more active involvement in some parts of the community analysis could be considered, and their functions in providing feedback should be stressed. Future operators could also be involved in the analytical and educational process. In Bangladesh, such operators are also given a health educational task (Pineo, 1976b), but their educational activities are usually not started until after the construction of the supplies. Finally, as many other community members as possible should be involved, to ensure the representation of all interests and categories. Clear policy guidelines to this effect should exist and be adhered to. In Latin America, for example, which has the longest tradition in participatory water supply and sanitation programmes, women are often not involved in the planning and promotional stages. This can be explained from the traditional exclusion of women from decision-making roles (World Bank, 1978).

3. INTERIM EVALUATION

To round off the preparatory phase in which the community increases its knowledge of the programme and the agencies involved extend their knowledge of the community, a joint evaluation should take place, resulting in recommendations and decisions for further action (Cardenas, 1978; Isely and Martin, 1977; Kreysler, 1970; Morfitt et al, 1969).

When general agreement has been reached on the necessity and contents of an environmental sanitation programme then a more detailed planning for the implementation will follow, with more consultation, agreement and recording of commitments and decisions.

Advice from a sanitary technician on the construction of a private sanitary latrine. (photo: UNICEF)

V THE ESTABLISHMENT OF THE ENVIRONMENTAL SANITATION FACILITIES

1. LOCAL ADAPTATION OF THE CHOSEN DESIGN

The acceptance of new facilities is not a simple matter. The users will compare them with the existing provisions to see in what respect the alternative is better. Obibuaku (1967) reported how a quickly adopted hydraulic palm oil press was abandoned just as quickly by the village women, because they had lost the by-products of the old method, which were their traditional labour reward. Foster (1962, 1973) explained the rejection of smokeless stoves in India and Iran because they did not keep away the mosquitoes and the roof-destroying white ants. Dodd (1934) found that people preferred to keep livestock in their living quarters for the safety of the animals.

The innovation may also have some flaws in its cultural compatibility. Latrines not open to the sky were unacceptable in some areas of El Salvador and Java (Foster, 1952). Rain water collectors not open to the sunlight were thought to make the rainwater less healthy and powerful (Segaar, 1979). Smokeless stoves can interfere with cooling and water-pipe smoking habits (Chandra, 1964; Dube, 1956).

The design of the facility may also not be in accordance with the local motor muscular patterns. Latrines not adapted to a squatting position are the best known examples of this (Foster, 1952; Rogers and Shoemaker, 1971). The opposite may also occur. In a case study in Mexico latrines adapted to the traditional practices were no longer acceptable for the majority of the population, who knew flush toilets through their work in the tourist industry and other outside contacts (World Bank, 1978). The same problems affect water supplies. In India a protective parapet changed the women's posture, thus making water collection more exhaustve in their view and causing long waiting times (Dube, 1956, 1958). In Tanzania a foot pedal for pump priming had to be adapted to operation by children (Chesham, 1969).

Adaption of the design can therefore be necessary. Such adaptations can first of all be the result of the community study, e.g. on financial capacities, (Morfitt et al, 1969), water collection by children, washing and cattle watering patterns etc.

Local preferences and discontent with existing designs can also be ascertained. Such a survey has been part of several excreta disposal projects (Blackmore et al, 1977; Feliciano and Flavier, 1967). This criticism may even include suggestions for improvements (Feliciano and Flavier, 1967).

More informal discussions on local perceptions of sanitation problems and solutions revealed that the pit latrines in Kasangati, Uganda, and the service latrines in New Delhi, India caused risks and problems for children. Special children's latrines were therefore developed (Letlhaku, 1964; Oswal, n.d.). In Managua, Nicaragua, no such adaptations were made, so that some families decided to keep their old stepped latrine for the children (Elmendorf, 1980).

The community can also be more involved in the testing of designs. When prototypes are tested, visits can be undertaken as part of the motivational and educational programme (Adeniyi, 1973; Obibuaku, 1967). Immediate or later comments on its suitability for the particular village may be invited, although it may be difficult to persuade the villagers that local expertise and perceptions will be taken seriously.

Care should be taken that all user categories are involved in such tests. Women as the major users must be more involved than they have usually been in the past. They can test for practicality such as the ease of operation of pumps (Van der Ploeg, 1979, 1980). They may perceive other consequences of the facilities than males, such as risks to children (Elmendorf, 1980; Hollsteiner, 1979) or problems of cleaning and privacy. Provisions for additional use, e.g. cattle watering, washing, bathing or fertilization may also be desired by some user categories.

Other possibilities are visits to nearby (pilot) projects, the installation of demonstration models in the community and the use of scaled models and audio-visual materials.

Sometimes the community may test or develop its own solutions: village expertise may have a high enough standard to find solutions which are technically and socially acceptable.

Kreysler (1970) described how, in a Tanzanian village, the decision process on the type of a piped water supply system included the local testing of bamboo pipes. They were rejected after three months in favour of a more sophisticated piped system; also rejected was a system of open concrete channels on the basis of its estimated construction costs. In some cases, locally developed solutions may be the most suitable from a technological, financial or social point of view. In this context, Versteeg (1977) mentioned the development of a bamboo suction handpump and piped supply system by immigrants in Vientiane, Laos, and a water-raising mechanism using a spongy material and a roller in Niamey, Niger. Cochrane (1970) described the design of a well by a local handyman in a resettlement project in the Gilbert Islands (Kiribatij), which proved to be superior to those proposed by the WHO and less expensive than those developed by the public works department. Dommen (1975) reported the construction of a bamboo tubewell by an Indian farmer. Shawcross mentioned a foot-operated shaded handpump for irrigation designed and constructed by another Indian farmer (pers. comm. 1978). Segaar (1979) showed that a locally-developed water supply of bamboo in a Javanese mountain village was a very satisfactory solution which could hardly be improved. In the Barpali village service project, local people made useful suggestions for a new type of well (Abbott, 1955; AFSC, 1959). Whyte (1976) referred to the construction of stone and branch dams and bamboo aqueducts.

Such an acceptance of locally-available creative resources fits in well with the ideas of intermediate technology, in which local materials* are

---

* Examples of such local materials are green bamboo for reinforced concrete in latrine construction (Feliciano and Flavier, 1967), shredded coconut husks and burnt rice husks for water filtration (Frankel and Yomee, 1973), indigenous plants for water disinfection (Langley, pers. comm.) and water coagulation (Pacey, 1977). Use can also be made of local expertise, e.g. in the manufacture of privy fittings of earthenware (Pacey, 1977), the blasting of rocks (Scott, 1977; Rep. of Malawi, n.d.) and the production of clay storage reservoirs (UNEP, 1979).

used in the construction of simple, cheap, durable and easily-maintained technologies.

2. SITING OF THE FACILITIES

During the preparatory phase an idea of the number and sites of water points needed in the particular village situation will have been formed. Problems of social access may demand adaptations to ensure an equal division of benefits. The existence of rivalries between neighbouring villages, or subvillages, may be an insurmountable barrier to the sharing of a supply (Scotney, 1976; Fanamanu and Vaipulu, 1966; A.T. White, 1978). Frequently attempts are made to gain sectional or individual advantages from siting. In such a case the agency might use its technical authority to stop such tactics, e.g. the location of a supply on the land of a wealthy landowner (Bridger and De Soissons, 1970; Chowdhury, 1978; Huizer, 1970). The owner may even try to sell this land first to the community at a high price (Müller, 1978; Vierstra, 1977). Pacey (1977) described how a local landowner in a project in Tigre, Ethiopia tried to have a well sited mainly for his own advantage. This plan was overcome through the joint discussion, inspection and selection of sites by village elders and water agency representatives, on criteria of general accessibility and probability of striking water. Vierstra (1977) also reported the successful use of technical arguments in such a case. Where construction activities will take place at a number of sites it may be advisable to start with those in the poorer sections, to alleviate all suspicions.

Where no alternatives are available, undue advantage and misuse by the owner of the land where the waterpoint is sited, should at least be prevented. At a well in Ethiopia, the household which donated the land got an unlimited quantity of free water with preferential service.

Even worse, they sold this water at a profit of 700 percent over the official price to those who could not line up for a long time or whose demand could no longer be met once they finally reached the tap (Browne, 1974). Similarly, owners of unmetered house-connections often sell water to poorer

neighbours when the number or siting of public standposts is inadequate. Unfortunately, the agencies do not always consider such socio-economic consequences for the villagers.

But neither should local landowners suffer unduly because of a new supply. In West Java, farmers objected both lawfully and through vandalism to the use of a source for a drinking water supply. They feared a shortage of irrigation water, and only accepted the project when a compromise was reached on a dry-season intake of 3-4 litres per second instead of the proposed 9 liters (Segaar, 1979). Rights of way for pipelines need to be established after due consideration of the local rules. Local people should take part in the selection of pipeline tracks. This will also alleviate fears of crop damage. When these proposed tracks are known and discussed, risks of pipe breakages from agricultural activities, road construction etc. will be diminished.

Specific socio-cultural values and environmental sanitation practices and beliefs can affect siting decisions. Discussing the failure of lowering the incidence of worm infestations in a sanitation project in Egypt, Allen Scott and Barlow (1938) suggested that the construction of latrines in the fields would have made a difference. Van der Ploeg (1979, 1980) found in Guinea-Bissau that some tribes rejected drinking water with a salt content of less than one-fifth of the WHO minimum. Once this problem was identified it was taken into account in the siting discussions. Most villages were situated on a ridge where salt contents were higher than in the valley. Villagers were therefore given the choice between a well in the village for non-drinking purposes or at some distance for drinking use. At the same time, the health consequences of this choice were discussed.

A dialogue may also reveal practical problems. Foster (1973) reported how, in a housing project, the kitchen tap suggested by the agency was rejected after 57 interviews in favour of a patio tap. This alternative had been suggested by the respondents because of leakage problems with the other one. Villagers in Lesotho complained that their gravity-fed water supply was out of use for two to three months each year due to frost overnight. It used a spring on a south slope: they had suggested one on a north slope

which would have allowed the morning sun to thaw out the frozen tank outlet (Feachem et al, 1978).

Cultural values play an even greater role in sanitation, and these may have special consequences for the siting. Thus, toilets in Islamic countries have to face away from Mecca (Goyder, 1977) and public toilets for males and females cannot be constructed in each others' view (Marinoni, pers. comm.). In other cultures, the availability of water nearby is a necessary condition, for convenience (Hoff, 1979) or even privacy: in Botswana the carrying of water to a latrine militates against the traditional secrecy of the act of defecation, so a combined latrine/laundry unit was made (Blackmore et al, 1977).

The siting of waste disposal facilities may also cause problems of water source pollution, necessitating special rules and supervision for their place of construction (Funck, 1976). Other projects may demand specific arrangements for facilities outside the house or yard, e.g. for households with lack of space (McMichael, 1976; PRAI, 1968; Srivastara, 1969; World Bank, 1978; Subburaman and Muthian, 1976); for children in urban-fringe areas where both parents are working and their apartments are locked (Curtis, 1977b); near a mosque (Funck, 1976); or near the major busstops in the area (Hall and Dodds, 1974).

3. VILLAGE CONTRIBUTIONS

There are many ways in which a community can contribute to the actual construction of the facility. The most common activity in self-help water programmes is the digging of the trenches, but other possibilities are the organization and execution of the clearing and fencing of the site, building the access road, the collection, transport and storage of local materials, making cement, moulding of lining for wells and the actual lining of the well, the provision of food and drinks to the labourers, and the housing of a technician or technical team (BURGEAP, 1974).

Common activities in the construction of latrines are the clearing of the site and digging of the pit, the construction of the superstructure, and sometimes the mixing of cement and moulding of the sill.

The financial value of labour, local materials and services, in addition to any cash contributions, can constitute a considerable proportion of the total costs. Local contributions to piped supplies in Colombia were estimated to amount to 20 percent of the construction costs (Mora Ramirez and Lopez Orozco, 1976), a figure which was also mentioned by Donaldson (1976), as an estimate for the whole of Latin America. In Kenya, voluntary labour and local materials even covered 41 percent of the total construction costs of 49 village water supplies (Whiting and Krystall, n.d.). The World Bank (1976) estimated that, based on the experiences of the Inter-American Development Bank in Latin America, communities may be expected to pay 3 to 20 percent of the capital costs, with an average around 10 percent. Studies of the Pan American Sanitary Bureau indicated that all costs of operation and maintenance can be borne by the villagers (Morfitt et al, 1969), and up to 50 percent of the construction costs of simple systems built, operated and maintained with the assistance of the community.

In Lesotho financial contributions amounted to about 7 percent, although the villagers themselves estimated them at half of the total costs. From two examinations of self-help labour schemes it was estimated that the effective value of such contributions was 15-35 percent of the material cost, while the authors considered that any on-site saving in time that could have been realized by using contractors, would have been outweighed by the time required for drawing up tender documents and accepting a tender (Feachem et al, 1978). Such detailed comparisons may throw light on the question of the effectiveness of voluntary labour, which has not been subjected to enough systematic examination to draw definite conclusions on its profitability (G.F. White, 1974).

4. LIMITATIONS TO SELF-HELP

It is uncertain whether voluntary labour contributions reduce construction costs without negative side effects to quality and rate of construction as well as to the local people.

Carruthers and Browne (1977) and Pacey (1977) have warned against the overrating of self-help contributions. Pacey pointed at the frustration of

the local population because of an excessive and unrealistic load of work, poor standards of construction and the inefficient allocation of the central government inputs of money, skilled personnel, tools and machinery. Curtis (1977 a) feared that the costs of supervision and communication personnel might surpass any financial gains on labour and material costs. In a Bangladesh well digging programme voluntary labour was stopped in favour of authorized contractors, because lack of supervision led to the early failure of the wells (Pineo, 1976 b).

A negative consequence for the people can be the withdrawal of labour from essential agricultural activities, so that cash- and especially foodcrops are affected. Another is the disproportionate use of socio-economic weaker groups (women, poor) for physical participation tasks, while excluding them from any participation in planning and organization. As said, not enough is yet known about the value of voluntary labour participation in comparison with construction by agency labour, by contractors, by paid local labour or any combination of these. Neither have programmes using voluntary labour carried out systematic experiments with different organization and management procedures. A satisfactory voluntary labour participation cannot be achieved without additional inputs for consultation, organization, training and supervision. Through such experiments, it will be possible to find out what minimum additional inputs are needed and whether the short and long-term results are worth the initial extra costs.

Similarly, contributions in cash and kind can cause many difficulties to the progress and the quality of the work, and have negative socio-economic consequences. Cash contributions may represent a much higher proportion of the income of the poor than of the rich (A.T. White, 1978, 1981). People with a bank account can give a very high voluntary contribution in the form of a cheque in a public meeting and subsequently take care that the cheque bounces when it is offered to the bank.

As with labour contributions, evaluation of, and experimentation with different organisational set-ups is therefore important to learn more about their value for the agency and the community. The motivational impact of self-help is even more difficult to assess. It has been stated that in-

volvement in the actual construction makes the inhabitants feel more responsible for the proper use and maintenance and acts as a catalyst to further development. But the opposite has also been observed, and attributed to discouraging experiences and feeling of 'having done one's share of the work'. Both views have got some statistical support in evaluations of rural water supply projects (Chapter VIII).

Not only do local labour contributions not always have the effects expected, but they are also not always available. This may be a matter of physical limitations, but also of attitudes. Villagers may be reluctant to provide voluntary labour for what is considered to be the work of lower classes or a government service (Funck, 1976; Khare, 1964) or may request the use of labour from a nearby government prison (Feachem et al, 1978; Ketcham, 1970). The men may dislike giving their labour to a project which will primarily benefit women (BURGEAP, 1974) and which may change the women's traditional role (Misra, 1975). This may cause the burden of voluntary labour to be added to the women's regular agricultural and household duties, so that they may feel that their health is affected (Whiting and Krystall, n.d.). The use of interesting new tools, such as augers and drills, may make participation more appealing to the men (Foster, 1973).

There may also be a relationship between the amount of labour people will contribute and the benefits that they think will emerge from it. This is illustrated by the beehive catchment tank project in Botswana. The tanks were situated at the local schools, so that their benefit for the water collection journey was less than the villagers had hoped for. In addition, their construction demanded two to three times as much labour in comparison with other types of tanks. It was therefore not surprising that labour contributions were disappointing (Pacey, 1977).

In an experiment on the relationship between mass media and the adoption of health innovations in rural Ecuador, Spector et al (1971) found similar indications of a relationship between adoption, self-help labour and the perceived advantages of the innovations. The adoption of four health innovations was studied: latrine building, smokeless stove construction,

marmalade making and smallpox vaccination. Latrine building, a relatively costly practice demanding five-men construction teams and giving delayed and less observable benefits, was the least popular; while the construction of smokeless stoves, also costly and labour intensive but with immediate and observable benefits, was more popular than marmalade making.

Moreover, there appears to be a 'ceiling' for self-help activities, at least temporarily. In the same experiment, Spector et al (1971) failed to find an increased adoption of the investigated health innovations when a combined mass media approach instead of a single one was used, while the three experimental villages showed a great similarity in average total expenditure in money and effort, regardless of which of the innovations they adopted. The authors attribute this to the existence of a saturation point for innovation adoption in a community. Fenwich (n.d.) noticed a similar reluctance to complement the adoption of a rural water supply and sanitation facilities at Zaina, Kenya, with the building of improved floors and fireplaces.

In well digging programmes in Upper Volta and Niger, people were found to lose interest when the construction took more than three months (BURGEAP, 1974). The Malawi piped water supply programme had similar experiences (Glennie, 1979).

People may grow tired of self-help labour and cash contributions when this becomes the normal procedure with every development programme, without any substantial intervals of time in between. In Kenya, the increasing politicization of self-help projects has already led to a point where the population feels overtaxed. Chambers and Belshaw (1973) mentioned the decline in self-help projects, as reported by Almy and Mbithi (1972), due to the intervention of over-ambitious politicians and administrators, so that new self-help groups began to avoid registration. Chege et al (1976) reported the same tendency with a drop in harambee (self-help) group membership of 40 percent in two and a half years.

Specific negative experences in previous programmes, such as projects which were never implemented, took a long time or were abandoned halfway, may add to a lack of enthusiasm. Sometimes contributions are forced (Chambers and Belshaw, 1973; Müller, 1978), or fall disproportionally heavy on the shoulders of the poorer classes, e.g. because they have to do the manual work, while the upper classes remain aloof (BURGEAP, 1974), or take up the task of supervision and organization (Dube, 1956). Earlier experiences with food-for-work programmes (Pacey, 1977), knowledge of nearby programmes without voluntary labour (BURGEAP, 1974) or knowledge of plans for a higher level service (World Bank, 1978), may also affect the willingness to engage in self-help. Morss et al (1976) recorded how, in a self-help project in western Kenya, the local committee overcame the initial scepticism towards the project by using hired labour for the rapid realization of the first communal facility, a social hall. After that, all other facilities, like a maize store, a milk cooler and a cattle dip, were built with voluntary labour contributions.

There may also be specific timing problems, e.g. because of a harvesting season or culturally less suitable periods for voluntary labour, such as the Ramadan (Matango and Mayerle, 1971). At the same time it may be difficult for the agency to plan the construction only in the slack village season. Problems of migration may add to the irregularity of available village labour (Feachem et al, 1978; Oberg and Rios, 1966). Factionalism may be higher at a time of national or local elections, and have a negative influence on the organization of village labour (Patnaik, 1961).

Such problems, brought to light in the initial dialogue between the agency and the various levels of the community during the preparatory phase (Chapters II to IV), will need to be solved through dialogue with the village institutions involved in the implementation.

From the above it is clear that the use of voluntary labour poses many problems, not only for the agency, but also for the community. But this need not be different for paid labour. The International Labour Office is worried that self-help projects will be used by national governments to avoid paying wages for work that should receive remuneration. Moreover,

subsequent savings may not be used to expand services more rapidly to other areas in need of water and sanitation. When paid labour is used, it can temporarily ease unemployment problems and generate income for the project area. Often however, the construction work is carried out through contractors. Cases are known where the water agency paid the contractor in cash, but the contractor paid the workers in kind and kept the difference. Moreover, tenders are often invited from all over the country, to get competitive prices. This implies that skilled labour is frequently brought from other areas, so that local people are not involved (Islam et al, 1979). There is even a greater risk of unfair distribution of the money then earned, as the labourours are often socially and economically dependent on the contractor and the financial transactions take place in their home village. This makes the already difficult control on the observation of the national labour laws even harder.

It is therefore important that the water agency, which uses paid labour rather than voluntary labour, realizes the possibility of such negative social consequences and if necessary takes action to prevent them.

5. DIVISION OF RESPONSIBILITIES

Clearly defined arrangements should be made for the division of responsibilities before and during the construction phase between the agency and the village institution representing either the community as a whole, or the future users of the facilities. Usually, this village institution will also be the one responsible for the village level management of the system in case some, or most, administrative responsibilities at the village level are delegated by the water, waste disposal, or health agencies. The various forms these institutions can take, according to the literature reviewed, will be discussed in Chapter VII.

In some cases, e.g. where functioning traditional organizations for self-help exist, these can be used for participation in planning and construction, while a separate organization may be set up afterwards for the management. The supply may also be a combination of free public and paid private connections, whereby the village organization for the in-

stallation will represent the whole village, whilst the village organization for its administration will represent a group of users with house connections.

If in a certain country or area the village management system is uniformly prescribed, the specific organizational set-up will manifest itself during the presentation of the agency's plans to the community. If the choice of system is still open, the most suitable system will be one of the items of discussion between agency and population (see Chapter III).

Where initial conditions have been laid down, the village organization involved in the construction phase may be made responsible. It may be given instructions on the procedure to be adopted for collecting any contributions, or it may be left to choose its own ways to reach the prescribed minimum, depending on the agencies' experiences and the information gained in the preparatory stages (e.g. earlier, negative experience with self-help financial contributions). For example, a fixed initial rate paid by all or a minimum number of households may be demanded by the agency before construction procedures will be started. Alternatively, the agency may establish a percentage that the community as a whole will have to contribute to the supply. The village can then decide whether this amount should be reached by flat contributions from all households, or from those wanting to join a users' association, or whether some kind of special taxation should be imposed. It may even be paid from existing village funds.

Where site preparation and collection of local materials are demanded before the actual construction is started, such labour may be seen as an alternative to an introductory fee, enabling the poorer households to join when this fee is higher than they can afford.

This happens for example under the Colombian programme. People in the village of Juanambu for instance contributed either 25, 35 or 55 days of work, or its equivalent in cash, to the construction of a piped supply. The size of the contribution requested from each household was determined by the promotor of the water agency and the local council. (Mora Ramirez and Salazar Duque, 1979).

However, in Cameroon, the system of having local bodies decide upon the size of the contributions to be made by each household has led to gross inequity. Müller (1978) therefore proposed a special procedure for calculating weighted household cash contributions, using locally valid indicators of wealth: (number of adults per household, number of wives, membership of cooperative society).

Whatever system is choosen, it is important that there is some kind of legal framework which gives the village water organization sufficient authority to solve problems of opposition and non-contribution. It may even be feasible to use positive, rather than negative measures, e.g. by deducting initial contributions from subsequent rates, as in Colombia (WHO/IRC, 1978). In an environmental sanitation pilot project in Tonga, the costs of the installation of water supply house connections were paid from the village funds for those villagers who had completed the construction of a sanitary latrine within eight weeks. These and other official and non-official premiums had been suggested by members of the community themselves and accepted during open village meetings (Fanamanu and Vaipulu, 1966). Also, instead of demanding afterwards a higher contribution from families joining water supplies already built by other users' groups, the lower cost of early participation and joining may be stressed, in order to persuade more people in the pre-construction stage. Here too, the special problems of the poorer families should not be neglected, however.

During construction, the village organization will usually be in charge of village labour. The necessary supervision could be given by a technician with some training or experience in community organization, or by a community development worker. The authority of the village organization and the supervisor in this phase, will need to be clearly defined so that problems of insufficient organization, absenteeism and the like can be solved by one or the other.

Confrontations should be avoided as much as possible. A small fine may work with absenteeism in voluntary labour teams, but where there are great differences in social status, a choice between voluntary labour or a larger cash contribution may be given. Such a flexibility in self-help labour arrangements, enabling the community to choose its own solution, but with

outside support and authority to legalize decisions and fulfill obligations, may result in a variety of organizational set-ups, as shown by Patnaik (1961). In one village, work proceeded along the traditional lines of village workteams with a schedule prepared each evening in the presence of all the villagers. In the second village, a well comittee was formed, framing daily work teams for which each family was to provide one free or hired labourer. In the third village, two wells were to be built, and each well was assigned to a group of 60 families, subdivided into 6 groups of 10 labourers who chose their own leader. In the fourth village, labour was hired from a fixed subscription per family. The fifth village organized a food-for-work scheme for the voluntary labourers, and a sixth village, joining the project although it was situated outside its area, made cyclical arrangements for free labour from each family.

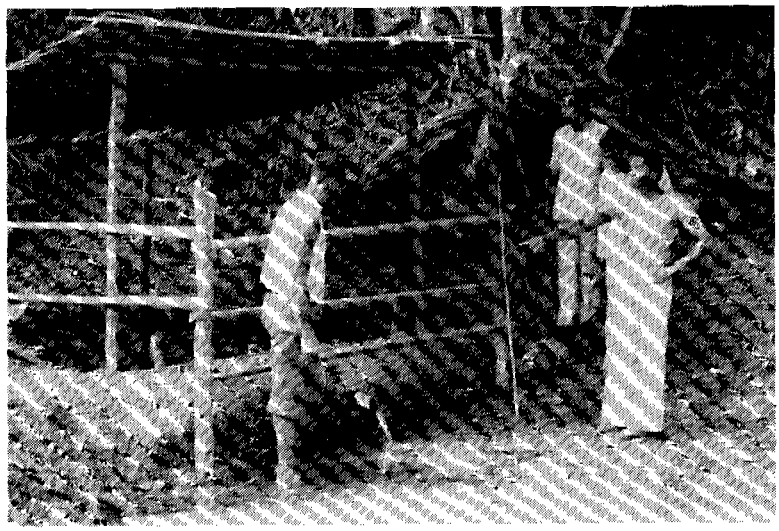
An essential will be the proper registration of the responsibilities of both parties. Cairncross et al (1977) and Feachem et al (1978) advise the development of a model constitution for village water committees. For the construction of the supply, contracts can be drawn up (Patnaik, 1961; Pineo, 1976 a, b, c, d; Republic of Peru, 1977). A.T. White (1978) suggests a meeting in the community at which the technical staff of the water agency agree with the community on operations, the division of responsibilities, the timetable, the lines of communication for progress reports and problems, and implementation methods and their feasibility.

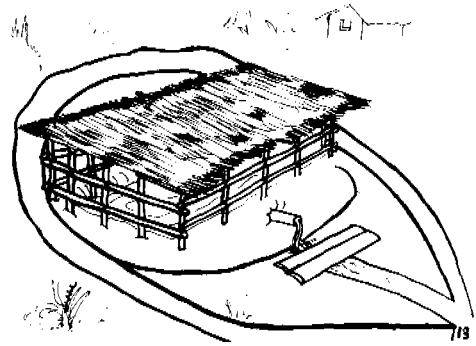
Some special efforts may be needed to ensure that such records are accessible for all members of the community, e.g. by disseminating simple information pamphlets, as in Peru (Republic of Peru, 1977), or using a bulletin board.

6. INAUGURATION CEREMONY

To finalize the construction period, an inauguration ceremony may be held (Adeniyi, 1973; Cardenas, 1978, 1979; Frankel and Yoomee, 1973; Holmberg, 1952; Ketcham, 1970; Matango and Mayerle, 1971; Scotney, 1976; Segaar, 1979). On such an occasion one can formally transfer to the community and its water, sanitation and sanitation education organizations such responsibilities as have been previously agreed on, like protection against

misuse and damage, the improvement of hygienic practices, or even the full legal ownership of the system. A knowledge of the traditional ceremonies held in association with drinking water or public services can be useful for this purpose (Chen, 1971). In Uttar Pradesh, for instance, no such ceremony was carried out by the agency. Therefore, rich inhabitants paid for the performance of the traditional puja (religious ceremony) at the public standposts and thus obtained unofficial control over their use (Dhawan, pers. com.).





Health education for self-reliance: a spring caption and protection made by a local village health committee in Cameroon after discussion of local needs and technologies for self-improvements with the mobile health educator.
(photo Atelier de Matériel pour l'Animation, Yaounde, Cameroon).

VI THE PLANNING AND IMPLEMENTATION OF THE SANITATION EDUCATION PROGRAMME

The link between environmental sanitation and preventive health will have been an important subject in the information given to the community during the preparatory phases of the environmental sanitation programme. The knowledge gathered on specific health problems and public and private health conditions will have been of assistance, especially when the community has been involved in the collection, analysis, and discussion of the results. This in turn may lead to the conclusion that a special sanitation education programme, adapted to local conditions and practices, is necessary. Added to this, some structure will be needed for the organization of such a programme. Optimal local involvement is necessary to increase the commitment of the community, and to continue the activities after the completion of the facilities.

Such programmes should stress the sanitary behaviour related to the use of the facilities as well as more general personal and household hygiene. At the same time, they could point out the importance of proper handling of the facilities to prevent unnecessary damage and wastage.

This chapter gives only a very general discussion of such a sanitation education programme during the planning stage (objectives, target groups, media, methods, and aids), to underscore the need for the integration of such programmes with the total planning of a rural and sanitation programme.

The organizational structure for village participation in sanitation education will be discussed in the next chapter, as it is even more important as a part of the programme component on continued functioning and use of the facilities, than for the adoption of the facilities.

1. LOCAL OBJECTIVES AND TARGET GROUPS

An overview of knowledge, attitude and action objectives for education programmes for safe water supply is given by Alles and Ratnaike (1976). These objectives are very general however, and were formulated mainly to emphasize a more systematic approach. In a participatory programme, specific objectives for change in public and private conditions and behaviour can be jointly listed after the discussion of the information resulting from the preparatory phase. These should be realistic rather than ideal. It will be useless, for example, to advocate the use of proper water containers in every home, when these are not available locally, or cannot be afforded by the majority of the population. Other solutions should then be sought, such as their purchase in bulk (A.T. White, 1978) or their distribution as supply adoption rewards (Elmendorf, 1980). Manufacturing with local craftmanship (e.g. water filters from local pots, ENDA, 1977), or the construction of a water tap in a village defecation area (Curtis, 1977 b) are other examples. The message itself can also be adapted to local realities, e.g. by stressing that excreta should be covered in the field and that defecation should take place at a sufficient distance from any water source (Chowdhury, 1978; Kidd and Byram, 1978; Spruyt et al, 1967). The use of a three pot system for sedimentation (Van Amelsvoort, 1969), is another suggestion, or the use of furrows in the field for excreta disposal and the field crests for walking, to prevent hookworm infection (Kochar, 1977).

For a maximal decrease in water-related diseases the blockage of all channels of transmission will be necessary. The provision of a good water supply in the Ryukyu Islands, for instance, did not stop the spread of trachoma among schoolchildren, since handkerchiefs and towels became new channels for transmission (Marshall, 1972). Degoma et al (1978), Perrett (1980) and A.T. White (1978, 1981) list the critical points where contamination may occur as a result of human behaviour.

Socio-cultural research on local environmental health habits could provide the necessary information for such sanitation education programmes, which use an adaptive and flexible approach aimed at the reinforcement of positive practices (Burton, 1964; Khare, 1962; Kochar et al, 1976; Kochar,

1977). Discussions with the people will produce more realistic objectives, adapted to the particular circumstances of the community or target groups (Curtis, 1977b; Oswal, n.d.). Field studies of the attitudes, beliefs and practices of the people are however not yet a regular part of health education programmes: of the 142 programmes investigated, less than 40 percent carried out such background studies (APHA, 1977).

A family-oriented approach

Specific target groups will also have to be identified for a continued sanitation education programme. Wagner and Lanoix (1958) suggested that a health educational approach starts with people who come to a health centre or a dispensary for treatment of water-related diseases, although this may be a minority of the population. After that the whole family should become involved. Similarly, health education may be linked to a medical survey on water-related diseases (Feliciano and Flavier, 1967; Kreysler, 1970). The disadvantage of such an approach can be that more attention is paid to those who are motivated by the existence of an immediate problem, whereas long-range prevention of water and sanitation related diseases for the whole community is the ultimate goal. The programme should therefore be set up in such a way that the villagers themselves draw this conclusion, and realize the necessity of permanent and general behavioural changes.

Within the family women will have a central role to play, since they are the main users of water, although the men may need to be involved in decisions on financial investments. In Tonga two village sanitation projects with a health education and community participation approach failed because the women had not been involved. The official and non-official male village leaders had excluded them from the planning and implementation of the programme, although women had a great influence and a high status within the family (Fanamanu and Vaipulu, 1966).

In some cultures, additional attention may need to be paid to the female head of the extended family, e.g. the mother-in-law. When older children are regular water carriers or contributors to human pollution by their excreta disposal habits, they may become a special target group.

Children under ten are nearly always an important target group, as they will drink any water available and are also poor latrine users (Briscoe, 1977; Skoda et al,1977). More study of the environmental sanitation behaviour patterns of children is therefore also needed (Widstrand, 1979). The behaviour of the youngest age groups can be influenced to a great extent by the mother. This is why the WHO Regional Office for the Eastern Mediterranean (1977) doubted the effectiveness of school health education, since the children's behaviour will have been formed largely in the pre-school period. Thus new behaviour, learned and to some extent practised in school, may never be put into practice in the home.

School health education

The impact of school health education on family behaviour will, however, greatly depend on the degree of cooperation which exists between the community, schools and homes (Ademuwagun, 1970). In some communities parent-teacher associations may play a role, while the health education curriculum may be community oriented rather than academic.

In some educational programmes the learning of intellectual skills, such as arithmetic, is directly related to the life environment of the students (Cardenas, 1979; Courtejoie, 1978; Rotsart de Hertaing et al, n.d.).

Out-of-school programmes integrating learning with development activities also show this tendency (Aarons and Hawes, 1979; Dave, 1979; Unesco, 1978). In a primary education programme for out-of-school children in India, for instance, special learning packages have been developed based on the children's daily experiences. One of these packages centres on the improvement of the village environment, including the disposal of human excreta (Purohit, 1980). Community water supply and sanitation programmes can make good use of this tendency and establish regular contacts with the educational system and its agencies as soon as possible. And as early as 1968 an adult literacy programme in Iran was exclusively based on concepts of water and water supply (Roberts, 1968).

The community can come to the school, e.g. when inspection visits are used for teaching purposes (Pisharotti, 1975). In a study of the change of

health knowledge, attitudes, practices through school health education, Dwivedi et al (1975) found that improvements were two to three times greater in those primary schools where the teacher was given a one-week training course and was actively supported by the local sanitary officer than in schools which followed the normal curriculum.

The school can also come to the community, as when the school health education is integrated in the local public health programme, with e.g. the construction of a rural water supply (Cardenas, 1978). Pisharotti (1975) and Courtejoie et al (1978) suggested practical field work, e.g. by identifying fly breeding places and latrine use. Such field work by students from local schools was part of the data collection exercise in a public health demonstration project in Japan (Miyasaka, 1971). And in Sri Lanka a community survey by senior students led to a school project for improvement of environmental sanitation conditions and practices in the community. A long-term programme is now considered (Ariyadasa, 1979).

Students and teachers may also be involved in the information output phase, e.g. by organizing exhibitions or giving a drama performance on village environmental sanitation (Cardenas, 1978; Kidd and Byram, 1978; Locketz, 1976; Pisharotti, 1975). The importance of the establishment of early cooperation between the environmental sanitation programme, village health officials, committees and the local schools has already been stressed as an activity in the preparatory phase. In order to reach the children at the youngest possible age, contacts with teachers may be extended to the nursery schools and kindergartens.

The role of local leaders

Another target group will consist of official leaders and opinion leaders, who can reach a part of the community through their words and examples. Sandhu et al (1977) doubt, however, whether they can be used for demonstrational roles, since they found no differences in the adoption of public health measures by leaders and non-leaders. These authors emphasize the leaders' role in enlisting people's cooperation within health education

programmes instead. Even where innovators (who are usually too progressive to function as real leaders* can be identified, and where leaders are among the early adopters, the diffusion process of public health innovations and innovative behaviour may be too slow and limited in scope. When such leaders are approached exclusively, e.g. in the hope that latrines built in their homes will serve as a status symbol or as an example for many followers, only a small proportion of the population may be reached. As a target group they remain important, however, since their cooperation, or at least absence of opposition, is required for the programme. They can demonstrate sanitary behaviour such as handwashing in a publicly visible way, e.g. through the installation of a tripod and bowl in front of the house or office. For the widest diffusion, opinion leaders of as many village categories as possible should be identified. The role of local water functionaries in the ongoing sanitation education programme is discussed in chapter VII.

2. THE MASS MEDIA

Advantages and limitations

Lack of the right type of knowledge is one of the barriers to the adoption of preventive health innovations and practices. Mass communication media are very suitable for the diffusion of information on a large scale for they can reach many people in a short time at relatively low costs.

The usefulness of the major mass media has, however, been overrated. They may contribute to a widening "knowledge gap" between high and low socio-economic status groups because the latter will have less access to newspapers and radio than the former, and understand less of their messages

---

* Rogers and Shoemaker (1971) suggested that in traditional systems followers interact with opinion leaders who are at the same or even a lower level of competence, whereas in modern systems opinion leaders are sought who are more technically competent than their followers. More research in this field is, however, necessary.

(Tichenor et al, 1970). Shingi and Mody (1976) carried out a field experiment on television forum programmes and the agricultural ignorance of Indian farmers. One of their findings was that the average farmer did not know the meaning of 58 percent of the technical terms used in selected programmes, words like hectare, kilogram, October and percent. Similar findings have been reported by the All India Field Workshop on action research in agricultural information transfer when testing, among other things, posters and radio talks on rat control (Varma et al, 1973). Different styles of pictures (photos with and without background, shaded drawings, line drawings, silhouette and stylized drawings) may have a different effectiveness in conveying ideas to illiterate people (Fuglesang, 1973; NDS/Unicef, 1975).

The effectiveness of the mass media is not only affected by the socio-economic level of the target groups. It is also necessary to find the right medium for each target group and each message. Radio, for example, was found in Ecuador to be more suitable for reaching women at home with general health information. Audio-visual media, such as film and slide demonstrations, were superior in reaching males, and in passing on more specific information (Spector et al, 1971). In India, men took the radio along to their work so women had to be reached by other means (Etherton, 1980). Neither has the most effective form been determined. Should one for example use a marketing approach, that is the continuous repetition of the same message, or an entertainment approach? Programmes in the field of environmental sanitation do exist, e.g. a humourous radio programme in Kenya, comic strips in Brasil, and a film promoting latrine construction in Bangladesh, but evaluation of the relative impact of such programmes is lacking.

Another important limitation is the lack of feedback. Such feedback is easier to realize with other information media reaching a confined audience, such as flannel board, video and slide presentations. Attempts are therefore made to create more channels for a two-way communication with the target groups when radio, television and press are used for development purposes. The rural press presently developed in Africa, for example, stimulates such feedback both by its form and content and by the use of

local communicators (Schreyer, pers.comm.; Unesco, 1978). The continuous linkage of a regional development programme with a local broadcasting system, as in Chiapas, Mexico, is another example.

As a reaction to the disadvantages of mass media more attention is now paid to local and traditional media. These have the advantage of a greater accessibility, a better cultural fit and a higher credibility. Examples of these are the street announcer, locally-produced printed matter e.g. local photographs, (Ademuwagun, 1975; Courtejoie and Herman, 1966; Jackson, 1979); local stories and poems, (Cardenas, 1978; Celestin, 1977; Gumpertz, 1964; Patnaik, 1961); lectures, exhibitions, microscope demonstrations, singing, dance and drama performances and puppet shows.

Possible functions in drinking water supply and sanitation programmes

Within their limitations mass media can still play an important role in community water supply and sanitation programmes. Four major functions can be distinguished: the creation of a general awareness of the link between water and sanitation on the one hand and health and development on the other; the distribution of general programme information; the provision of support and reinforcement for projects, and the diffusion of self-help information for people and communities who want to carry out their own improvements.

The role of the mass media in the creation of environmental health awareness and knowledge demands some caution. The ultimate goal of a sanitation education programme is the change of behaviour that limits the potential public health impact of the improved facilities. It is not possible to change locally specific behaviour patterns that are determined by many factors, just by providing some "scientific" information on environmental health in general. Moreover, socio-psychological processes can affect the information transfer, so that the knowledge produced is not always the knowledge intended. Selection and distortion can take place unconsciously, and resistance or confusion can be created. Why would it for example be dangerous to eat strong-smelling meat, but not strong-smelling milk products, when both have been consumed without bad after-effects? Where more general health education programmes have had unintended effects, it

will be difficult to undo these in a local programme adapted to the specific circumstances and culture. Careful testing and avoidance of too much detail are important.

A mass approach to general programme information can create a universal awareness of the existing programmes and motivate people to participate. At the same time, it will be necessary to build in checks to prevent over-demand and precipitation. This means that local leadership must be informed about selection criteria and procedures, the duration of the process etc.

In supporting and reinforcing projects, mass media can have many functions. In Malawi, for instance, a film on a piped water supply project with community participation gives the people an idea of what they will get and how they will be involved (Rep. of Malawi, n.d.). In Andhra Pradesh, newly-trained village handpump attendants are interviewed on the radio (Panchayati Raj, 1979). In Colombia, much attention is paid to the construction of information boards, while for the education of those with house connections, posters and brochures have been prepared with normative and practical information (Rep. of Colombia, 1973). In Kiribati, special radio programmes were broadcasted during a latrine construction campaign (Hoff, 1979). The scale of possibilities for such support and reinforcement through the mass media is very wide. This necessitates not only a careful selection, but also more attention to the determination of the relative value of such activities for the overall success of the programme.

Finally, mass media can be a useful channel to reach those communities that are not yet served by any national or regional drinking water supply and sanitation programme, but that would like to improve their conditions by their own efforts. The success of such programmes will however also depend on the availability of the necessary materials, equipment and expertise. Some possibility of feedback and external support will therefore usually be required.

3. INTERPERSONAL CONTACTS

Interpersonal contacts have a greater impact than mass media in persuading people to adopt and continue an innovation or innovative behaviour.

Small group meetings

This is one of the reasons why many radio and television campaigns have been extended with forums, small groups which under the leadership of a chairman listen to the programmes together. These groups discuss afterwards the contents with the help of further information material distributed by the leader, who later also reports back to the programme staff (Hall, 1973; Jain, 1969 a, b; Klonglan, 1967; Neurath, 1962; Shindy and Mody, 1967; Unesco, 1964/65). In 1973 such a radio forum campaign reaching about two million people was organized in Tanzania on health knowledge and preventive health measures to be taken by groups and individuals, including sanitation. The activities of 2,131 groups were evaluated by programme supervisors immediately after the programme. Among these activities were the construction, repair and rebuilding of latrines (20 percent) and the digging of wells (3 percent) (Hall and Dodds, 1974; Hall, 1978). Thus this group approach provided the personal element in the communication process. During the discussion the radio information is explained by the group leaders and other group members, relating it to the people's daily lives.

Kidd and Byram (1978) used discussion groups after local drama performances on area problems such as venereal disease and sex education, nutrition and vegetable gardening, and village sanitation. In addition they tried to find organizational structures for a continued follow-up, e.g. through the publication of booklets for use by primary schools in reading lessons and by the regional extension services. Similar links with the regular school curriculum were made in schistosomiasis control programmes in Surinam and St. Lucia (Locketz, 1976; Celestin, 1977) and in a rural water supply programme in Paraguay (Cardenas, 1978).

Discussions can embrace many activities organized at village level for other purposes, such as testing a design, or information collection about the village. Visits to demonstration sites, field laboratory tests with microscopes, the recording of health practices, etc., can be used for educational purposes at the same time. Such group meetings may vary greatly in their degree of formality. They may include talks given by an outside expert or by a trained person from the village itself. Although the talks can be interrupted with frequent questions from the audience, the at-

mosphere is that of the conventional teacher-student relationship. This system will only work for a few categories: those who have already got some knowledge and those who rely on the authority of the speaker.

The discussions may also be characterized by a guided approach, as described by Holmes (1964), who led his audience from the question "Do you have feet?" to the conclusion that it would not be a good idea to eat excreta and that food hygiene was necessary. A similar discussion approach for the adoption of latrines has been used by Tentori (1962).

A larger degree of freedom is possible in discussions by small groups of people. Such groups may be neighbourhood gatherings of about 15 people or three to six households with all their members (A.T. White, 1978). In such groups the participants reach their own conclusions. They may need guidance to prevent too great a deviation from the subject, and a guaranteed chance for all to be heard. Some training in group discussion techniques for the leaders of such groups will of course be necessary.

In Durban, South Africa, Steuart et al (1962) used such free discussions in small friendship groups consisting of two to seven women in an experiment on sanitation education and evaluation. A before-after survey on environmental sanitation conditions was held in the control area, which received the standard educational approach (individual interviews, community organization and mass media campaign) and in the study area, in which also 192 primary group meetings were held. Only in the area where small group meetings had been held, was the result a significant improvement in all six environmental sanitation items.
Such meetings may lead to authoritative statements by respected village leaders and group leaders in larger village gatherings. Public commitments can take the form of group or individual decisions. These will, however, need a follow-up.

House visits

Finally, house visits and personal dialogues may be organized to encourage the adoption of behavioural changes, and to discuss barriers to this adoption.

Ogionwo (1973) compared this individual approach with the use of group meetings of varying size (of extended families, community associations and the whole village) at which public decisions were taken. He found that initial adoption rates for cholera vaccination and sanitation behaviour were higher for the village in which group meetings were used, and that the continued adoption rates for health practices only showed an even greater difference.

Extension and inequity

When extension workers are used in this personal health education approach, care should be taken to avoid inequity effects. The approach of such workers has recently been subjected to a lot of criticism, especially in the field of agriculture, since it tends to widen the gap between high and low socio-economic groups in the community (IAC, 1975; Lele, 1975, Röling et al, 1976; Rogers, 1975, 1976; Saint and Coward, 1977; Wilson, 1977).

It has already been mentioned that the adoption of preventive health measures is often positively related to the standard of living, education, caste, social class, mass media, extension worker contacts and outside village contacts (Chandra, 1964; Chen, 1969; Ogionwo, 1973; Roberts, 1961; Rogers et al, 1970; Roy, 1968; Thorat, 1969; Tiglao, 1963).

The extension workers often concentrate on those categories of people to whom change comes easily, the so-called innovators and early adopters. Effective communication between extension worker and client is facilitated by the relatively smaller social distance separating them, and the greater similarity in outlook and values.

In order to lower this inequity effect, more attention is now paid to the identification of potential late adopters, the design of special programmes for them , the involvement of people from this group as voluntary extension workers, and the recruitment of staff at the village level such as the primary health worker. Their social level, compared with that of other members of the village, is sufficiently increased by training and by an official function to give them some authority in matters of health, but not so much that a new gap is created between them and the other villagers.

The identification of late adopters and the development of special methods to stimulate them is also getting more attention. A health education research project among American minority groups, for example, used projective techniques to measure nutrition attitudes of the respondents, so as to identify different target groups needing a different communication approach (Quesada et al, 1975).

Arango (1973) mentioned a programme of the dental school at Baru, Brazil, which identified non-innovative dentists in small towns in Sao Paulo province through tracing the diffusion of recent innovations. A prepackaged course of slides and other educational material was then designed to introduce important dental innovations. With these aids extension workers - who were dentists themselves - visited their conservative colleagues to demonstrate the new techniques, and to assist in using them in practice.

Kar (1969) used the scores given by local administrators and public health workers to Indian villages on cooperativeness in health and development programmes, and the records on their proportion of traditional groups, in order to select villages that were slow adopters of preventive health measures. Within these villages he combined a mass media approach with door-to-door visits, involving volunteers to persuade the villagers to be vaccinated against smallpox. Those who were found resistant were paid special home visits so that their objections could be identified. The first few of these strong objectors who were persuaded were then involved to reach the others. Through the use of these additional voluntary extension workers a 90 percent adoption of smallpox vaccination was reached instead of the 30 percent of previous campaigns.

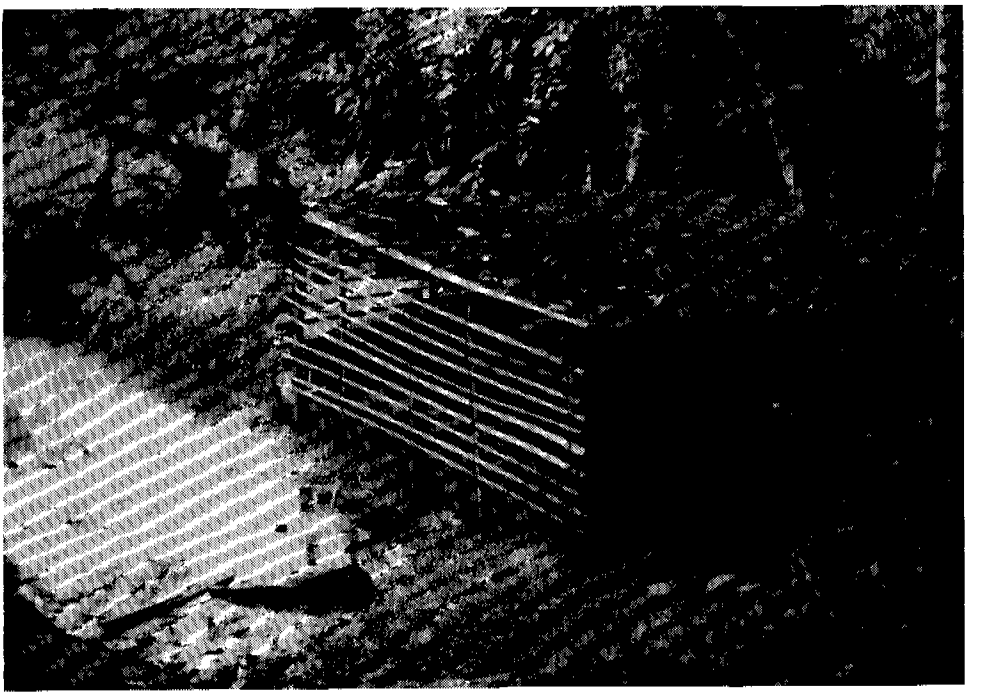
4. EDUCATION AIDS

Audio-visual aids usually form an important part of health education programmes, but their usefulness is limited, and they may even have certain negative effects (Scotney, 1976b). They are more suitable for the transfer of knowledge than for inducing changes in behaviour. They are not always comprehensible: this requires pre-testing (Courtejoie and Herman, 1966; Fuglesang, 1973; Holmes, 1964; NDS/UNICEF, 1975). They tend to generalize,

and are associated with entertainment; they are restricted in terms of time, place and scope; their credibility varies strongly; and their users may develop too great a dependence on them. However, the advantages are considerable as well. They can be used to acquire or recapture the attention of the public and create a general awareness of a problem. They can reach many people in a relatively short time, and bring variation in a longer campaign to both health educators and audience. They can illustrate points which are difficult or too time consuming to put into words. Their message can trigger off group discussions, and reinforce earlier messages. Finally, the authority and prestige of the health educator can be strenghtened by the use of attractive aids.

It may be useful to distinguish between general educational aids, like films and centrally produced posters, brochures and games (Holmes, 1964; Ehlan, 1978), and specific aids, which allow the involvement of the community in their design, production, distribution and use, and which reflect local situations. Such local aids should not, of course, cause problems of time, qualified manpower, organization and money for their production and distribution. One can, for example, think of the production of local aids through art competitions as part of a school sanitation education programme. Such efforts could be concentrated on the specific environmental sanitation conditions in the village and their related diseases, and could result in village exhibitions. Such a competition was organized as a follow-up to a regional videotape programme on schistosomiasis in Surinam (Locketz, 1976).

Another function audio-visual aids can have is the distribution of information useful for the implementation of the programme. Various aids can be used to inform the villagers of times and places of meetings, to act as an information resumé to the community, to demonstrate the results of environmental sanitation and health surveys, to announce the joint decisions taken in the planning stage of the programme, and to give any special information for the realization of material improvements, e.g. guidelines for the construction of latrines, meat and water storage containers. Even when village resources are involved in the development and production of such material *for* information and motivation, it should remain what it is called: an <u>aid</u> to the programme. Its use should not be detrimental to other educational methods (WHO/IRC, 1978).



Health education can stimulate collective commitment to changes in environmental health conditions and behaviour.
This protected water supply in Méfon, Cameroon, was planned and built by the local health committee. (photo: J.F. Martin)

Demonstration of water filtration through a piece of muslin cloth. (photo: courtesy of Mr. Essien, Department of Community Medicine, Ahmadu Bello University, Nigeria)

Extension worker in discussion with the village health committee. (photo: WHO)

VII PLANNING FOR CONTINUITY

Even more important than the adoption of the environmental sanitation facilities is their continued functioning, and the internalization of proper sanitary behaviour. Community organization, regular evaluation and permanent links with the agencies will be the major tools to realize these objectives, as will be discussed in this and the following chapters.

1. OPERATION AND MAINTENANCE

Prior to the official inauguration ceremony, arrangements for caretaking, operation, maintenance, repair and administration will have been made, including the supervision of these tasks.

Where there is a water agency maintenance team to look after the water supply, local caretakers may only be responsible for operation, or they may exercise a guarding task as well, and carry out non-technical maintenance, such as repairing fences, clearing blocked drains, providing protection against night frost, checking the covering of the pipes, etc., and recognizing and reporting problems at an early stage. In some instances (Scotney, 1976; Pineo, 1976b, 1977) a nearby household watches over the proper use and functioning of the supply. In one Lesotho mountain village, the pipeline was divided into sections and the tasks of covering exposed pipes, and protecting them against frost and damage were given to the families living near these sections (Feachem et al, 1978).

Trouble or breakdowns will usually be reported through the village water organization, but in the case of a great number of smaller systems, e.g. wells with handpumps, there may be a steady stream of complaints. Raman (1962) described how complaint boxes were kept at shops, schools, union board offices, health centres and subcentres. The residents and union board members were given printed complaint cards on which details of the location

of the wells and the nature of the defect could be filled in. The cards were collected by the mobile technician on his regular repair rounds.

An alternative, finding increasing acceptance, is the training of local inhabitants for operation, maintenance and carrying out simple repairs. Such operators can be selected by the agency with, or without, suggestions from the village water organization or other village representatives, or can be elected by the community.

Possible selection criteria are: age (according to culture); basic knowledge of official language; knowledge of local language; local inhabitant of good reputation; some experience in a technical job (e.g. bicycle repair) or in a responsible - in some cases non-government - function (e.g. parish council); own - additional - means of support and a good guarantee of prolonged residence (WHO/IRC, 1981; Panchayati Ray, 1979). The sex of the operator will depend on local conditions and functions. For health education tasks a woman will be more suitable. In Guinea-Bissau a male and female operator are therefore elected, for technical and educational tasks respectively (Van der Ploeg and Van Wijk, 1980).

In some situations, e.g. where extensive labour migration of men occurs, or where women groups have been the major force behind the village water supply, one should consider training women for technical tasks as well (Feachem et al, 1978; Pacey, 1977; A.T. White, 1978, 1980). The technology should then be adapted for women. Women's associations may also be involved in the selection procedure. Other prospective operators could be the primary health workers (Feachem et al, 1978; A.T. White, 1978), water haulers in danger of losing their jobs (A. White, 1978), traditional well diggers (Hima, 1976), people with some technical experience, e.g. fitters and surveyors (Buckles et al, 1978; Pacey, 1977), and village leaders (Frankel and Yoomee, 1973). In Guatemala, the functions of operator, (para) engineer and promotor are even combined in the person of the rural water technician (Buckles et al, 1978).

It may be advisable to train more than one operator, so that prolonged absence does not lead to complications (Ketcham, 1970*, Matango and Mayerle, 1971). Kreysler (1970) also pointed at the importance of preventing any monopoly.

Operators could be paid by the agency directly or by the community from the water rates. In the latter case they may also be made responsible to the community, as is the case with some health personnel (Allan, 1977; Tomic et al, 1977). Non-financial, or indirect financial rewards, can also be given, such as exemption from communal labour (Matango and Mayerle, 1971), a free agricultural or housing plot, or materials and equipment for starting a small village workshop (Matango and Mayerle, 1971; Whyte, 1976). Where it is decided to combine the two functions of primary health worker and operator, the community may save one salary post, while at the same time the continuation of the sanitation education component of the programme is facilitated. A.T. White (1978) even suggested the construction of a community clinic near the water supply when this involved a central installation, such as a slow sand filter, whereby viligance could be exercised by the village health worker (and the waiting patients) over the installation, e.g. to ensure that no damage is done, or that no pollution is caused by children and animals.

---

* This author described such a case in a well drilling programme in Madagascar. In visiting the various completed wells it was noted that one pumpman, trained under the project, was not on duty. When an old gentleman, who was getting ready to start the pump, was asked where the man was, he replied that the man had joined the army three months previously but that they were not to worry for he had taught him everything. Whereupon the old man removed his coat and donned a suit of overalls which was hanging in the pumphouse. Then, with a flourish, he dusted the top of the fuel tank with an old rag and filled the reservoir. While he was struggling to get the stubborn engine started, the Malagasy mechanic asked him if he ever bothered to check the oil level. He replied that he looked at it every week or so. Then, with a great show of thoroughness, he removed the fuel sediment bowl, stirred the fluid vigorously with his index finger and then, when he had all the dirt particles in suspension, he deftly removed the petrol tank lid and dumped the contents of the bowl into it. A considerable amount of time was then spent on explaining to the old man the rudiments of proper engine care, but in view of the difference in age and background between the mechanic and the operator it is doubtful whether the explanation made any difference, for his one comment after the briefing by the mechanic was "Rubbish".

Responsibilities for the local operation and maintenance of water supplies and those for other environmental sanitation facilities could be combined. Instructions and supervision for building and upkeep even of private facilities, like latrines and composting pits, will stimulate maintenance and proper use.

In the PLANSAR project in Nicaragua, for example, supply operators were also to be responsible for latrine maintenance and the stimulation of housing improvements (Zuniga, 1977).

In some countries, public health inspectors carry out this task, but members of the community may also be officially involved, e.g. through the local health committee, water organization, or any other village institution with links with environmental and household sanitation.

Proper maintenance arrangements are especially important to increase the acceptability of communal toilet and washing facilities in high density, low-income communities. Experiences in Ibadan, Jakarta and Patna indicate that such services can be successful with private management, regular caretakers paid from user fees and support from traditional leaders*.

Unfortunately, the construction of the facilities is a much more tangible matter than are operation and maintenance whose importance is usually not realized until the moment that something goes wrong and the service can no longer be taken for granted. This is the main reason why Feachem et al (1978) concluded that regular voluntary contributions towards maintenance will not work.

To keep people alert to the importance of proper operation and maintenance, as well as of environmental sanitation generally, it may be worthwile to institute a yearly ceremony or campaign, such as the spring cleaning campaigns in China (Orleans and Suttmeier, 1970) or the town cleaning campaigns in Singapore. Where household rainwater collectors are used, people can be reminded to remove the collected deposits and clean the tank at the

---

* Ademuwagun, 1975; Etherton, 1980; Nihon Suido Consultants, 1977; Vijayendra, 1979, 1980.

end of the dry season. Regular evaluation and self-surveys (e.g. latrine surveys by local students) and local or national competitions (Isely et al, 1979; Kincaid et al, n.d.) may also have a stimulating effect.

2. USER EDUCATION

Local provisions for operation and maintenance are an important contribution to achieve the regular functioning of the provisions and a condition for user acceptance. The education of the users themselves, still rarely done, can also greatly contribute to the prevention of breakdowns. To start such a programme one can find out what common problems could be prevented by the users themselves and what stops them from taking action. For problems like a lack of knowledge, insufficient experience with modern technology, or constraints to get essential materials, special provisions can be made in the programme. Group discussions, demonstrations, films and brochures are already used in some programmes. To solve material problems, more locally feasible substitutes (e.g. cooking oil instead of a commercial lubricant, Van der Ploeg, pers.com.) can be identified, or special arrangements for supply made. The wastage at unmetered house connections is worsened by the use of privately bought household taps of a poor quality; instead, the water agency can supply good quality taps on an installment payment system.

In Malawi, some user education is included in the village contacts during the construction and inauguration of piped water supplies. Farmers are explained the need for connecting their last ploughing furrow to the pipeline ridge, to avid erosion by rainwater. Villagers are encouraged to establish paths along the pipelines to stimulate regular patrolling and early reporting of leakages. The inauguration ceremony includes a demonstration of tap operation and a discussion of user responsibilities for the upkeep of the site. The headman is taught how to replace washers and given a small stock. When the maintenance assistant finds a leaking tap or damaged apron, he can plug up the tap when no heed is paid to a public warning (Glennie, 1979).

The responsibility for continued user education after the completion of the facilities can be part of the responsibilities delegated to individuals and organisations in the community. In Andhra Pradesh, India, Unicef handpump caretakers are also trained in user education for a proper operation of the pump. It is hoped that this will decrease mechanical problems caused by the too short strokes made by its users. Such operation habits were also observed in the Sudan. There women preferred a more staccato rhythm of pumping, in time to their singing and dancing during the operation (Scotney, 1980). It is however a question when one should change people's customs and when to adapt the design to these customs.

Another task for the operator is public information. Users have a right to be informed about the reason for and probable duration of breakdowns, and other matters which directly affect them. User education and public relations can however not improve a bad service.

3. VILLAGE LEVEL ADMINISTRATION

There are many possible solutions when the agency or agencies decide to delegate some or most of the responsibilities at village level to one or more members of the community.

As mentioned before, one may decide on an overall system to be introduced during the preparatory phase, or it may be preferred to make individual arrangements, because a flexible approach to community level administraton will offer better chances for an adaption to the existing socio-cultural differences within the country or area. Such flexibility may vary from the joint decision on any form of community level administration to variations within one overall system. In Peru for example, in all communities an administrative committee is elected in a village meeting, organized with the assistance of the water agency's promotor, but the size of this committee is left to the particular community, provided it does not get too cumbersome to function properly (Republic of Peru, 1977).

Local specialists and leaders

In small communities, where delegated tasks are relatively simple, it may be advisable to make one person, preferably the village health worker, responsible or to set up a team consisting of an operator and health worker for these tasks.

The utilization of one form of traditional leadership, the chieftainship was studied in Lesotho. In four of the villages, chiefs were involved in the organization of village level management, which was successful in only one case. The chief, an exceptionally well-educated and capable man, initiated the programme himself and organized an elected committee chaired by his charismatic wife. In the other cases committees were also formed, but failed their tasks because of the chief's frequent absence, the organization of opposing committees, and the people's reluctance to commit themselves to either the old or the new order (Feachem et al, 1978). A.T. White (1978) pointed out that, in a changing society, it will be necessary to find out if and to what extent the authority of the traditional leaders is still recognized.

In Malawi, the drinking water supply programme planners therefore decided to use both traditional and political leaders of the areas for community motivation and initial organization. These leaders also delegated the necessary authority to subsequently formed water committees (Bharier, 1978; Glennie, 1979; Rep. of Malawi, 1977).

Existing Community Organizations

Use can also be made of existing village committees, such as a general development committee. In Lesotho, these committees were mostly selected through the one-party system, but the degree of government control under which they functioned varied greatly, while in a number of villages they were, for one reason or another, freely elected (Feachem et al, 1978). Besides selected, or elected, general development committees there may be existing committees in specific fields, such as on garden development and health, to which water supply and sanitation can be an additional task.

Isely and Martin (1977) described the organization of such health committees in Cameroon. The latter's activities resulted in the construction of latrines, animal enclosures, garbage pits, and the protection of springs. The use of such village health committees, combining envrionmental sanitation with other activities, like immunization or nutrition programmes, may not be feasible in larger communities and in more complex environmental sanitation systems, where more administration and maintenance is demanded.

Ad hoc arrangements could also be made with the help of existing and well-functioning traditional village institutions, such as traditional organizations for water supply or similar communal facilities. These organizations will have been contacted during the preparatory phase, at the time of first contacts with the community. Perrett (1980) advocates such ad hoc arrangements with existing community organizations. She rejects a standardised approach on the ground that local capabilities for participation and administration vary too much. She therefore developed a checklist to determine the capacities of traditional and modern organizations for self or co-management. In addition, the list aims at determining whether the use of an existing organization will lead to a fair distribution of benefits. Another aim is the possibility of lower costs in construction and exploitation.

New village institutions

Where these committees do not exist, do not function properly, or where a separate water and sanitation committee seems advisable, new committees may be formed, such as the local water boards in many Latin American countries (Donaldson, 1976). In Peru such administrative committees are chosen by a general assembly organized by the promotors of the water supply agency, and are responsible fo the self-help activities, operation, maintenance and administration of the system (Republic of Peru, 1977). In Colombia however, these responsibilities are phased and split up, as will be discussed later. Cairncross et al (1977) and Feachem et al (1978) pointed out that in their experience, democratically chosen committees functioned best. Alertness for non-representation and politicization can be necessary, however. In Haiti

for example, a negative influence of direction from above was experienced in a well digging project. Since the formation of village committees had become compulsory, political issues had made many of them ineffectual (World Bank, 1978).

Feachem et al (1978) also advocated single purpose committees rather than general development committees, or committees combining a number of related programmes such as those for village garden and water development. An example of the successful functioning of such single purpose committees is a rural area development project in Yugoslavia. Here, special Health Committees were created for each programme component, such as a water supply system, local health stations and school gardens (Nikolic et al, 1975; Tomic et al, 1977). Hima (1976), however, advocated the integration of well operation activities with the tasks of production and marketing cooperatives.

User associations

Another solution for village level organization is the formation of "user-associations" or "user-groups" which provide water only to members (Feachem et al, 1978; Scotney, 1976; Vierstra, 1977). Although initial funding would largely depend on the government, or on other outside financing agencies, the matter of recurrent costs could be solved by regular cash contributions from members who had made a personal choice to join the association. They may therefore be considered to be better motivated, while sanctions can be applied to ensure regular payment.

A properly functioning association may also reduce factionalism and conflict, because individuals rather than the whole village are involved, and power and influence are more evenly spread (Feachem et al, 1978). This might make it easier to prevent secondary use being made of the facilities common in a system of flat rates, such as irrigation or cattle watering. This misuse of the supply furthers the inequity between farmers and people with no agricultural plot or stock at all (Vierstra, 1977).

However, user associations may themselves increase inequities by making it more difficult for the poorer members of a community to join when equal contributions are asked from all (A.T. White, 1978).

Control of water use by non-members may be difficult, especially with standpipes. In a scheme in Kenya a family who knew all members personally held the key to the supply, but even then supply to third parties could not be prevented (Scotney, 1976). Another problem with some user groups in Kenya was that they were not real groups, just lists of names without identity or leadership. Only the groups which had developed an inner cohesion were still functioning (Scotney, 1976).

A combined approach

A combination approach of a village committee and user association is found in Colombia. In the initial phases, the community participates through an existing or elected village development committee, the communal action committee. The subsequent administration and maintenance of the supply are carried out by an autonomous administrative committee. This committee is composed of one representative each of the communal action committee and the user association. Both are elected by a general assembly of users. The promotor functions as the secretary to the committee, attending its monthly meetings (Mora Ramirez and Lopez Orozco, 1976; Republic of Colombia, n.d., 1975; Santacruz, pers.comm.).

A similar approach is followed in Paraguay, where an organizational committee is elected by a general assembly of community leaders, representatives of village organizations and heads of families for the implementation of the first phase of the construction programme (source improvement). Upon completion, a final organization, the Water Board, is established in accordance with the law (Cardenas, 1978).

Such a solution is also advised by Feachem et al (1978). They suggested that, in Lesotho, the whole village should elect the village water committee that is to organize the building of an improved supply. After that the system should be used by subscribers only, who would also choose the committee for the administration of the supply from their midst.

Special arrangements may however be necessary to assure a fair distribution of burdens and benefits. This can mean relating contributions in construction to participation in a user organization. For it can happen that those who contribute free labour under pressure of a village committee cannot afford to join a users' association. It can also happen that those who later join the association escape a contribution to construction costs paid by the workers of the first hour.

Another example of a combined approach is in Malawi. There arrangements are quite flexible, based on the existing local situation. Local leaders are directly involved. In addition, committees are formed for the construction of the supply*. Of these, the main committee or in a large scheme the branch committees organize some delegated operation and maintenance tasks. At village level, the village committee can stay on for operation and maintenance or the headman or a group of leaders can look after this. This includes selecting a village for a one-day training in PVC pipe repair. The final responsibility for operation and maintenance, including its financing remains with the agency. The users get the water free. (Glennie, 1979; Rep. of Malawi, 1977).

Subcontractors

Sometimes, water supply systems are leased to individuals. In Kenya for example, kiosks and licensed retailers are found (Carruthers, 1973; Scotney, 1976). Such solutions are likely to create an easy distribution and rate collection system, facilitate the operation and maintenance and control damage and pollution. Special precautions will be necessary, however, to avoid that the poorest people spend a substantial part of their income on drinking water. Figures for Yemen and East African cities showed that up to 10 percent of the income of the average worker is used for buying water (Davelaar, 1978; G.F. White et al, 1972). Figures for some West African and Central American states are even higher (Etherton, 1980; A.U. White, 1977).

---

* The main committee, for digging the main area line, section and branch committees at inter-village level, and village committees for the public taps. These committees are either directly elected or formed by the local authorities.

A solution, suggested by the World Bank, is that the agency is on the alert for the making of excessive profits. In such a case it should raise its price to the subcontractors and return the extra revenue to the general village funds (World Bank, 1975). Another suggestion, made by Scotney (1976), is that kiosks be leased to local cooperative groups. Considering the negative consequences this service may have for any income redistribution objectives of the scheme, consultation with its future users may be deemed a necessity.

Private and group ownership

Private ownership may occur where large institutions, such as missions or schools, share a water supply with the community, or when storekeepers also act as water vendors from a private source. The state of maintenance is usually better than that of public supplies (Feachem et al, 1978; OECD, 1978; Platt, 1973) but where payment is demanded, costs for users may be relatively high.

A private supply using rainwater from corrugated iron roofs depends greatly on the regularity of rainfall. Feachem et al (1978) found that in Lesotho the number of lowland houses with such roofs was quite high, but the proportion with some kind of guttering very low. In one village, 63 percent of the houses had iron instead of thatched roofs, but only three had crude guttering provisions. When asked for the reasons, householders replied that they could not afford guttering, although the cost for a typical house would be about 1/7th of that of the roofing alone. A more logical explanation is that the distribution of rainfall over the year necessitates storage. A storage tank, of a size sufficient for half of the daily water consumption, costs about twice as much as a roof. Part of the water would still need to be collected from another source, despite the large investment.

Subsidies on catchment tanks and guttering could improve this, but would mean further advantages for those who can already afford a more expensive type of house. Interesting in this respect are the efforts of Kikuyu women groups in central Kenya. They work as temporary agricultural labourers

during the harvesting season to buy corrugated iron roofs for each member's house. Unicef now provides subsidies to such a group for constructing cement rainwater roof collectors (Gachukia, 1979*)

In West Java the same problems were solved by designing low cost group rainwater collectors. Neighbours were asked to form their own household groups and to apply for loans to purchase a large cement water jar. Lower production costs or higher subsidies for poorer households are however necessary to make this solution affordable to all (Segaar, 1979).

An example of groups owning not the supply itself but a supply point is the Lusaka site and service project (Hollsteiner, 1979). The area was divided into sections of 25 households and each group was offered a standpost. The standposts are jointly owned and paid for. For prompt payment of the group rate, a deduction of 7.5 percent is given, which greatly improved payment records. Group connection also exists in urban supplies in Ivory Coast and Gabon. Such group connections can also be considered for rural piped schemes offering a choice between house connections and public standposts. Where many cannot afford a house connection and the number of standposts is limited for reasons of financial viability, group connenctions deserve more attention.

Privately-owned public or group provisions for excreta disposal are less usual. Public provisions managed by the local authorities are however often insufficient in number, poorly maintained and inconveniently situated. Safe private provisions are desirable, but not always realizable for every household. Intermediate solutions are therefore tried in a number of high density areas.

In Patna, India, a voluntary agency runs public latrines and washing facilities for the urban poor. In addition they convert private service

---

* As far as known, no study has yet been carried out on the formation and membership of these groups. Another interesting point is their absence in other high rainfall areas in Kenya with a tradition of women cooperation.

latrines into water-seal latrines. This successful project is now under expansion to other Indian states (Etherton, 1980; Vijayendra, 1979, 1980; WHO, 1978). The comfort stations in Ibadan are already well-known, and have found imitation in Jakarta (Ademuwagun, 1975; Adeniyi, 1973; Nihon Suido Consultants, 1977; Pineo and Subramanian, 1975).

In the bustees of Calcutta, space to locate one aquaprivy for each household is often not available. Location of group latrines at the outskirts was rejected, as this would complicate use and maintenance. But the use and maintenance of sanitary latrines assigned to a small group of families living in one hutment or quadrangle was quite reasonable (Maitra, 1978).

A combination of joint installation and private ownership is the toilet-and-washing blocks used in densely settled areas in Lusaka, Zambia. The blocks are installed at the border of two, three or four adjacent plots, but each family has its own unit (Vincent et al, 1961).

Public ownership

Finally, the system may be fully owned by the community, or it may be owned by a local authority, provided there is sufficient legalized decentralization (Feachem et al, 1978). In 1962 a special law in Nepal authorized elected village councils to initiate and execute all kinds of self-help programmes including water supplies and excreta disposal, using 10 percent of the local taxes for the purpose (Blackwell, 1969). In Brazil, mixed companies of public officials and representatives of the commercial section are found (McGarry, 1977).

4. INTEGRATED ADMINISTRATION

These arrangements, however, still leave open the question of sanitation education. The importance is increasingly recognized of integrated environmental sanitation programmes in which safe water supplies, excreta disposal facilities and sanitation education are the minimal components. However, package approaches covering community organization and education through local participation in the planning, implementation and construction phases are still rare. Literature on national or relatively

large scale programmes, in which all these aspects are covered at the various levels of the agencies involved, is equally scarce.

Continued community participation in long-term sanitation education programmes will be necessary. Ademuwagun (1975) for example, reported how the comfort station (communal sanitation and washing facility) with the best results was the one where a retired public works officer informally continued the sanitation education programme, after it had officially ended.

For a wider impact on environmental health, community organisation and development techniques should be the basis of an educational programme. This means that the members of the community participate in the identification of necessary behaviour changes and the planning, implementation and evaluation of local programmes. It also means that such programmes can be continued by the community itself, with minimal outside support (Isely, 1979; Isely et al, 1979; A.T. White, 1981).

A health committee may be formed, or may already exist, or a subcommittee of the water committee may be responsible for the continued sanitation education activities and the control of public sanitary conditions and behaviour. It can also provide assistance, advice and supervision for the improvement of sanitation facilities in the home. Care must be taken that the various target groups are adequately represented in such a committee; sometimes, for example, women are not involved (Kanungo, 1957; Fanemanu and Vaipulu, 1966).

Primary health workers can be involved, as in some cases they are the operators, but usually their task will be a supporting one. Where public health inspectors are present, retraining for such a participating approach will be necessary (Y.O. Yeboah, 1978).

Such arrangements will also facilitate long-term evaluation with the involvement of the community. The short-term impacts of a sanitation education programme as part of a larger water supply and sanitation programme may be great because of the heightened interest in these matters, but interest may wane with the passage of time. In other cases not everyone

will, or can, realize all the improvements propagated witin the relatively short time of an action programme and the village population and housing pattern may change continuously. Regular evaluation of environmental sanitation conditions, and revival of educational efforts through village level institutions, may therefore be a useful addition to the programme of the regular health staff.

5. DELEGATION OF AUTHORITY AND WATER RATES

When some responsibilities are delegated to village institutions or members of the community, the latter must be given some authority in order to function properly. They will need the authority to enforce the public regulations on sanitary behaviour and provisions, while more informal sanctions can be kept for those activities which do not cause public nuisance or risks. They will also need some authority to ensure the continued contribution of the community to the operation, maintenance and administration of the system. Although sometimes assistance in labour or local materials may be demanded, these contributions will usually be in the form of water rates.

In many Latin American countries, the rates must also cover the repayment of the loan given to the community for the construction of the system. This loan often originates from revolving funds for water supplies on a regional, or national basis (Donaldson, 1976). The proportion of the total costs and the length of time given for repayment may vary with local circumstances, such as size of the community or potential income (World Bank, 1976). Since it is important that the rates should be accepted as equitable, they should be fixed in concert with the users.

First of all, there are differences in level of development among the communities themselves to be taken into account. In Colombia, the rates that the users pay to cover the construction loan and recurrent costs are fixed by the agency in consultation with the communal action committee. The decision is based on the costs of the system and the socio-economic study of the community made by the promotor. The final arrangement, contractually laid down, must have been approved in a general meeting (Rep. of Colombia, 1975).

In Argentina, similar socio-economic studies serve as a basis for separate payment arrangements in each community. Initially, the rates are fixed by the water agency at provincial level, attuned to the average household income. The cooperatives responsible for operation, maintenance and administration can fix adjustments within certain limits. These are indicated in the "Regulations for a community service for a potable water supply" drawn up at national level (Rep. of Argentina, ca. 1971; Inhouds, pers.com.). In South Korea, specific village rates are set by the maintenance committee, covering operation, maintenance and depreciation (Pineo, 1976c).

There can also be a differential household rate, to compensate for differences in user benefits, and if necessary to subsidize the supply to the poorest people. In this matter, consultation with the village water organization on the apportioning of the charges may be useful, since the organization has an inside knowledge of community conditions. Such a system was proposed in West Java (Segaar, 1979). It worked successfully where a generally acknowledged leadership existed. In Ethiopia, too, the agency only fixes the total amount to be contributed by the villages, based on the economic potential of the region. The local water committee (a subcommittee of the development committee or a group of local leaders) determines the way in which the rates are paid. This can be through funds from communal fund, cooperatives or household rates. The government only recommends that payments are weighted to achieve a redistribution of income (Gov. of Ethiopia, 1979).

Misuse of such decision power is quite possible and can result in an unequal distribution of benefits. An example is an agreement on flat rates for unmetered house connections owned by a minority of the population and public standposts on which a larger group relies. Superficially the house connection rates can be considerably higher than those of the standpost users. But the much higher quantity of water means a much lower unit cost for the house connection owners. They can even make a profit, through irrigation of a vegetable plot, selling water to neighbours, etc. And when council boreholes in Botswana were handed over to local syndicate

management, a flat rate for each stock owner was charged regardless of the number of stock he watered. This problem was also encountered with committees administrating newly built dam reservoirs (Chambers and Belshaw, 1973).

In such cases the agency may have to build in special precautions such as a weighted rate, technical devices and regulations on secondary use. The linkage of water rates to a weighted property tax as suggested by Costa (1976) can be a useful method in countries where such taxes exist (e.g. house tax in India). It is much less likely that the lower income groups themselves will request such weighting, although cases have occurred, e.g. in Mexico (Elmendorf, 1978).

Other matters in which the village administration may be given some authority are those concerning decisions on the time and place of collection. These factors may account for a poor payment record. Farmers, for example, may be dependent on the harvesting and marketing season which makes regular monthly payments much more difficult than payments linked to the times when they have ready cash. Monthly payments may be preferred by people with regular salaries (Jakobsen et al, 1971; PRAI, 1968; Scotney, 1976). Payments which must be made in person at some distant office may also be a barrier to regularity (Scotney, 1976). The inadequacy of a water point due to its remote situation or intermittent supply may even be a reason for a rate reduction (WHO/IRC, 1978).

As with the contributions during the construction phase, sanctions which are less negative than the cutting-off of the supply of non-payers may be considered. In the Dominican Republic, a practice of personal visits to non-payers seeks to improve the situation where at the end of 1975 about one third of the total number of house connections had been suspended. This system is already functioning in Peru (Pineo, 1976b, 1976c).

VIII EVALUATION AND COMMUNITY PARTICIPATION

Evaluation is becoming accepted as an essential part of drinking water supply and sanitation programmes. Many evaluations now cover more than the cost-efficiency of construction. They are also carried out to determine the cost and the effectiveness of the service, the socio-economic and health impacts and the distribution of burdens and benefits. These evaluations in general support the call for the introduction or improvement of community participation and education. They also lead to an increased interest in the evaluation of community participation and education itself. What are the results of a programme with a particular participation and education component? Are they better than programmes without such a component? And what type of participation and education is most successful in a particular economic, political, socio-cultural and programme setting? Such outcome evaluations and the process evaluation necessary for them are discussed in the first part of this chapter: evaluation of participation. In the second part of the chapter, the participation of the community in such evaluations is discussed.

1. EVALUATION OF PARTICIPATION

A growing need as a result of other evaluations

Too often, evaluation of drinking water and sanitation projects and programmes have focussed on construction alone. Programmes are often considered successful when they have been completed in time and according to plan, when the costs have not surpassed the allocated budget and when the construction is up to standard. Where individual facilities are provided, such as water-sealed latrines or rain catchment tanks, the major concern is also to serve the maximum number of people within the planned time and budget. Sometimes, there is not even a check whether the latrines acquired have indeed been installed. Operation and maintenance are the responsibility of the individual users and follow-up for maintenance is rare.

In the last decade there has been a change in the focus of the evaluations of drinking water supply and sanitation programmes. The interest goes beyond cost-benefit studies in terms of the number of people served and the per capita costs. Studies are also carried out to evaluate the effective use and continued operation of the services. Such studies have frequently revealed problems in the coverage, the adequacy of the service, the continued operation and the financial viability, the appropriate use, the realization of health and socio-economic benefits and the distribution of these benefits.

Bantje (1978) for instance found a poor continuity and inadequacy of service when he evaluated piped water supplies in the coast region of Tanzania. Operators were regularly absent due to programme logistics. In schemes with one operator (34 out of 50) or no operator (3), a continuous functioning was therefore not guaranteed. Frequency of breakdowns varied between once a month or more (23 percent), twice to four times a year (20 percent) and once a year (40 percent). In 27 percent of the cases no estimate could be given. When the breakdown occured, operators usually had to wait till a mobile team arrived; in only 3 schemes were some spare parts available. Such waiting could take several months; regular visits by the teams were reported in 29 percent of the schemes, but no visits in 45 percent. An effective upward communication system is still lacking. When Bantje determined the number of households served by each standpost in 48 villages, he found that with the existing discharge (300 liters/hour) nearly one third of the villages had an inadequate supply. Line-ups were reported in 24 villages, varying from less than 15 minutes to over one hour. In these circumstances, people more or less regularly returned to the unimproved sources. Buying from private water lorries at a rate equal to one day's labour wage for five gallons of water was also reported.

In Botswana, the local district councils responsible for the exploitation of rural water supply schemes are hampered by financial and institutional constraints, including that of rate collection. Officially, water is not free, but capacity to pay is low. Also, people are not willing to pay a flat rate which does not take into account the variations in daily consumption between households nor the seasonal absence of the farming popul-

ation. In general, no revenue collection therefore takes place. But where this is done, the administrative cost takes all or most of the revenue collected (Harlaut and Hansen, 1978).

A survey of 200 out of 2,600 protected wells in six West African countries showed that in almost all cases people continued to use unprotected sources as well. Problems with distance, physical and social access, taste and adequacy were the major reasons for non-use (EEC, 1978).

Such a lack of general and continuous acceptance has considerable consequences for the public health impact of improved water supply and waste disposal. At present, findings in this field are inconsistent, while a few studies show a decrease in water and sanitation related diseases, most do not. Important intervening factors are the absence of a general continuous and correct use of the improved facilities and the continuation of other transmission channels for these diseases, as a result of a poor hygiene.

Nor do economic impacts always materialize. Time gains resulting from a shorter distance can be eliminated by line-ups or more frequent trips. A considerable increase in water consumption only occurs when house connections are installed (A.U. White, 1977). The productive use of such time and energy gains and increased quantities depends very much on the local circumstances. Usually, additional inputs are necessary, such as arrangements for extension, material and equipment, credit, marketing, and ownership.

Evaluations like the ones mentioned above have led not only to recommendations on more or better community involvement. They have also created an interest in more specific evaluations of community participation. Such studies are still limited in number. More evaluation is necessary to prove the value of a community participation and education component in technical programmes, and to find the most appropriate system for each area and technology.

The first problem mentioned was the incomplete coverage. One of the ways advised to realize the targets of the International Drinking Water Supply

and Sanitation Decade is to let the users bear part of the construction costs. This advice is based on the assumption that well-organized community participation in the construction can lead to cost savings without negative side-effects for the agency or the community. Considerable savings to drinking water supply projects and programmes have been reported in various countries. But no information has been given on the costs of the additional inputs necessary to realize these savings. In most cases, community motivation, consultation and organization are necessary. Are the ultimate savings worth the costs of such additional inputs? Müller (1978) and Cairncross (pers.com.) answer this question positively. Müller estimates the costs of the additional inputs by the community development department in West-Cameroon at 7 percent of the total construction costs, while the total village contribution is about 20 percent. Cairncross estimates that manpower costs for the guidance of local participation in Lesotho in 1976 would be about 10 percent of the total material costs. This is less than the savings that self-help labour with a rational amount of supervision can constitute. Differences in the participation potential of the various technologies, in local circumstances and in agency resources will play a role, however. More operational research in this field is therefore needed. Such studies should also look at the positive and negative socio-economic consequences of the participation for the community.

A second expectation of what community participation can do is to decrease operation and maintenance costs to the agency, together with a satisfactory or even better service. In many countries the community pays part of the operation and maintenance costs and/or provides the manpower to run the service. The effectiveness of the systems used is not everywhere the same. Evaluation topics for each participation system and scheme include the functioning of the facilities; the frequency and duration of breakdowns, the number of repairs managed locally and by the maintenance service of the agency; the number of breakdowns reported by the community and found by the agency on its maintenance rounds; the regular payment of rates etc.

Van Harderwijk (1980) for example, evaluated the maintenance of shallow wells with handpumps in Shinyanga, Tanzania. Local and unpaid pump attendants appointed by the village water committee are responsible for the

maintenance, evaluation of performance and reporting of problems. Maintenance officers at district and regional level are responsible for the follow-up and the bi-yearly maintenance visits. This system was set up after it had been found that one year after construction, two-thirds of the wells needed repair. Visiting 70 wells (ca. 10 percent of the total) Harderwijk found that half of them needed repair and 90 percent had minor damages. Only one pump had recently been lubricated. Hygienic conditions around the site were poor in 60 percent of the cases. Of all breakdowns, 20 percent had been reported by the village. Waiting time for repairs was 1-3 months. Meanwhile, either local repairs were tried, the wells opened up or other, unprotected sources used.

In Mexico, de la Barra Rowland (1978) compared the continued functioning of participatory water supply projects with non-participatory ones. For participation, he looked especially at participation in the planning and construction phase. No information on operation and maintenance arrangements is given. He found that such participation led to better operation and maintenance results. In 49 percent of the 43 villages where the community had not been involved, the supply was out of order. For the 94 communities that had participated in the project, this percentage varied from 15 to 38. De la Barra Rowland also looked at financial contributions to operation and maintenance. Where the communities had in one way or another participated in the realization of the service, payment in time varied from 26 percent to 71 percent. None of the projects without participation answered this question, so it can be assumed that their results are not impressive. On the basis of these and other data de la Barra Rowland concluded that participatory projects have a higher effectiveness than non-participatory ones. No information on costs could be obtained however*.

---

* The author also found that communities which participated in the water supply had more often a follow-up development project than communities which did not (69 percent versus 53 percent). Both results support the view stated in section 4 of chapter V that self-help has a motivating effect. But the evaluation of D.C. Miller (1978) and Bennell (1979) discussed later in this chapter does not support this.

A third objective of drinking water supply and sanitation projects with a community participation and education component is a positive impact on health. In Guatemala, Shiffman et al (1978) investigated the health and economic impact of an improved water supply in terms of a better nutritional status. No mention is made of any participation, but a one year health education programme was carried out after the installation of house connections in 164 households. No decrease in the incidence of diarrhoea was found, however. Skin-diseases decreased slightly, probably reflecting an increase in volume of water used. The study in food waste showed a change in the right direction, but results were not significant.

A project in St. Lucia had as health objective the decrease of schistosomiasis cases. Free house connections were installed in five communities and special provisions made for the more dispersed population. When it was found that people continued to use the river, a health education programme in the local schools and the community was added. This was found to have the desired result. Observations showed that people no longer used the river and stool examiniation showed a great reduction in disease incidence (Celestin, 1977).

Such a blocking of infection routes is very difficult for diarrhoeal diseases. Yet Misra (1975) reported that a piped water supply with community participation and education led to an increased acceptance of paid private connections and a decrease in water-related diseases, including child diarrhoea. An earlier public standpost project without such a component had been unsuccessful.

Little attention has yet been paid to the effects of participation and education procedures on the distribution of burdens and benefits. In the above mentioned study by Misra, for example, there is no differentiation of adoption and health impact data for the various socio-economic categories. De la Barra Rowland (1978) found that in Mexico the participants in construction were mainly people from the middle classes, with good incomes but relatively low education. It is not clear, however, if contributors and non-contributors profited to the same extent from this work. A.T. White (1981) quotes a case from Peru (Grondin, 1978) where it was the poor who initiated and constructed the supply, but the wealthier people who obtained the connection.

Evaluation as part of the regular programme

All studies mentioned above were either a single evaluation by an outsider or outside agency, or a pilot project. It can be useful, however, when some of such evaluations are built into the regular programme of the agencies concerned*.

In Argentina, an evaluation was planned after each phase of the national plan for rural drinking water had been implemented. For the first evaluation in 1970 a survey was carried out in a representative sample of 15 communities on use, user satisfaction, rate payment, programme and health knowledge and participation (Rep. of Argentina, 1972). Ten percent of the users were not satisfied with the service (taste, leakage, pressure). Late payment was found in 16 percent of the cases. This was caused by inability to pay in 8 percent of the cases and by negligence of users and committee in 4 percent of the cases. Payment should be based on volume consumed said 90 percent of the respondents. The relationship between water and disease was known to 60 percent. Forty percent reported to have read the health education booklets. Unhygienic storage was found in 22 percent of the households. Use of the piped water was limited to consumption and personal hygiene in 19 percent of the cases, 51 percent used piped water also for cleaning and 30 percent for vegetable irrigation. Participation in the formation of the user organisation was reported by 64 percent. Two-third of the users said they were satisfied with the elected committee, but one-third did not answer this question or answered it negatively. No reasons for this reply were given.

A more recent example is the rural water supply programme in Southern Guinea-Bissau. An action study was carried out to develop a participation and education system for the construction, operation and maintenance of rural wells and footpumps. The major objectives of the agency, the Ministry of Natural Resources, were a *good technical continuity* and an impact on public health. Because no health statistics and laboratory facilities were yet available, it was decided to use the user acceptance as an intermediate variable to determine the health impact.

---

* For the question of who should carry out programme evaluations, see Cairncross et al (1980).

For the evaluation the promotion team pays a half-yearly visit to each community where wells have been installed. They evaluate the pump conditions, the hygiene of the pump area, the functioning of the operation and maintenance and the productive uses of water. In addition, they carry out observations and interviews on the general, continuous and exclusive use of the wells, at least for drinking purposes.

The evaluation on user acceptance revealed various problems that had consequences for the technical and participational programme. The acceptable salinity, for instance, was below 200 mg/l/NaCl, less than one-fifth of the WHO minimum. This meant adaptations to the siting procedure and more discussion with the community. People sometimes had to choose between a farther well for drinking or a nearer one for other uses, so the consequences of this choice had to be clear. It also meant that wells could no longer be assigned to different sections of the villages before they had been made. This made a later division in universal drinking and non-drinking wells more difficult. Similarly, handpumps are now installed instead of footpumps because of operation problems. (van der Ploeg, 1979, 1980; van der Ploeg and van Wijk, 1980).

Evaluations comparing types of participation and education

It is not only important to know that one kind of participatory programme has the intended result or that this programme is better than a non-participatory one. It is also important to investigate what kind of participation and education procedures are most successful in a particular setting. In the OECD study of the Mexican rural water supply programmes, de la Barra Rowland (1978) found that the best operation and maintenance results were obtained when the community had participated in the construction phase with labour, materials and money. In that case, the system was working in 83 percent of the cases. The least successful in this respect were supplies where the community had only participated through a development committee. There 60 percent of the systems were working. (Compare: 51 percent working in communities that did not participate at all). The highest percentage of punctual water payment (71 percent) was in villages that had contributed cash to the construction. In this respect, villages with a development committee came second with 52 percent.

A similar study also carried out for the OECD gave some different results. The study was developed by Imboden (1977) and carried out in 11 rural water supply projects in 7 countries all over Africa. The results were analysed by D.C. Miller (1978) and Bennell (1979). Problems of low reliability, small sample size and unsuitable indicators remain to be solved. But the outcomes of the first application of the questionnaire indicate that in some phases and forms community participation contributes to the successful functioning of rural water supplies. Three variables in particular accounted for a significant difference in project success: participation in maintenance, the presence of a committee and the existence of water regulations.

Contrary to the findings of de la Barra Rowland however, Bennell and Miller found that participation in the construction phase did not significantly contribute to a successful operation and maintenance. More important in the cases investigated were participation in the planning phase and particularly in maintenance. For communities that participated in this phase, the duration of the longest breakdown was significantly shorter than for communities that did not participate. (see table 1 and 2).

It was also found that in these projects the existence of a committee did significantly contribute to the operational success of a supply. Of those villages with the lowest duration of breakdowns, almost 75 percent had a committee. Of all projects where a committee existed, 64 percent had a longest breakdown of less than one week. In villages without such a committee this percentage was 40 (D.C. Miller, 1978).

The divergence in the importance of a committee for project success in Mexico and Africa may reflect a difference in the composition, functions, and training of the committees. In the Mexican study no details were given on these aspects. In the African cross-cultural study, a number of questions on creation, composition, tasks and results of activities were asked. The answers were not clear enough however. Neither were enough cases found where the village organisation was responsible for operation and maintenance to make statistical analysis possible.

Table 1: Percentage of villages with a minimal and maximal duration of the longest breakdown, according to indicence and phase of participation.

EFFECTIVENESS OF OPERATION AND MAINTENANCE		PHASE OF PARTICIPATION									
		ALLOCATION		SITING		INSTALLATION		MAINTENANCE		OPERATION COST	
		P (N = 63)	NP (N = 28)	P (N = 36)	NP (N = 55)	P (N = 62)	NP (N = 29)	P (N = 49)	NP (N = 42)	P (N = 34)	NP (N = 37)
DURATION OF LONGEST BREAKDOWN	short: 0-7 days	60	43	64	49	58	48	61	48	62	51
	long: ½-1 year	21	18	14	24	18	24	8	33	21	19

After Bennell (1979)

P = participation
NP = non-participation

Table 2: Percentage of villages with a few or almost all supply facilities out of order, according to incidence and phase of participation

EFFECTIVENESS OF OPERATION AND MAINTENANCE		PHASE OF PARTICIPATION									
		ALLOCATION		SITING		INSTALLATION		MAINTENANCE		OPERATION COST	
		P (N = 66)	NP (N = 31)	P (N = 40)	NP (N = 31)	P (N = 66)	NP (N = 31)	P (N = 51)	NP (N = 46)	P (N = 31)	NP (N = 59)
% OF FACILITIES OUT OF ORDER	few: 0-9 %	62	68	68	61	62	68	61	67	53	71
	many: 90-99%	23	7	20	16	19	13	16	20	26	12

After Bennell (1979)

A final participation and education variable that was found to contribute significantly to the succesful functioning of the supply was the existence of water regulations. Villages which had specific regulations on traditional and/or modern water use defined by the village and/or the project, had a significantly better operation and maintenance (Bennell, 1979).

The studies summarized above evaluated in what phases and forms community participation and education contributed to project success. Other evaluations are meant to indicate what manpower and methods have the best results. In Guinea-Bissau, for instance, it is proposed to use the expansion of the programme to other regions for the testing of five different strategies: the use of agency promotors directly or via existing socio-political organizations; the use of extensive or intensive promotion programmes; the use of a directive or a self-discovery approach, and the use of a male or female line (van der Ploeg, 1980). Similarly, Steuart et al (1962) and Ogionwo (1973) compared the use of two different approaches for sanitation education (see Ch. VI).

In several countries national programmes have one standardized community participation and education procedure. Such procedures can have different results in different communities, e.g. in continued functioning, payment and distribution of benefits. In such a case it will be useful to find out what accounts for such differences and if another procedure in such cases will lead to more equivalent results.

In the Dominican Republic, for example, payment of the flat water rate for house connections (RD 1.50, and in low income areas RD 1.00 or 0.50) varied considerably. This resulted in about one third of all house connections being disconnected. In one area, 38 percent of those still connected had not yet paid their last bill. In one of the communities, only 3 of the 73 house connection owners had paid their rates (Pineo, 1973). Thereupon, adaptations were made to improve this situation. On his monthly visit to the local administrative committee, the promotor and the local treasurer or bill collector visited the defaulters before disconnecting the tap. This resulted in a payment of 92 percent of all bills in the first half of 1975 (Pineo, 1976a). It was not mentioned however, if this system has led to a substantial increase in supervision costs. Neither have the characteristics

of the defaulters or the reasons for non-payment been mentioned. The socio-economic consequences of this system for the community are therefore not clear.

Process Evaluation

To realize the objectives of a participatory water supply and sanitation programme or project it is also important to check the process by which these outcomes are reached. Monitoring of inputs will be necessary to know if the programmes are carried out as planned. Outputs are monitored to keep track of the effect of the activities. The collection of input and output data during the process will also facilitate final evaluations, e.g. on cost-effectiveness. For this purpose, special recording systems can be developed (Millan and Baquero, 1972)

In the field, simple record keeping techniques can be used, e.g. on attendance. They should however not take up too much time (A.T. White, 1978). Nor should they constitute a serious threat to individuals who fear that the information gathered will be used against them (Feachem et al, 1978). Such records serve in the first place to evaluate the performance of the community. In Colombia, for instance, the promotor records the amount of community contributions per type and household, the progress of the work etc. (Rep. of Colombia, 1975; Millan and Baquero, 1972). But they can also help agency personnel to evaluate their own performance. In Niger, record keeping helped health workers discover that their conventional approach reached only 15 percent of the target population (Belloncle, 1974).

Process evaluation thus goes further than the registration of what happens. It also means looking if the developments are in the right or wrong direction and identifying explanatory factors. For this purpose intermediate objectives are often set.

Quantitative data, like those mentioned above can be a help, but qualitative information is also important. Standards of work can be set, in the technical and the organisational field. A uniform depth of the trenches dug with local labour will, for example, be important in a piped supply (Glennie, 1979). Three criteria applied to evaluate the functioning of local environmental health committees in Cameroon were meeting attendance without reminder, initiation of new village projects and detailed demands

for outside help after the inventorization of local resources (Isely and Martin, 1977). When discussions on health aspects are held, understanding will be no less important than attendance. Paying attention to the characteristics of participants and non-participants can contribute to a better insight into the distribution of burdens and benefits.

2. PARTICIPATION IN EVALUATION

When the community is involved in the design and implementation of the programme, it is natural to involve them periodically in the ongoing evaluation. Discussions of problems can reveal specific reasons why the contribution of the community does not come up to expectation. Similarly, the agency owes the community an explanation when the process stagnates for outside reasons. In a latrine building project in India, for instance, time lags of up to 16 months occurred. When the reasons were not explained by higher level officials, the angry villagers demanded their money back (PRAI, 1968).

For some parts of the programme, e.g. sanitation education, it is likely that intermediate local objectives will have been set jointly by the agency and the community. The realization of such objectives will then also be jointly evaluated. Such joint progress evaluations were part of a water supply and sanitation project in Tonga, Polynesia. At weekly meetings, observations of visible achievements were discussed by the villagers and the health staff (Fanamanu and Vaipulu, 1966).

After the projects have been completed, the two most common evaluation systems are the regular monitoring of performance of the services and the organization of incidental or periodic evaluations. The monitoring is often carried out by local agency personnel without any direct participation. The only way in which the community can participate in this monitoring is to report problems. Formal feedback channels do not always exist or function satisfactorily. In cultures with a strong patron-client relationship an upward flow of communication will not come as a matter of course (Blackwell, 1969, Bryant, 1969). Twumasi et al (1977) reported that there was a reluctance to report breakdowns in improved water supplies in Ghana for fear of being considered disrespectful.

In India, users can record complaints in special agency registers. It took a Harijan section of a village in Andhra Pradesh a year to complain about the absence of a standpost for which they were paying taxes to the village council. Neither is the follow-up always efficient and effective, nor agency personnel trained in giving feedback to the users. In the case of the above hamlet, the water agency designed an extension but did not directly inform the Harijans. Instead, they contacted the local council to get the prescribed deposit of part of the construction costs. The council was not willing to do this, but the population of the hamlet, who did not know of the council's refusal, blamed the agency.

Community participation in the monitoring of performance also occurs. In many Latin American countries it is a part of the responsibilities of a local water committee. The committees have to send regular reports to the agency and get a periodic visit of a supervisor (Rep. of Peru, 1977). Or they get monthly record inspection visits (Pineo, 1976a; Rep. of Colombia, 1975). Statutory meetings with the members of the user cooperative and regular elections of its committee provide the users with a means to express their satisfaction with the functioning of the system. It could however be useful to add some informal measurement of user satisfaction during inspection visits. An evaluation study of a government well in Dongoro, Ethiopia, for instance revealed that a whole black market existed from which the operators and the nearby households profited (Browne, 1974).

There are also overall evaluations, carried out once or with long intervals. Some of these evaluations do not involve local people at all, but rely on objective data to measure project success. Methods used in such studies are observations at the water sources, water measurements (e.g. on flow, quality), inspection of agency records and study of health statistics. Usually, however, sociological surveys are also carried out, to collect information on acceptance, patterns of use, reported incidence of disease etc. In Nigeria, for example, a survey on patterns of use and user satisfaction was carried out in four rural towns with a piped water supply (Akintola et al, 1979). It was found that the quantity of water used had increased by 44 percent. But the bad distribution of the standposts limited a full acceptance for a greater health impact. In the evaluation model

developed for evaluations of rural water supplies in Botswana and Ethiopia, a survey on user satisfaction is part of the general study. The central authority, the local maintenance organization and the users were all asked to comment on design, water quality, operation and maintenance, costs and/or acceptance (Harlaut, 1977; Harlaut and Hansen, 1978).

It is still rare that such passive involvement is followed by a more active involvement, e.g. through a discussion of local results and consequent action by the agency and/or the community.

The half-yearly evaluation study on continued functioning and adequate use of rural wells in Guinea-Bissau is an example. The survey observations and interviews on which the evaluation is based take one to two days. Immediately afterwards the results are laid down in a report in the vernacular language. The results are discussed in a meeting with the village development committee and the male and female pump caretakers and health educators. Decisions are taken on village action and on agency follow-up (van der Ploeg and van Wijk, 1980). The resulting post-installation care has not yet reached all villages, but where additional action was taken, 0-13 percent continued using unsafe water for drinking, while in the villages without follow-up this proportion varied from 25 to 56 percent (van der Ploeg, 1980).

It may even be possible to involve the community in the collection of evaluation data, as discussed in chapter IV, or to stimulate regular self-surveys. One way to do this would be through integration into the school health education programme. For this purpose, the preparation of simple models and guidelines for repetitive studies by successive student generations could be developed by the departments of health and education. Another way is to train village health committees for this purpose. This is done in Cameroon, where the environmental sanitation programme for self-help action was evaluated by outside evaluators who visited the communities and by the committees themselves. They met at an annual conference to report the accomplishments of the last year and declare their objectives for the next (Isely et al, 1979).

Experiences with participation in project evaluations are very limited, however. This has also consequences for the judgment of the importance of participatory evaluations for ultimate project success. Miller (1978) stated that such involvement can yield important benefits, e.g. for the identification of the real effects of water supplies and the underlying reasons. Due to the lack of cases no hypothesis-testing research could yet be carried out on this aspect of participation. With more attempts to integrate evaluations into water supply and sanitation programmes and to involve the community in project evaluations, future evaluations can also show if and in what form local involvement in project evaluation is important for project success.

The fair distribution of burdens and benefits of a public water supply is an important part of planning and evaluation. This picture shows a public tap with a water drum belonging to the president of a village council in Uttar Pradesh, India. (photo: C. van Wijk/IRC)

Student sanitarians check and repair a well near the Kolladuba Health Centre in Ethiopia. (photo: WHO)

An essential part of the higher level support is the regular training of villagers for technical, educational and administrative tasks. (photo: IRC)

IX HIGHER LEVEL SUPPORT

1. ORGANIZATIONAL STRUCTURE

The acceptance of an integrated approach towards rural water supply and sanitation, in which community participation and education are essential, will have consequences for the organizational structure behind the programmes.

In most countries a national water supply unit will already exist. See, for instance, the report on well construction in three countries in francophone Africa (BURGEAP, 1974). The existence of special rural programmes, as described for eight developing countries by Pineo (1976-1978), may be less universal.

These reports showed that excreta disposal programmes were less common, and usually not integrated into a rural water supply programme. This may be because water supply programmes concern public provisions or systems, while excreta disposal programmes in rural areas will usually be limited to construction without a sewage system. Therefore, waste disposal usually is a subject of a health education programme, and health education as part of a public water supply programme is less usual.

Where community participation in the construction and/or operation of rural water supplies is accepted as an essential part of the programme, special units for community consultation, organization and motivation often exist within the rural water organization. Little, however, is known about their role in sanitation education or how they try to effect an optimal health impact of the water supply itself. In addition, more information is needed about an improvement of environmental health in general through activities for better waste disposal and personal and household hygiene.

Another consequence of the acceptance of community participation will be its effect on the functioning of the other divisions within the agency, such as the planning department and the departments for the construction, operation, maintenance and management of water supplies. In the latter departments, for example, more supervision and a different approach will be needed, as will be the case for the supply line (Donaldson, 1976; Pineo, 1973; PRAI; 1968). The timely delivery of construction materials and spare parts will be even more important when the community has been involved in and contributing to the programme from the beginning. When the agency fails to answer the expectations of the community, without an acceptable explanation for this failure (and any explanation will become unacceptable when it has been repeated too often), one cannot blame the community for its growing scepticism.

An organizational unification of the entire integrated programme of environmental sanitation in its widest sense would of course be ideal, but it will usually be impossible to realize it within the existing government structure. The formulation of a special policy on rural water supply and sanitation, including a definition of the concepts "integrated" and "community participation", will usually result in a series of "organigrams", networks of administrative coordination and lines of communication, and a division of responsibilities. A special policy will also greatly affect the terms of references for engineering firms. These are often still limited to the construction of a certain number and type of works within a certain time. But when the policy is changed, early arrangements for operation and maintenance, the pursuit of an optimal user's acceptance and concern for local socio-economic and health consequences are likely to be included in these terms.

2. ADMINISTRATION, COORDINATION AND LINES OF RESPONSIBILITY

Links between the organizations

In some cases ten or more separate agencies are involved in supplying water within one country, and coordination of their activities is seldom optimal (McGarry, 1977).

Such coordination of activities will nevertheless be essential for an integrated rural water supply and sanitation programme at the local level, since the motivation of the community and the initiation of community organization and education programmes must start before the initiation of the technological programme. The links with non-technical agencies and sections should be established long before the programme is actually started. The necessity of cooperation and coordination of the various activities should be understood and taken seriously by all parties*. With the integration of a single unit responsible for community organization, coordination may be easier than when more such organizations are involved, but some interagency contacts must be made in any case, e.g. for school health education and adult education with the department of education, or for rural composting with the department of agriculture. All this must be done as early as possible.

The importance of early contacts between the political sector and the bureaucracy, between planners and policy makers, has already been mentioned in Chapter I. These contacts should result in explicit guidelines for macro planning. Other categories for linkage are planning, outside production and research units, planners and consultants, and the various financing agencies and departments (Dube, 1967).

The organization of institutionalized interagency contacts, such as general conferences, interagency meetings, the installation of coordinating committees and the use of information sheets (Hall, 1978; Miyasaka, 1971; PRAI, 1968; WHO/IRC, 1978) should be taken seriously by all, if it is to guarantee success (PRAI, 1968).

---

* In practice, the integration of technical and community development components and the necessary decentralization and two-way communication may not be easily accepted. Feachem et al (1978) documented several examples in which the district community development officer was circumvented, ignored or not actively involved by the water agency.

Links within the organizations

In practice, one or two agencies will have the major responsibility for the technical and non-technical components of the programme, and the horizontal and vertical links within the(se) organization(s) will be a second condition for a good higher level support.

Woods (1977) stressed the importance of a downward, upward and horizontal communication flow. When a message is trickling down, one should check whether it contains relevant information, whether it is understood and used, and whether it reaches the intended audience.

In the upward flow, which is more difficult to realize, distortion of a message often takes place since there is more appreciation of positive than of negative information. The latter may be more important, however, to adapt the programme in time for ultimate success. A critical factor for successful community participation and trust is the knowledge that the agency welcomes information on problems, and is prepared to act on it. Horizontal flows of information are as essential, but hard to realize since such flows are often only informal.

A short training in the communication network of the programme, covering upward, horizontal and downward flow within and between the organizations involved may be very useful. Alternatively, one may think of the mere visualization of this network, with its various key persons serving as liaison officers in their respective fields. A timetable to coordinate the various activities should also be added. An explanation of these schemes can be given to those who lack experience in large scale planning, in particular the lower level officials and community representatives.

Decentralization of responsibilities should be fully accepted by the higher levels. With the creation of village level organization, appropriate organization at the local government level should also be instituted, especially for maintenance matters (WHO/IRC, 1978).

Continued liaison with the community

Manpower Since the continuity both in the functioning of the environmental sanitation facilities and in the sanitation behaviour of the members of the community is generally more important than the initial adoption, provisions will have to be made for continued supervision and assistance by the agency.

Where government officers are present, e.g. public health inspectors and community development workers, they can check the continued use of the facilities, the maintenance of waste facilities such as latrines, refuse heaps and public rubbish dumps, and the general household hygiene. However, their effectiveness will often be limited by factors such as their frequent transfer, the lack of clear responsibilities for the stimulation of a continued adoption, and the social distance between them and many of the villagers (PRAI, 1968). The health inspectors may see their task too much as the correction of unsatisfactory conditions and behaviour through penalties, and may interpret education to mean publicity and information only. Adaptation of selection criteria and training methods may be needed, as well as the diffusion of clear guidelines on a wider task and a new approach.

Primary health workers, who are usually tied more to their own community and take part in the community life, may be more successful. But to guarantee the continuity of their work it may be necessary to develop the possibility of a village or area bound carrier. In any case, village committees should continue to play a role.

Where villagers are responsible for simple maintenance and repair, and also where agency stationed operators are working, there is an obvious need for higher level support to preventive maintenance and repair, and for the timely provision of spare parts, including the upkeep of a small local stock. It may be helpful, in facilitating such support, to provide for the existence of a special unit, operating within the agency responsible for the maintenance and repair of the technological facilities. For handpump programmes, for example, a three-tier system is presently developed in

India (Subramanian et al, 1979; Panchayati Raj, 1979) and Bangladesh (Islam et al, 1979). A mobile unit at central level assists the technicians at the regional level and the caretakers at the local level in maintenance and repair.

In addition, the creation of the function of a special liaison officer could be considered. The local operator can contact this officer when other channels of contact are blocked, e.g. for the supply of spare parts. The presence of such a personal contact within the agency might facilitate upward communication. Finally, Scotney (1976) suggested the publication of a regular bulletin for distribution to scattered field staff personnel, to improve downward communication.

For the continued liaison with administrative committees, various arrangements have been made in Latin America. Promotors who have been used for the organization and motivation of the community can also be made responsible for the supervision of administrative committees in an area, as is the case in Colombia. In this country, the promotor becomes an outside member of the administrative committee after the completion of the supply.

In Peru the same task is carried out by health inspectors who visit the community every three to four months and review the accounts. Since about 50 percent of the users were found to be behind in their payments, an association of administrative committees has been planned to stimulate their proper functioning (Pineo, 1976c). In South Korea specially trained sanitarians are used for the continued liaison with the communities. The training of the water committee and the operator, and the supervision of system maintenance and water quality, are part of their task, while the design of the simpler systems is also carried out by them (Pineo, 1976e).

In the Philippines, a team of at least one technician, one administrator and one health expert pays evaluation and support visits to assess the technical and administrative functioning, water quality and use. In selected projects, economic and health impacts are studied (Rep. of Philippines, 1977).

Morfitt et al (1969) suggested to make sanitary inspectors responsible for the routine inspection of both administration and technology, including the control of equipment and water quality, assistance in the extension, repair and replacement of the system, and the organization of refresher courses within the sanitation programme of the health department. In the Dominican Republic a special category of supervisors, called commercial agents, have been trained. These agents are responsible for about 15 systems scheduled on 4 routes, so that every system receives a monthly visit. During this visit the books are audited, accounts are checked with the treasurer of the committee, the money is forwarded to the zone office by post, and problems and matters of interest are discussed in a meeting with the administrative committee. To improve rate payments, the agent accompanies the treasurer or bill collector on house visits to users who have fallen behind in the payment of their contributions. A report, with recommendations if necessary, is then sent to the zone office (Pineo, 1973, 1976a).

Listing and Recording The preparation of checklists and guidelines, and the standardization of records will also facilitate the continued contact between the agency and the community. Reference has already been made to the use of model constitutions (Cairncross et al, 1977; Feachem et al, 1978); guidelines for water committees (Rep. of Argentina, 1971; Rep. of Peru, n.d.); community and individual contracts (Rep. of Colombia, 1975; Rep. of Peru, 1977; Patnaik, 1961; Pineo, 1976a, 1976c); village books (Whyte, 1976); and guidelines for socio-economic studies (Rep. of Peru, 1977; Rep. of Colombia, 1975).

For the recording of operational activities Scotney (1976) suggested an occurrence book, in which observations of a technical and a non-technical nature are entered, to which rainfall records can be added. The use of standardized report form for operators (BURGEAP, 1974), standardized request forms for agency assistance in maintenance and repair (Raman, 1962) and standardized equipment lists (Donaldson, 1976) should also be mentioned.

In its three-tier system of handpump maintenance, Unicef uses preprinted and prestamped postcards. The local caretaker fills these in and mails them

in case of a problem. To facilitate a correct diagnosis of the trouble Unicef now uses pictures rather than text.

Lovel (1978) and Curtis (1977a) developed checklists on higher level planning and support and on the allocation of responsibilities.

3. TRAINING

Various categories of people involved in rural water supply and sanitation programmes will need special training courses to optimalize their functioning in such programmes. This is especially the case when the programmes are organized on a large scale, and training cannot be given informally at the village level.

The importance of an integrated programme, including community participation, sanitation education and upward, downward and horizontal communication, will have to be impressed on all personnel of the agencies involved, in particular on the engineering staff working in the field.

Local caretakers and operators will need some technical training. In the case of the former this may be limited to the early recognition of serious trouble, but for the latter it also involves the undertaking of simple repairs and technical maintenance. The need for viligance over the supply, preventing damage by children, animals and clumsy or ignorant users, as well as wastage and pollution at the source should also be included. Added to this some basic knowledge of sanitation and sanitation education is required. The amount of instruction in the latter will depend on the actual task the operator or caretaker will have in the educational process. Knowledge of his responsibilities should include knowledge of his authority: an operator may for example be given the right to intervene when latrines are constructed too close to a source, in order to prevent all risks of groundwater pollution.

For such training, special courses and manuals have been developed (Rep. of Malawi, 1979; WHO/IRC, 1981; Panchayati Raj, 1979; Rep. of Philippines, 1977; Rep. of Colombia, 1980).

Where *promotors* are used, they will need training in community organization, community motivation and community analysis, including the possible involvement of the community in the process. Another major topic will be sanitation education, in cooperation with other health workers and organizations in the community. Such health education training exists e.g. in the Colombian programme (Rep. of Colombia, 1974), though it is not yet sufficiently integrated with the national. programme for rural health workers.

Training of these fieldworkers can be on-the-job (Glennie, 1979; van der Ploeg and van Wijk, 1980) or through additional periodic courses (Lopez Orozco, 1976). Special manuals for promotors have been developed in various Latin American countries (Rep. of Argentina, n.d.; Rep. of Colombia, 1975; Rep. of Peru, 1977). In the programme of the Philippine Rural Reconstruction Movement promotion guidelines for excreta disposal are part of a manual for multi-purpose field workers (Price, 1967). A combined technical and social training was set up by Agua del Pueblo for Guatemala and other central American countries (Agua del Pueblo, 1980).

Originally, training for sanitation education (e.g. Drenckhahn, 1966) was based mainly on a didactic approach. But training for the organization of the community and the involvement of its leaders or representatives in all phases of a sanitation education programme are gaining more acceptance (Sinha and Bawa, 1978; Isely et al, 1979; USAID, 1977). More support for the least motivated groups remains necessary, however.

The training of administrative committees, or of any person responsible for the administration of community participation programmes is often carried out by the fieldworkers (Glennie, 1979; Cardenas, 1979; Rep. of Colombia, 1975).

Alternatively, village administrators may be directly trained by the agency, who may organize "leaders' camps" or other short training courses for the various types of village leadership (CHEB, 1978; Dube, 1967; PRAI, 1969). Such training might promote a spirit of cooperativeness among them, and lead to a division of responsibilities.

Training courses for fieldworkers and community members should be based on the conditions in which they have to work and the type of educational approach that will be expected from them at community level. Staged training may be necessary to train the large numbers of people involved in participatory programmes. Morfitt et al (1969) suggested progressive training. This implies that construction workers are gradually trained for increasingly difficult tasks, resulting in a technical manpower pool for operation and maintenance. Similarly, progressive training is given to a community survey leader, who in turn trains the volunteer neighbourhood survey team, is further trained as a community information leader, and finally as a water systems director. Staged training of technologists (Pineo, 1976d; PRAI, 1968) and discussion leaders (Hall, 1974, 1978; Hall and Dodds, 1974) has been used successfully. Scotney (1976) suggested that the analysis of successful operators' attitudes and personalities be taken as a basis for selection and training.

It must be remembered that most participants will have received their formal education along the traditional lines of a teacher-student relationship, one-way communication, reproduction of facts, and little flexibility. It will therefore be quite difficult for these trainees to accept a different approach, to which they and the villagers may attach less prestige or authority. But it is essential to adapt the training to the participatory approach and to the cultural background of the communities from which the trainees come and where they will work (Martens, 1966).

ANNEXES

ANNEX I LIST OF REFERENCES

AARONS, A. et al, Child-to-Child, London, MacMillan Press, 1979

ABBOTT, E., Report on Work in the Field of Sanitary Engineering, Social and Technical Assistance, Barpali Village Service (AFSC, Orissa/Philadelphia (November 1955)

ADEMUWAGUN, Z.A., "The role of school health education in developing countries", the Health Education Journal, 29, 4, (1970), pp. 111-120

ADEMUWAGUN, Z.A., The Ibadan Comfort Stations, an Experiment in Environmental Sanitation Health Education, African Regional Health Education Centre, Dept. of Preventive and Social Medicine, Faculty of Medicine, University of Ibadan, Ibadan, Nigeria, (October 1975)

ADEMUWAGUN, Z.A., "The challenge of interview techniques to health education", Journal of the Society of Health in Nigeria, (January, 1976), p. 10

ADENIYI, J.D., "Cholera control: problems of beliefs and attitudes", International Journal of Health Education, 15 (1972), pp. 238-245

ADENIYI, J.D., "Human waste disposal programmes, the place of health education", International Journal of Health Education, 16, 3, (1973), pp. 206-213

A.F.S.C. Latrine for Village Use, Barpali Village Service/American Friends Service Committee, Orissa, India, (December 1959)

AGUA DEL PUEBLO, The Quiche Rural Potable Water and Latrine Program, Agua del Pueblo, St. Louis, n.d.

AGUA DEL PUEBLO, Manual Docente, Agua del Pueblo, Chimaltenango, Guatemala, June, 1980

AKINTOLA, F.O., et al, "A survey of people's perceptions as a method of establishing standards for water supply improvement schemes in Nigeria", Water Supply and Management, 3 (1979), pp. 267-273

AKHAURI, N., "Socio-cultural barriers to rural change in an East Bihar community", Eastern Anthropologist, 11, (1957/58), pp. 212-219

ALLEN, D., "Kosovo, an end and a beginning", Unicef News, 94, 4, (1977), pp. 18-23

ALLEN SCOTT, J., Barlow, C.H., "Limitations to the control of helminth parasites in Egypt by means of treatment and sanitation", the American Journal of Hygiene, 27 (1938), pp. 619-649

ALLES, J., RATNAIKE, J., Learning components in 'Safe Water for Drinking' programmes, Unesco, Unit for Cooperation with Unicef and WFP, Series Notes, Comments, No. 9, Paris, (April 1976)

ALMY, S.W., MBITHI, P.M., Local Involvement in the Special Rural Development Programme, an overall evaluation of the Special Rural Development Programme, Institute for Development Studies, University of Nairobi, 1972

AMELSVOORT, V. VAN, "Teaching of better water supplies to medical auxiliaries", in D. Warner (ed.), Rural Water Supply in East Africa, Proceedings of a Workshop at the University College, Dar es Salaam 17-19 December, 1969, BRALUP research paper 11

AMSYARI, F., KATAMSI, E., "The status of health knowledge and patterns of seeking health advice in rural East Java", International Journal of Health Education, 21, 1, (1978) pp. 34-40

A.P.H.A. The State of the Art of Delivering Low-Cost Health Services in Developing Countries, A Summary Study of 180 Health Projetct, Public Health Association, Washington, (January 1977)

ARANGO, J.B., "An approach to planning and implementing development programs", Peace Corps Program and Training Journal, 1(1973), pp. 15-20

ARGENTINA, REP. OF, Plan Nacional de Agua Potable, Buenos Aires, Secretario de Recursos Hidricos, Servicio Nacional de Agua Potable, n.d., (ca. 1971)

ARGENTINA, REP. OF, Evaluacion de la Ier Etapa del Plan Nacional de Agua Potable Rural, Ministerio de Obras y Servicos Publicos, Subsecretaria de Recursos Hidricos, Servicio Nacional de Agua Potable, Buenos Aires, Enero 1972

ARGENTINA, REP. OF, Guia para Organizacion y Administracion de Cooperativas y de Sistemas de Abastecimiento de Agua, Ministerio de Obras y Servicios Publicos, Subsecretaria de Recursos Hidricos, Servicio Nacional de Agua Potable, Buenos Aires, 1971

ARIYADASA, K.D., Schools and Primary Health Care, Unesco, Unit for Cooperation with Unicef and WFP, Series Notes, Comments, No. 19, Paris, (December 1979)

ARIYARATNE, A.T., Sarvodaya and Development, Sarvodaya Shramadana Movement, Moratuwa, Sri Lanka, (Februari 1979)

AROLE, R.S., AROLE, M., "Comprehensive rural health project, Jamkhed", Journal of the Christian Medical Association of India, 74, 4, (1972), pp. 177-180

ASCROFT, J., "A conspiracy of courtesy", International Development Review (Focus), 16, 1, (1974), pp. 8-11

BACKHEUSER, M.P., KAMPEL, M.M., PEREIRA DA COSTA, A., "Um programa de educacao comunitária para saúde", Boletin de Sanitaria Panamericana, 84, 3, (1978), pp. 255-261

BANTJE, H., Sociological Aspects of Improved Water Supply in the Coast Region, BRALUP, University of Dar-es-Salaam, June 1978

BARRA-ROWLAND, F.L. DE LA, Analysis of Experiences of Self-Help and Public Participation in Rural Water Supplies: The Case of Mexico, OECD Development Centre, Experiences in Rural Development, Occasional Paper No. 6, Paris, (June 1978)

BELCHER, J.C., VAZQUEZ-CALCERRADA, P.B., Cross-Cultural Aspects of Sanitation Norms, Paper prepared for the Seminar 'Community Development in a Sociological Perspective; 3rd World Congress of Rural Sociology, Baton Rouge, Louisiana, August 23-24, 1972

BELLONCLE, G., Total Participation in Health Programs: Some Reflections on the Niger Experience, Institut de Recherches et d'Applications des Méthodes de Développement, Paris, 1973/74

BENNELL, T., Planning and Design of Rural Drinking Water Projects: Results from Pilot Runs, OECD Development Centre, Occasional Papers on Experience in Rural Development, 8, March 1979

BENNETT, F.J., SERWADDA, D., JELLIFFE, D.B., "Kiganda concepts of diarrhoeal disease", East African Medical Journal, 41, 5, (1964)

BEYENE, A., Planning Considerations for Rural Water Supply in Developing Countries, Ethiopian Water Resources Authority, Addis Ababa, (May 1978)

BHARIER, J., "Improving rural water supply in Malawi", Finance and Development 15, (September 1978), pp. 34-36

BHATNAGAR, G.S., "Monomorphic and polymorphic leadership in some North Indian villages", Eastern Anthropologist, 25, (1972), pp. 235-240

BLACKMORE, M.D., BOYDELL, R.A., MBERE, E.N., Botswana Low Cost Sanitation Project, Paper presented at the Conference 'Sanitation in Developing Countries Today', OXFAM/Ross Institute of Tropical Hygiene, Oxford, 5-9 July, 1977

BLACKWELL, J.E., "Fundamental education and village development in Nepal", Community Development Journal, 4, (1969), pp. 178-185

BRIDGER, G., SOISSONS, M. DE, Famine in Retreat?, London, Dent and Sons, 1970

BRISCOE, J., The Role of Water Supply in Improving Health in Poor Countries (with special reference to Bangladesh), Paper presented to the U.S. National Academy of Science Workshop on 'Effective Interventions to Reduce Infection in Malnourished Populations', Haiti, June 13-16, 1977

BRISCOE, J., The Organization of Labour and the Use of Human and Other Organic Resources in Rural Areas of the Indian Subcontinent, Paper presented at the Conference 'Sanitation in Developing Countries Today', OXFAM/Ross Institute of Tropical Hygiene, Oxford, 5-9 July, 1977b

BRISCOE, H., AHMED, S., CHAKRABORTY, M., "Domestic water use in a village in Bangladesh, I: A methodology and a preliminary analysis of use patterns during the 'Cholera Season'", Progress in Water Technology, 11, 1/2, (1978), pp. 131-141

BROWNE, D.G., Dangore Water Supply: a Study of a NWRC Rural Well, National Water Resources Commission, Addis Ababa, (1974)

BRYANT, J., Health and the Developing World, Cornell University Press, Ithaca/London 1969

BUCKLES, P.K., The Introduction of Potable Water and Latrines, A Case Study of Two Communities in Guatemala, World Bank, New York, (May 1978)

BUCKLES, P.K., KARP, A.W., CLEMENS, B.W., The Training and Utilization of Rural Water Technicians in Guatemala, background paper for the 22nd JCHP Study on Water Supply and Sanitation Components of Primary Health Care, Geneva, (1978)

BURGEAP, La Construction des Puits en Afrique Tropicale et l'Investissement Human, Séries Techniques Rurales en Afrique BURGEAP Ministère de la Coopération, Paris, 4, (1974)

BURTON, J., "Enteric diseases and health education", International Journal of Health Education, 7, (1964), pp. 57-67

CAIRNCROSS, S., CURTIS, D., FEACHEM, R., Some Aspects of Village Participation in Rural Water Programmes, Paper presented at the Symposium on Community Water Supply in Development Cooperation, Amsterdam, Royal Tropical Institute, 7-10 February, 1977

CAIRNCROSS, S., et al, Evaluation for Village Water Supply Planning, WHO International Reference Centre for Community Water Supply, Technical Paper Series, 15, The Hague, February 1980

CAMERON, S., Local Participation in Bank-Supported Urban Development Projects, World Bank, March 1978 (Unpubl. paper)

CARDENAS, M., Community Participation and Sanitation Education in Water Supply and Sanitation Programmes in Rural Areas of Paraguay, Paper presented at the meeting of temporary consultants on the Study of Water Supply and Sanitation Components of Primary Health Care for the Unicef/ WHO Joint Committee on Health Policies, Geneva, 20-27 June, 1978

CARDENAS, M., "Rural water supply and sanitation education in Paraguay", Assignment Children, 45/46 (Spring 1979), pp. 109-120

CARRUTHERS, I., Impact and Economics of Community Water Supply, a Study of Rural Water Investment in Kenya, Agrarian Development Unit, Wye College, University of London, (1973)

CARRUTHERS, I., BROWNE, D., "The economics of community water supply", in R. Feachem, M. McGarry, D. Mara (eds.), Water, Wastes and Health in Hot Climates, London, Wiley and Sons, (1977), pp. 130-161

CELESTIN, H.N., "La educacion para la salud: funcion que desempena en un programa de lucha contra la esquistosomiasis", Boletin de Sanitaria Panamericana, 82, 6, (1977), pp. 520-530

CHAMBERS, R., BELSHAW, D., Managing Rural Development: Lessons and Methods from Eastern Africa, Institute for Development Studies, discussion paper no. 15, University of Sussex, Brighton, (1973)

CHANDRA, P., "Communication of some new ideas in a Mahya Pradesh village: a sociology study conducted in a mixed village", Eastern Anthropologist, 17, 3, (1964), pp. 183-214

C.H.E.B., Health Education Strategy for the Slow Sand Filtration Project Phase II in India, Paper presented at the International Meeting on Extension and Community Participation in the SSF Project, WHO International Reference Centre for Community Water Supply, The Hague, May 29-June 2, 1978

C.H.E.B, Report on Orientation Training Programme for Health and Community Development Workers and Local Leaders of Village Borujwada, SSF Project Phase II, Central Health Education Bureau, New Delhi, June 1978

CHEGE, F.W., RÖLING, N. et al, Small Farmers on the Move: Results of a Panel Study in Rural Kenya, Paper for the fourth World Congress of Rural Sociology, Torun, Poland, 9-15 August, 1976

CHEN, P.C.Y., "The water seal latrine in a rural Malay community", Far East Med. Journal, 4, December 1968, pp. 386-389

CHEN, P.C.Y., "The method of disposal of human excreta used by 177 rural Malay households", The Medical Journal of Malaya, 23, 3, (1969), pp. 159-168

CHEN, P.C.Y., "Indigenous concepts of causation and methods of prevention of childhood diseases in a rural Malay community", Journal of Tropical Paediatrics, 16, (1970), pp. 33-42

CHEN, P.C.Y., "Socio-cultural aspects of a cholera epidemic in Trengganu, Malaysia", Tropical Geographical Medicine, 23, (1971), pp. 296-303

CHESHAM, M., "Community development trust fund of Tanzania, village water wells programme", in D. Warner, (ed.) Rural Water Supply in East Africa, proceedings of a Workshop held at the University College, Dar-es-Salaam, 17-19 December, 1969, BRALUP Research Paper no. 11, pp. 157-159

CHOWDHURY, Z., "The paramedics of Savar: an experiment in community health in Bangladesh", Development Dialogue, 1, (1978), pp. 41-50

CLINARD, M.B., Slums and Community Development: Experiments in Self-Help, New York/London, The Free Press/Collier-McMillan, (1966)

COCHRANE, G., "The administration of Wagina resettlement scheme", Human Organization, 29, (1970), pp. 123-132

COLLIER, D., Squatters and Oligarchs: Authoritarian Rule and Political Change in Peru, Johns Hopkins University Press, Baltimore/London, 1976

COLOMBIA, REP. OF, Programa Nacional de Saneamiento Basico Rural, Instituto Nacional Para Programas Especiales de Salud, Division de Saneamiento Basico Rural, n.d.

COLOMBIA, REP. OF, La Participación Comunitaria en el Plan Nacional de Agua Potable y Alcantarillado Rural en Peru, INAS, Division de Saneamiento Básico Rural, Sección de Promoción, SBRP 0011, Bogotá, n.d.

COLOMBIA, REP. OF, La Participación Comunitaria en el Plan Nacional de Agua Potable Rural de la Argentina, División de Saneamiento Básico Rural, Sección de Promoción, SBRD 0014, INPES, Bogotá, n.d.

COLOMBIA, REP. OF, Programa Nacional de Saneamiento Básico Rural, Ministerio de Salud, Instituto Nacional de Salud, Bogotá, 1973

COLOMBIA, REP. OF, Manual de Educación Sanitaria, INPES, División de Saneamiento Básico, Sección de Promoción, Agusto de 1974

COLOMBIA, REP. OF, Manual de Procedimientos en Promoción Comunitaria para el Programa Nacional de Saneamiento Básico Rural, Instituto Nacional Para Programas Especiales de Salud, Division de Saneamiento Básico Rural, Sección de Promoción, SBR No. 0062, Bogotá, Enero de 1975

COLOMBIA, REP. OF, Programa de Capacitación de Juntas Administradoras de Acueductos y Alcantarillados Rurales, Instituto Nacional de Salud, Division de Saneamiento Básico Rural, Sección de Promoción Comunitaria, Bogotá, Noviembre de 1980.

COSTA, R.L., Groupe de travail sur l'approvisionnement en eau et services sanitaires des zones rurales, Réunion Inter-Etatique des Responsables Gouvernementaux de l'Approvisionnement en Eaux et de l'Assainissement en Milieu Rural, Ouagadougou, Haute Volta, 6-10 Decembre, 1976, Institut de Génie de l'Environnement, Ecole Polytechnique Fédérale, Lausanne, Suisse, Avril, 1977, pp. 190-196

COURTEJOIE, J., ROTSART DE HERTAING, I., NZUGU, C, Helminthiaseis, creating awareness of the problem along young people, supplement to International Journal of Health Education, 21, 2, (1978)

COURTEJOIE, J., HERMAN, F., "Une expérience d'éducation sanitaire en Afrique Centrale", Revue Médicale de Liège, 21, (1966), pp. 265-267

CURTIS, D., Socio-Economic Studies in Phase II of the Slow Sand Filtration Project: a Practical Guide, Birmingham University, (1977a)

CURTIS, D., The 'Social Factor' in Sanitation Programmes, Paper presented at the Conference 'Sanitation in Developing Countries Today', OXFAM/ Ross Institute of Tropical Hygiene, Oxford, 5-9 July, 1977, (1977b)

DAVE, P.N., Developing Relevance Based Learning Materials: a Record of Experiences with Exemplar Learning Materials, Unesco, Unit for Cooperation with Unicef and WFP, Series Notes, Comments, No. 12, Paris, November 19, 1979

DAVELAAR, H., Notice in: From the Unicef Waterfront, 19, (August, 1978), pp. 6

DEGOMA, E.S., OUANO, E.A.R., POLPRASERT, C., "The need for integrated planning in rural health services", Progress in Water Technology, II, 1/2, (1978), pp. 97-107

DEOM, J., Water Resources Development and Health, a Selected Bibliography, WHO, M.P.D. 76.6, Geneva, (1976)

DERRYBERRY, M., "Health education aspects of sanitation programmes in rural areas and small communities", World Health Organization, 10, (1954), pp. 145-154

DOBYNS, H.F., "Thirsty Indians, introduction of wells among people of an arid region", Human Organization, 9, (1952), pp. 33-36

DODD, S.C., A Controlled Experiment on Rural Hygiene in Syria, American University of Beirut/American Press, Social Science Series No. 7, Beirut, 1934

DOMMEN, A.J., "The bamboo tube well: a note on an example of indigenous technology", Economic Development and Cultural Change, 23, (1975), pp. 483-489

DONALDSON, D., "Rural water supply in Latin America: organizational and financial aspects", Carnets de l'Enfance, 34, (1976), pp. 46-55

DONALDSON, D., "Health issues in developing country projects", in C.G. Gunnerson, J.M. Kalbermatten (eds.) Environmental Impacts of International Civil Engineering Projects and Practices, American Society of Civil Engineers, New York, 1978, pp. 134-157

DOUGLAS, M., Purity and Danger, an Analysis of Concepts of Pollution and Taboo, London, Routledge and Kegan Paul, 1966

DRENCKHAHN, V., "Training sanitarians in the Pacific", International Jounal of Health Education, 8, (1965), pp. 95-99

DUBE, S.C., "Cultural factors in rural community development", Journal of Asian Studies, 16, (1956), pp. 19-30

DUBE, S.C., India's Changing Villages, London, Routledge and Kegan Paul, (1958)

DUBE, S.C., "Communication innovation and planned change in India", in D. Lerner, W. Schramm (eds.), Communication and Change in the Developing Countries, East West Centre Press, Honolulu, (1967), pp. 129-167

DUBEY, K.C., "A note on water divining in the tribal district of Jhabua, M.P.", Eastern Anthropologist, 21, (1968), pp. 79-82

DWIVEDI, K.N., TIWARI, I.C., MARWAH, S.M., "India, innovations in health education in rural schools", International Journal of Health Education, 16, 2, (1973), pp. 100-108

E.E.C., Sectorial Evaluation (Ex-Post) of Urban and Village Water Supply Projects, Vol. I, II, Commission of the European Communities, Directorate-General for Development, Brussels, August 1978

EHLAN, D.B., "Mana, a health education game", International Journal of Health Education, 21, 1, (1978), pp. 66-67

ENDA, Amélioration de l'Eau et l'Assainissement d'un Quartier, Propositions prâtiques, African Environment, Séries Relais Technologique, RT 2F, ENDA, Dakar, (July, 1977)

ELMENDORF, M., Appropriate Technology for Water Supply and Waste Disposal, a Behavioral Case Study: the Artibonite Valley and Port-au - Prince, Haiti, World Bank, Energy, Water and Telecommunications Department, n.d.

ELMENDORF, M., "Public participation and acceptance", in C.G. Gunnerson, J.M. Kalbermatten, (eds.), Environmental Impacts of International Civil Engineering Projects and Practices, American Society of Civil Engineers, New York, 1978, pp. 184-201

ELMENDORF, M., Women, Water and Waste: Beyond Access, a Discussion Paper for the Equity Policy Centre Mid-Decade Workshop, 'Women, Water and Waste, Mid-Decade Forum', World Conference of the UN Decade for Women, Copenhagen, July 1980

ELMENDORF, M., MCGARRY, M., Appropriate Technology for Water Supply and Waste Disposal, a Behavioral Case Study: Chan Kom, Mexico, World Bank, Energy, Water and Telecommunications Department, February 1978

ETHERTON, D., Water and Sanitation in Slums and Shanty Towns, Unicef, New York, May 1980

ETHIOPIA, REP. OF, Findings and Recommendations from the 1979 Review of Rural Water in Hararghe Region, Report of a Workshop held at Dire Dawa, Gov. of Ethiopia/SIDA/VIAK, November 8-13, 1979

FANAMANU, J., VAIPULU, T., "Working through the community leaders: an experience in Tonga", International Journal of Health Education, 9, 3, (1966), pp. 130-137

FATHI, A., "Leadership and resistance to change: a case from an underdeveloped area", Rural Sociology, 30, 2, (1965), pp. 204-212

FEACHEM, R.G., "Appropriate Sanitation", New Scientist, 8, (January, 1976)

FEACHEM, R.G., Public Health Studies in Phase II of the Slow Sand Filtration Project, Ross Institute of Tropical Hygiene, London School of Hygiene and Tropical Medicine, prepared for the WHO International Reference Centre for Community Water Supply, London/The Hague, 1977, (1977a).

FEACHEM, R.G., "Water supplies for low income communities: resource allocation, planning and design for a crisis situation", in R. Feachem, M. McGarry, D. Mara (eds.), Water, Wastes and Health in Hot Climates, London, Wiley and Sons, 1977, (1977b), pp. 75-95

FEACHEM, R.G. et al, Water, Health and Development, an Interdisciplinary Evaluation, London, TriMed Books Ltd., (1978)

FELICIANO, G.M., FLAVIER, J.M., "Strategy of change in the barrio: a case of rural waste disposal", in D. Lerner, W. Schramm (eds.), Communication and Change in the Developing Countries, East West Centre Press, Honolulu, (1967), pp. 279-288

FENWICK, K.W.H., A Progress Report on the Zaina Environmental Sanitation Scheme, a Pilot Project in Rural Africa, n.d. (ca. 1967)

FOSTER, G.M., "Relationships between theoretical and applied anthropology: a public health program analysis", Human Organization, 11, 3, (1952), pp. 5-16

FOSTER, G.M., Traditional Cultures and the Impact of Technological Change, New York, Harper and Row, (1962); reprinted as Traditional Societies and Technological Change, New York, Harper and Row, (1973)

FRANKEL, R.J., YOOMEE, S., A Contest of Spirits: the River versus the 'Pra Pa', unpublished paper, Asian Institute of Technology, Bangkok, (1973)

FREIRE, P., Pedagogy of the Oppressed, New York, Herder and Herder, (1971)

FUGLESANG, A., Applied Communication in Developing Countries: Ideas and Observations, Dag Hammarskjöld Foundation, Uppsala, (1973)

FUNCK, J.C., "L'introduction d'un programme d'eau potable à Belhassenat", Carnets de l'Enfance, 34, (1976), pp. 71-78

GACHUKIA, E., "Women's self-help efforts for water supply in Kenya", Assignment Children, 45/46, (Spring 1979), pp. 167-174

GHANDHIGRAM RURAL INSTITUTE, Research Activities 1964-1976: Major Findings and Implications, Bulletin of the Ghandhigram Institute of Rural Health and Family Planning, 1977

GLENNIE, C., The Rural Piped Water Programme in Malawi, A Case Study in Community Participation, University of London, Dept. of Civil Engineering, Imperial College of Science and Technology, September 1979

GOULDS, H.A., "Modern Medicine and Folk Cognition in Rural India", Human Organization, 24, 3, (1965)

GOYDER, C., Sanitation in the Health and Social Development Projects Supported by Oxfam, Paper presented at the Conference 'Sanitation in Developing Countries Today', OXFAM/Ross Institute of Tropical Hygiene, Oxford, 5-9 July, 1977

GRIMES, O.F., Housing for Low-Income Urban Families, Economics and Policy in the Developing World, World Bank Research Publ., Johns Hopkins University Press, 1976

GRONDIN, M., Comunidad Andina: Explotación Calculada, Secretaria de Estado de Agricultura, Santo Domingo, R. Dominicana (1978)

GUGGENHEIM, H., FANALE, R., "Water storage through shared technology, four projects among the Dogon in Mali", Assignment Children, 45/46, (Spring 1979), pp. 151-166

GUMPERZ, J.J., "Religion and social communication in village North India", Journal of Asian Studies, 23, (1964), pp. 89-97

GUNARATNE, V.T.H., Inaugural Address, at the Research Study Group Meeting on Appropriate Technology for Improvement of Environmental Health at the Village Level, SEARO, 16-20 October, 1978

GUPTA, S.C., "Some observations on the practice of social and preventive medicine in ancient India", Social Science and Medicine, 4, 1, (1970), pp. 65-74

GUZMAN, I. DE, "Health educational aspects of community development including community organization in the Philippines", in S. Katsunuma, N. Maruchi, M. Togo (eds.), Health Aspects of Community Development in South East Asia, proceedings of the 4th SEAMIC Seminar, Tokyo, South East Asian Medical Information Centre, (1977), pp. 247-252

HALL, B.L., Wakahi wa Furaha, an Evaluation of a Radio Study Group Campaign, Uppsala, Scandinavian Institute of African Studies, 1973

HALL, B.L., "Revolution in rural education: health education in Tanzania", Community Development Journal, 9, 2, (1974), pp. 133-139

HALL, B.L., Mtu ni Afya: Tanzania's Health Campaign, Clearing House on Development Communication, Information Bulletin 9, Washington D.C., (June 1978)

HALL, B.L., Creating Knowledge: Breaking the Monopoly; Research Methods, Participation and Development, Research Project working paper 1, International Extension College, I.E.C. Broadsheets on Distance Learning no. 6, Cambridge, (1978b)

HALL, B.L., MERRIMAN, D.O., Recommendations on Upper Region Water Project, January 1977 (Unpubl. doc.)

HALL, E.T., The Silent Language, Fawcett, New York, (1964)

HAQUE, W. et al, "Towards a theory of rural development", Development Dialogue, 2, (1977), pp. 133-137

HARDERWIJK, W. VAN, Een Technies Project als Ontwikkelingssamenwerking; Een Studie: Hoezo Samen? (A Technical Project as Development Cooperation; A Study: What Cooperation?), Werkgroep Waterbeheer, Amsterdam/Delft, April 1980 (unpubl. doc.)

HARLAUT, A., "Problems encountered in the planning of rural water supplies in Eastern and Southern Africa", Proceedings Second World Congress IWRA, New Delhi, India, December 1975, Vol. II, pp. 563-570

HARLAUT, A., A Practical Method of Evaluating Alternative Water Supply Systems for the Development of Rural Areas, Paper prepared for the Third World Congress, IWRA, Sao Paulo, Brazil, 1978, SWECO, Stockholm, Special Report no. 01:77.1, August 1977

HARLAUT, A., HANSEN, L., Botswana Rural Water Supply: Evaluation of Existing Rural Water Supply Schemes and Preparation of Guidelines for Nitrate Reduction of Contaminated Boreholes, Final Report, SIDA/SWECO, Stockholm, August 1978

HAUK, H.M. et al, Aspects of Health Sanitation and Nutritional Status in a Siamese Rice Village, Cornell-Thailand Project, Interim Reports, No. 2, Ithica, New York, September 1956

HEIJNEN, J.D., CONYERS, D., "Impact studies of rural water supply", in G. Tschannerl, (ed.), Water Supply, proceedings of the Conference on Rural Water Supply in East Africa, BRALUP University of Dar-es-Salaam, research paper no. 20, (5-8 April 1971), pp. 53-65

HERZOG, W. et al, Patterns of Diffusion in Rural Brazil, East Lansing, Michigan State University, Department of Communication, Report (1968)

HIMA, G., "Hydraulique villageoise et investissement humain au Niger", Carnets de l'Enfance, 34, (1976), pp. 77-88

HOFF, W., "Overcoming barriers to sanitary improvements", Salubritas, 3, 4, (October 1979), pp. 3-6

HOLLSTEINER, M.R., "The unwashed urban multitudes", Assignment Children, 45/46, (Spring 1979), pp. 79-92

HOLMBERG, A.R., "The wells that failed: an attempt to establish a stable water supply in Viru Valley, Peru", in E.H. Spicer, Human Problems in Technological Change, a Casebook, New York, Russell Sage Foundation (1952), pp. 113-126

HOLMES, A.C., Health Education in Developing Countries, London, Thomas Nelson and Sons, (1964)

HOPPER, G., "The environmental aspects of the planning of community health services in Malawi", Malawi Medical Bulletin, 1, (1967), pp. 1-17

HOWELL, A.M., "Self-help or cooperative involvement: approaches to effective development in rural settlements", Habitat International, 4, 1/2, (1979), pp. 207-213

HOWELL, A.M., From Self-Help to Cooperative Involvement in Rural Water Supply Programmes of Developing Countries, M.A. Thesis, University of Toronto, Dep. of Geography (1977)

HUIZER, G., Peasant Unrest in Latin America, Ph.D. Thesis, University of Amsterdam, (1970)

INTERNATIONAL AGRICULTURAL CENTRE, De Kleine Boer en de Ontwikkelings-samenwerking, Eindrapport van het vooronderzoek, Wageningen, I.A.C., (1976)

I.E.O.S., Sistemas de Agua Potable en el Area Rural y Participación Comunitaria, Instituto Ecuatoriano de Obras Sanitarias, Dirección Nacional de Planificación, División de Technologia, Departamento de Promoción y Educación Sanitaria, Quito, Ecuador, Julio 1980

IMBODEN, N., Planning and Design of Rural Drinking Water Projects, A Research Framework to Analyse Experiences with Rural Drinking Water Schemes, OECD Development Centre, Experiences in Rural Development, Occasional Paper No. 2, September 1977

INSTITUT DU GENIE DE L'ENVIRONNEMENT, Réunion Inter-Etatique des Responsables Gouvernementaux de l'Approvisionnement en Eau et de l'Assainissement en Milieu Rural, Ouagadougou, Haute Volta, 6-10 décembre 1976, Institut de Génie de l'Environnement, Ecole Polytechnique Fédérale de Lausanne, Suisse, avril 1977

ISLAM, N. et al, "Water and sanitation in Bangladesh", Assignment Children, 45/46, (Spring 1979), pp. 131-143

ISELY, R.B., "A community organisation approach to clean water and waste disposal in Cameroonian villages", Progress in Water Technology, II, 1/2, (1978), pp. 109-116

ISELY, R.B., "Reflections on an experience in community participation in Cameroon", Annales de la Societé Belge de la Médicine Tropicale, 59 (suppl.), 1979, pp. 103-115

ISELY, R.B., MARTIN, J.F., "The village health committee: starting point for rural development", WHO Chronicle, 31, (1977), pp. 307-315

ISELY, R.B., SANWOGOU, L.L., MARTIN, J.F., Community Organisation as an Approach to Health Education in Rural Africa, International Jounal of Health Education, 22, 3 (suppl.), (September 1979)

JACKSON, I.C., Advance in Africa, a Study of Community Development in Eastern Nigeria, Oxford University Press, London, (1956)

JACKSON, T., "Rural sanitation technology, lessons from participatory research", Assignment Children, 45/46, (Spring 1979), pp. 51-74

JAHN, S. AL AZHARIA, "Traditional practices of handling drinking water in tropical developing countries", Aqua, 9/10, (1980), pp. 14-15

JAIN, N.C., Some Social Psychological Factors Related to the Effectiveness of Radio Forums, East Lansing, Michigan State University, Department of Communication, Diffusion of Innovations, Technical Report No. 11, (1969)

JAIN, N.C., The Influence of Group Radio Listening, Discussion, Decision and Commitment on Attitude Change in Radio Forums, Paper presented at the Association for Education in Journalism, Berkely, (1969)

JAKOBSEN, B., ASCROFT, J., PADFIELD, H., "The Case for Rural Water in Kenya", in M.E. Kempe, L.D. Smith (eds.), Strategies for Improving Social Welfare, Proceedings of a Workshop held at the Institute for Development Studies, University of Nairobi, May 31-June 3, 1971, I.D.S., University of Nairobi, Occasional Paper 4, (1971), pp. 412-450

KANUNGO, S.C., A Report on the Use of Latrines, Social and Technical Assistance, Barpali Village Service/AFSC Barpali, Orissa/Philadelphia, July 1957

KAR, S.B., "A model for persuading resistants for planned change", International Journal of Health Education, 12, 3, (1969), pp. 106-117

KAR, S.B., "Communication research in health and family planning programmes in India", International Journal of Health Education, 13, 3, (1970), pp. 94-102

KATES, R.W., Experience in User-Choice from Kenya and Tanzania, Working Paper No. 5 presented at the International Development Research Centre Seminar on Rural Water Supply and Sanitation, Lausanne, 29 May-1 June 1973

KAWATA, K., "Of typhoid fever and telephone poles, deceptive data on the effect of water supply and privies on health in tropical countries", Progress in Water Technology II, 1/2, (1978), pp. 37-43

KEBEDE, H., Improving Village Water Supplies in Ethiopia: A Case Study of the Socio-Economic Implications, United Nations Economic Commission for Africa, ECA/Unicef, Training and Research Centre for Women, Addis Ababa, (1978)

KETCHAM, D.L., "Digging wells in Madagascar, an achievement of combined effort", Community Development Journal, 5, (1970), pp. 197-203

KHARE, R.S., "Ritual purity and pollution in relation to domestic sanitation", Eastern Anthropologist, 15, 2, (1962), pp. 125-139

KHARE, R.S., "A study of social resistance to sanitation programmes in rural India", Eastern Anthropologist, 17, 2, (1964), pp. 86-94

KIDD, R., BYRAM, M., Popular Theatre and Development: A Botswana Case Study, Popular Theatre Committee, University College of Botswana, Institute of Adult Education, Gaborone, January 1978

KINCAID, D.L., et al, Mothers' Clubs and Family Planning in Rural Korea: the Case of Oryu Li, Case Study no. 2, East West Communications Institute, Honolulu, undated (ca. 1975)

KIVLIN, J.E., ROY, P., Communication in India: Experiments in Introducing Change, National Institute of Community Development, Hyderabad, Research Report no. 15, (1968)

KIPUYO, M.A.O., "Mass treatment of urinary schistosomiasis with Ambilhar among the Wambugwe of Hanang District, Northern Tanzania", in D. Warner (ed.), Rural Water Supply in East Africa, Proceedings of a Workshop held at the University College, Dar-es-Salaam, 17-19 December 1969, BRALUP Research Paper No. 11, pp. 116-121

KLONGLAN, G.E., Radio Listening Groups in Malawi, Africa, Ames, State University, Rural Sociology Report no. 70, (1967)

KOCHAR, V., et al, "Human factors in regulation of parasitic infections: cultural ecology of hookworm populations in rural West Bengal", in F.X. Grollip, H.B. Haley, (eds.), Medical Anthropology, The Hague, Mouton, (1976), pp. 287-312

KOCHAR, V., Intrinsic Regulators of Man-Parasite Interactions: Culture Patterns and Human Behaviour Relevant to Hygiene, Sanitation and Disposal of Excreta in a Rural West Bengal Region, Paper presented at the Conference 'Sanitation in Developing Countries Today', OXFAM/Ross Institute of Tropical Hygiene, Oxford, (5-9 July 1977)

KREYSLER, J., "Total coli counts: method to determine biological contamination of rural water supplies, the Ismani example", in D. Warner (ed.), Rural Water Supply in East Africa, Proceedings of the Workshop on Rural Water Supply, University College of Dar-es-Salaam, BRALUP, Research Paper no. 11, (17-19 December 1969), pp. 82-87

KREYSLER, J., "Uhuru na maji: health, water supply and self-reliance in Mayo village", Journal of Tropical Pediatrics, 16, (1970), pp. 116-123

KRISHNA, K., Induced Change in Health Behaviour, Planning, Research and Action Institute, Lucknow, India, (1967)

LAAK, F. VAN DER, "The Ndoleleji water development scheme", in D. Warner (ed.), Rural Water Supply in East Africa, Proceedings of the Workshop on Rural Water Supply, University College of Dar-es-Salaam, BRALUP, Research Paper no. 11, (17-19 December, 1969), pp. 165-170

LEES, S.H., "Socio-Political Aspects of Canal Irrigation in the Valley of Caxaca, Volume 2", in K.V. Plannery (ed.), Prehistory and Human Ecology of the Valley of Oaxaca, Memoirs of the Museum of Anthropology, University of Michigan, Ann Arbor, 6, (1973)

LELE, U., The Design of Rural Development, World Bank, Johns Hopkins University Press, Baltimore, (1975)

LEST, J.C.C. VAN DER, Community Self Survey: Purpose and Significance; Directions for Application, Working Party on Rural Sociological Problems, Ministry of Social Work, The Netherlands, The Hague/FAO, Rome, (1962)

LETLHAKU, L.L.M., "Towards integrated health education activities", International Journal of Health Education, 7, (1964), pp. 188-198

LEVINE, R.J., et al, "Failure of sanitary wells to protect against cholera and other diarrhoeas in Bangladesh", The Lancet, (July, 1976), pp. 86-89

LIN, N., BURT, R.S., Roles of Differential Information Channels in the Process of Innovation Diffusion, Monograph 001, International Centre for Social Research, Department of Sociology, State University of New York, Albany, (1973)

LINDEN, J.J. VAN DER, The Bastis of Karachi, Types and Dynamics, Ph.D. Thesis, Free University of Amsterdam, April 1977

LINDENBAUM, S., "Santé et maladie au Pakistan Oriental", Etudes Rurales, 32, (1968), pp. 94-103

LOCKETZ, L., "Health education in rural Surinam: use of video tape in a national campaign against schistosomiasis", PAHO Bulletin, 10, 3, (1976), pp. 219-226, also published in Boletín de Sanitaria Panamericana, 81, (1976)

LOGAN, H.H., "Humoral medicine in Guatemala and peasant acceptance of modern medicine", Human Organization, 32, (1973), pp. 385-395

LOPEZ OROZCO, O., Capacitación Continuada en Desarrollo de la Comunidad para Promotores de Saneamiento Basico Rural, Instituto Nacional de Salud, Division de Saneamiento Basico Rural, Sección de Promoción, Bogotá, Colombia, (enero de 1976)

LORING, W.C., "Environmental health education, a different orientation", International Journal of Health Education, 20, 1, (1977), pp. 51-56

LOVEL, R., Planning and Evaluation of a Community Extension Programme: Health Extension in Phase 2 of the Slow Sand Filtration Programme, Institute of Development Studies, University of Sussex/WHO International Reference Centre for Community Water Supply, Brighton/The Hague, unpublished document, (1978)

LOZOFF, B., KAMATH, K.R., FELDMAN, R.A., "Infection and disease in South Indian families: beliefs about childhood diarrhoea", Human Organization, 34, (1975), pp. 353-358

MAITRA, M.S., "Sanitation for the poor in Calcutta", in A. Pacey (ed.), Sanitation in Developing Countries, Wiley, Chichester, 1978

MALAWI, REP OF, Rural Piped Water Projects Handbook, A Handbook for Field Engineers, 1977

MALAWI, REP OF, Piped Water for the Villagers, The Overseas Film and Television Centre Ltd., London, n.d.

MALAWI, REP. OF, "Syllabus for course of instruction in handpump maintenance", Assignment Children, 45/46, (Spring 1979), p. 144

MANN, R.S., "Concepts of disease and change in a Delhi village", Indian Journal of Social Work, 27, 4, (1967), pp. 353-360

MARSHALL, C.L., "Some exercises in social ecology: health, disease and modernization in the Ryukyu Islands", in M.T. Farvar, J.P. Milton, (eds.), The Careless Technology, Ecology and International Development, New York, Natural History Press, 1972, pp. 5-18

MARTENS, E.G., "Culture and communications: training Indians and Eskimos as community health workers", Canadian Journal of Public Health, 57, (1966), pp. 495-503

MASCARENHAS, A., HOWELL, A., Water Supply and Sanitation Components of Primary Health Care, UNICEF/WHO JCHP, Conference Room Document no. 1, Geneva, 29-31 January, 1979

MATANGO, R.R., MAYERLE, D., "Maji na maendeleo vijijini: the experience with rural self help water scheme in Lushoto district", in G. Tschannerl (ed.), Water Supply, Proceedings of the Conference on Rural Water Supply in East Africa, 5-8 April, 1971, BRALUP, University of Dar-es-Salaam, Research Paper 20, pp. 229-239

MBITHI, P., Rural Sociology and Rural Development, its Application in Kenya, Nairobi, East African Literature Bureau, 1974

MCCULLOUGH, F.S., et al, "Water resources and bilharziasis transmission in the Misungwi area, Mwanza district, North-West Tanzania", East African Medical Journal, 45, 5; also published in D. Warner (ed.), Rural Water Supply in East Africa, proceedings of a Workshop held at the University College, Dar-es-Salaam, 17-19 December 1969, BRALUP Research Paper 11, pp. 97-112

MCGARRY, M.G., "Institutional development for sanitation and water supply", in R. Feachem, M. McGarry, D. Mara (eds.), Water, Wastes and Health in Hot Climates, Wiley and Sons, London, (1977), pp. 195-212

MCMICHAEL, J.K., Health in the Third World, Studies from Vietnam, Bertrand Russell Peace Foundation, Nottingham, 1976

MEDIS, L.P., FERNANDO, P.A., "Health education in emergency situations: a cholera outbreak in Sri Lanka", International Journal of Health Education, 20, 3, (1977), pp. 200-204

MERTON, R.K., Social Theory and Social Structure, New York, The Free Press of Glencoe, (1957)

MESSING, S.D., "Some human factors, problems and possibilities in developing Ethiopia", Human Factors, 10, 6, (1968), pp. 559-564

MESSING, S.D., "Social problems related to the development of health in Ethiopia", Social Science and Medicine, 3, (1970), pp. 331-337

MESSING, S.D., "Emics and ethics of health problems in Ethiopia", in F.X. Grollis, H.B. Haley (eds.), Medical Anthropology, Mouton, The Hague, (1976), pp. 429-435

MESSING, S.D., PRINCE, J., "Health Practices in Ethiopian pre-urban communities", Journal of Health and Human Behaviour, 7, (1966), pp. 272-276; also published in S.D. Messing, The Target of Health in Ethiopia, M.S.S. Information Cooperation, New York, (1972), pp. 217-227

MESSING, S.D., et al, "Health culture research in a developing country", The American Behavioural Scientist, (April 1964), pp. 29-30; also published in S.D. Messing, The Target of Health in Ethiopia, M.S.S. Information Cooperation, New York, (1972), pp. 162-164

MESSING, S.D., et al, "A method of health culture research in an African country", Journal of Health and Human Behaviour, 6, (1965), pp. 261-263; also published in S.D. Messing, The Target of Health in Ethiopia, M.S.S. Information Cooperation, New York, (1972), pp. 166-171

MICKELWAIT, D.R., et al, Women in Rural Development, Westview Press, Boulder, 1976

MILLAN, A.R., BAQUERO, C.A., Proyecto de 'Manual de Procedimientos Administrativos y Contables para Promotores de Saneamiento Básico Rural', Ministerio de Salud Publica, Instituto Nacional para Programes Especiales de Salud, División de Saneamiento Básico Rural, Sección de Supervision y Asistencia Téchnica, Bogotá, (Septiembre 1972)

MILLER, D.C., A Self-Help Paradigm for Rural Water Systems, OECD, Experiences in Rural Development Occasional Paper No. 9, Paris (March 1978)

MILLER, F.C., "Cultural change as decision making: a trotzil example", Ethonology, IV, 1, (1965), pp. 53-65

MILLER, F.C., CONE, C.A., Latrines in Yalcuc: A Twenty Year Perspective, World Bank, (May 1978)

MISRA, K.K., "Safe water in rural areas: an experiment in promoting community participation in India", International Journal of Health Education, 18, 1, (1975), pp. 53-59

MIYASAKA, T., "An evaluation of a ten-year demonstration project in community health in a rural area in Japan", Social Science and Medicine, 5, (1971), pp. 425-440

MORA RAMIREZ, J., LOPEZ OROZCO, O., "Participación communitaria y saneamiento básico rural en Colombia", Carnets de l'Enfance, 34, (1976), pp. 89-101

MORA RAMIREZ, J., SALAZAR DUQUE, A., "A community-initiated water supply project in Colombia", Assignment Children, 45/46, (Spring 1979), pp. 121-130

MORFITT, R.P., et al, A Non-Conventional Mass Approach to Rural Village Water Projects, Pan American Sanitary Bureau Report to the Pan American Health Organization, (May 1969)

MORSS, E.R., et al, Strategies for Small Farmer Development: an Empirical study of rural development projects, executive summary, Development Alternative Inc., Washington, (1975)

MORSS, E.R., et al, "Lirhembe multi service cooperative", in Strategies for Small Farmer Development, an Empirical Study of Rural Development Projects in The Gambia, Ghana, Lesotho, Nigeria, Bolivia, Colombia, Paraguay and Peru, Case studies, West View Press, Boulder, Col., (1976), pp. 126-135

MUHONDWA, E.P.Y., Latrine Installation and Use in Bagamoyo District, a Study of Sociological Factors, M.A. Thesis, University of Dar-es-Salaam, June 1976

MÜLLER, H.P., Die Helvetas Wasser Versorgungen in Kamerun, eine Ethnologische Evaluation, (The Helvetas Water Supplies in Cameroon, an Ethnological Evaluation), Zürich, February 1978

NDS/UNICEF, A Strategy for Basic Services, n.d. (ca. 1977)

NDS/UNICEF, Communicating with Pictures, National Development Service/ UNICEF, Kathmandu, Nepal, 1975

NEURATH, P.M., "Radio rural forums as a tool of change in Indian villages", Economic Development and Cultural Change, 10, (1962), pp. 257-283

NIEVES, I., FARRELL, W.T., Behavioral and Social Aspects of Technology Diffusion and Decision Making in Marginal Urban Communities in San Salvador, World Bank, Washington (April 1978)

NIGER, REP. OF, Etablissement d'un Programme d'Hydraulique au Niger: Construction de Puits, Ministère des Travaux Publics, des Mines et de l'Urbinisme/CEE/NEDECO, 1965

NIHON SUIDO CONSULTANTS, Immediate Programme for Sanitation for Kampung Improvement Programme of Jakarta, in Jakarta Sewerage and Sanitation Project, A Report Prepared for the Government of Indonesia/WHO/UNDP, Vol. VII, (draft), 1977

NIKOLIC, A., NIKILIC, L., TOMIC, B., "The health programme in Ivanjica, Yugoslavia", in V. Djuknanovic, E.P. Mach (eds.), Alternative Approaches to Meeting Basic Health Needs in Developing Countries, WHO, Geneva, (1975), pp. 67-77

NORWOOD, I.A., HUGHES, R.C., Evaluation: Ghana Rural Water Supplies, CIDA, (1979)

OBERG, K., RIOS, J.A., "A community improvement project in Brazil", in B.D. Paul (ed.), Health, Culture and Community, Russell Sage Foundation, New York, (1955), pp. 349-377

OBIBUAKU, L.O., "Socio-economic problems in the adoption process: introduction of a hydraulic palm oil press", Rural Sociology, 32, 4, (1967), pp. 464-468

O.E.C.D., Community Aspects of Rural Water Supply and Sanitation Programmes at Village Level, Research Study Group Meeting on the Development of Appropriate Technology for Improvement of Environmental Health at Village Level, WHO/SEAEO New Delhi, (10-16 October, 1978)

OGIONWO, W., "Socio-psychological factors in health behaviour: an experimental study on methods and attitude change", International Journal of Health Education, 26, 2, (1973), pp. 1-16

ORLEANS, L.A., SUTTMEIER, R.P., "The Mao ethic and environmental quality", Science, 170, (1970), pp. 1173-1176

OYUGI, W.O., "Participation in development planning at the local level", in D.K. Leonard, Rural Administration in Kenya, Management and Administration Series no. 2, East African Literature Bureau/Dag Hammarskjöld Foundation, Nairobi, (1973), pp. 53-75

OSWAL, M.G., Health Education in Slum Areas, Central Health Education Bureau, New Delhi, n.d.

PACEY, A. (ed.), Water for the Thousand Millions, Intermediate Technology Development Group, Water Panel, Oxford, Pergamon Press, (1977); also published as "Technology is not enough: the provision and maintenance of appropriate water supplies", Intermediate Technology Development Group, Water Supply and Management (Aqua), 1, 1-2, (1977), pp. 1-58

PADFIELD, H., Issues in Development Research: the Case of Water in Kenya, Paper contributed to the Workshop on Strategies for Improving Rural Welfare, May 31 - June 3, 1971, Nairobi, Institute of Development Studies, University of Nairobi, Discussion Paper no. 107, (May, 1971); also published in M.E. Kempe, L.D. Smith (eds.), Strategies for Improving Rural Welfare, Proceedings of a Workshop held at the Institute for Development Studies, University of Nairobi, May 31 - June 3, 1971, 4, (1971), pp. 451-472

PANAMA, REP. OF, Programa de Agua Potable y de Construcción de Letrinas, 1977-1980, Ministerio de Salud, Dirección General de Salud, Dirección de Salud Ambiental, (Julio 1977)

PANCHAYATI RAJ, Guide to the Selection and Training of Village Handpump Caretakers, Dept. of Panchayati Raj, Andhra Pradesh/Unicef, 1979

PATNAIK, N., "Digging wells in Barpali Orissa, an experience in rural reconstruction", Man in India, 41, (1961), pp. 83-99

PERRETT, H., Social and Behavioral Aspects of Project Work in Water Supply and Waste Disposal, World Bank, Transportation, Water and Telecommunications Department, Public Utilities Note, PUN 52 T, Washington, February 1980

PERU, REP. OF, Manual de Promoción de Communidades, Ministerio de Salud, Plan Nacional de Agua Potable Rural, Lima, (1977)

PERU, REP. OF, Principales Funciones de los Auxiliares de Promoción de Communidades, Plan Nacional de Agua Potable Rural, III Etapa, Ministerio de Salud, Dirección de Ingenieria Sanitaria, Division de Obras, Departemento de Promoción de Communidades, (1977)

PHILLIPS, T., Popular Participation in Development: The Samaeul Movement in Korea, (Draft), World Bank, Washington, November 1978

PHILIPPINES, REP. OF THE, Barangay Water Project, Project Paper, Dep. of Local Government and Community Development, April 1977

PHILIPPINES, REP. OF THE, Training and Organization, Barangay Water Program, Booklet No. 7, Dep. of Local Government and Community Development, September 1977

PHILIPPINES, REP. OF THE, Barangay Water Program, Administrative Procedures, Booklet No. 8, Local Government, Planning and Requirements Handbook, Dept. of Local Government and Community Development, October 1977

PINEO, C.S., Story of a Successful National Rural Community Water Supply Program in the Dominican Republic: PLANAR, Pan American Sanitary Bureau, Dominican Republic 2200, (1973)

PINEO, C.S., Dominican Republic, History of the Rural Water Supply and Sanitation, Observations of the Rural Water Supply and Sanitation Programmes in 8 Developing Countries (Draft), World Bank Documents, 1976-1977, World Bank, 1976a

PINEO, C.S., Bangladesh, History of the Rural Water Supply and Sanitation Programs, Observations of the Rural Water Supply and Sanitation Programmes in 8 Developing Countries (Draft), World Bank Documents, 1976-1977, World Bank, 1976b

PINEO, C.S., Peru, History of the Rural Water Supply and Sanitation Program, Observations of the Rural Water Supply and Sanitation Programmes in 8 Developing Countries (Draft), World Bank Documents, 1976-1977, World Bank, Washington DC, 1976c

PINEO, C.S., Columbia, History of Rural Water Supply and Sanitation Program, Observations of the Rural Water Supply and Sanitation Programmes in 8 Developing Countries (Draft), World Bank Documents, 1976-1977, World Bank, Washington DC, 1976d

PINEO, C.S., Korea, History of Rural Water Supply and Sanitation Program, Observations of the Rural Water Supply and Sanitation Programmes in 8 Developing Countries (Draft), World Bank Documents, 1976-1977, World Bank, Washington DC, 1976e

PINEO, C.S., Upper Volta, History of Rural Water Supply and Sanitation Programs, Observations of the Rural Water Supply and Sanitation Programmes in 8 Developing Countries (Draft), World Bank Documents, 1976-1977, World Bank, Washington, 1977

PINEO, C.S., Malaysia, History of the Rural Water Supply and Sanitation Program, Observations of the Rural Water Supply and Sanitation Programmes in 8 Developing Countries, World Bank, Energy, Water and Telecommunications Department, P.U. Report No. PUN 42, September 1978

PINEO, C.S., SUBRAHMANYAM, D.V., Community Water Supply and Excreta Disposal Situation in the Developing Countries: a Commentary, WHO, Geneva, (1975)

PISHAROTI, K.A., Guide to the Integration of Health Education in Environmental Health Programmes, WHO, Geneva, (1975)

PISHAROTI, R.A., UNICEF Waterfront, 18, (June 1978)

PLATT, L.V., Barpali After Ten Years, Observations Made in Revisiting Barpali, AFSC, Philadelphia, November 1973

PLOEG, J.D. VAN DER, A Activaçao Social dentro do Quadro do Abastecimento de Agua Rural do Projecto de Agua em Buba e Tombali, Direcçao Internacional de Ajuda Técnica e o Commissariado de Estado de Recursos Naturais, Guiné-Bissau, 1979

PLOEG, J.D. VAN DER, Verslag van de Eerste Experimentele Evaluatie Ronde, Voorlichtingssektie PHRR/Buba/Tombali, (Report of the first experimental evaluation), Comisariado de Estado de Recursos Naturais/ DTTH, Bissau/The Hague, January 1980

PLOEG, J.D. VAN DER, WIJK-SIJBESMA, C.A. VAN, "Community participation in the rural well construction programme of Guinea-Bissau", Aqua, 9/10, (1980), pp. 21-23

P.R.A.I., Experiments on Latrines for Rural Homes, Planning, Research and Action Institute, Lucknow, India, (1958)

P.R.A.I., Induced Change in Health Behaviour: A Study of a Pilot Environmental Sanitation Project in Uttar Pradesh, Planning, Research and Action Institute, Publication no. 356, Lucknow, India, (July, 1968)

P.R.A.I., Developing Effective Fly Control Programme for Rural Areas, Report of an Action Research Study, Planning, Research and Action Institute, Lucknow, India, (July 1970)

PRICE, H.B., Rural Reconstruction and Development, A Manual for Field Workers, International Institute of Rural Reconstruction, Silang, Cavite, (1967)

P.R.R.M., "Environmental education and immunization", in H.B. Price (ed.), Rural Reconstruction and Development, A Manual for Fieldworkers, International Institute of Rural Reconstruction/Philippine Rural Reconstruction Movement, Silang, Cavite, 1967, pp. 296-316

PUROHIT, J.N., Improving Sanitary Conditions of Village Surroundings: Human Excreta, National Council of Educational Research and Training, Comprehensive Access to Primary Education Group, (November 1980)

QUESADA, G.M., MCCARTY, R.H., BRENNER, D.J., Project Report on a Model for Improving Access to and Utilization of Regional Health Facilities through Health Education-Communication Programmes, Texas Technical University, School of Medicine, Health Communication Department, Lubbock, Texas, (1975)

RAMAN, V.S., "Water supply programme under Singur rural health unit", Swasth Hind, (April, 1962), pp. 99-104

RAMAN, V.S., "Health education in relation to water supply and sanitation in rural areas", Journal of the Indian Water Works Association, 9, (1977)

RAMOS, E., Client-Change Agent Relationships in Three Colombian Villages, M.A. Thesis, East Lansing, Michigan State University, (1966)

REW, A., "Water dependency and urban poverty", Assignment Children, 45/46, (Spring 1979), pp. 93-105

ROBERTS, G.O., Cultural and Social Differentials in Acceptance of Health and Sanitation Practices in Bo, Sierra Leone, Ph.D. thesis, The Catholic University of America, Washington DC, (1961)

ROBERTS, M.E.S., Notes, Comments, Unesco, September 1968

RODRIGUEZ,R.I., A Rural Health System as the Basic Component of Rural Development in Villarica, Colombia, World Bank, Washington, (March 1978)

ROGERS, E.M., Diffusion of Innovations, Free Press, New York, (1962)

ROGERS, E.M., Communication in Development: Modification in the Classical Diffusion Model for Family Planning, Paper presented at the 3rd World Congress for Rural Sociology, Baton Rouge, (22-27 August, 1972)

ROGERS, E.M., Where We Are in Understanding the Diffusion of Innovations, Paper presented at the East West Communication Institute Conference on Communication and Change: Ten Years After, (January 12-17, 1975)

ROGERS, E.M., "Communication and development, the passing of the dominant paradigm", Communication Research, 3, 2, (1976), pp. 213-240

ROGERS, E.M., ASCROFT, J.R., RÖLING, N.G., Cross-Cultural Generalizations about the Diffusion of Innovations: Research in Brazil, Nigeria and India, Paper presented at the International Sociological Association's 7th Congress of Sociology, Working Group 7, on Modernization, Diffusion and Resistance to Change, Varna, Bulgaria, (14-19 September, 1970)

ROGERS, E.M., ASCROFT, J.R., RÖLING, N.G., Diffusion of Innovations in Brazil, Nigeria and India, Diffusion of Innovations Research Report no. 14, Department of Communication, Michigan State University, East Lansing, (1970b)

ROGERS, E.M., SHOEMAKER, F.F., Communication of Innovations, A Cross-Cultural Approach, Free Press, Glencoe, (1971)

RÖLING, N.G., ASCROFT, J., CHEGE, F. WA, "The diffusion of innovations and the issue of equity in rural development", Communication Research, 3, (1976), pp. 155-170

ROSENHALL, L., HANSEN, L., "Evaluation of rural water supplies in Eastern and Southern Africa", Progress in Water Technology, II, 1/2, (1978), pp 25-30

ROTSART DE HERTAING, I., et al, L'Education de la Santé dans l'Enseignement Primaire et Secondaire, Bureau d'Etudes et de Recherches pour la Promotion de la Santé, Zaire, n.d.

ROY, P., "Correlates of health innovations in 8 Indian villages", in P. Roy, J. Kivlin, Health Innovation and Family Planning, A Study in Eight Indian Villages, Report 21, National Institute of Community Development, Hyderabad, (May 1968)

SAINT, W.S., COWARD, E.W., "Agriculture and behavioural science: emerging orientations", Science, 197, (1977), pp. 733-737

SALINAS, B., CACERAS, R., Research Report: A Case Study in Guatemala, San Pedro de la Laguna, (Draft), World Bank, Washington, January 1978

SANDBACH, F.R., "Preventing schistosomiasis: a critical assessment of present policy", Social Science and Medicine, 9, (1975), pp. 517-527

SANDHU, S.K., et al, "Adoption of modern health and family planning practices in a rural community of India", International Journal of Health Education, 20, 4, (1977), pp. 240-247

SANDHU, S.K., SINHA, K.S., BAWA, P.S., Health Education Service Project, SSF Project Phase II, 1978-1981, Central Health Education Bureau, New Delhi, 1978

SAUNDERS, R.J., WARFORD, J.J., Village Water Supply: Economics and Policy in the Developing World, World Bank/Johns Hopkins University Press, Baltimore/London, (1976)

SCOTT, M., "Self-help in rural Mexico: Santa Maria's well", Community Development Journal, 12, 2, (1977), pp. 116-121

SCOTNEY, N., Rural Water Supply Evaluation: Report on Some Relevant Social Factors Based on a Survey of Three RWS Schemes, Ministry of Water Development, Nairobi, (1976); also published in Evaluation of the Rural Water Supply Programme, Ministry of Water Development, Nairobi, (February 1977)

SCOTNEY, N., Health Education, A Manual for Medical Assistants and Other Rural Health Workers, Rural Health Series no. 3, African Medical and Research Foundation, Nairobi, (1976b)

SCOTNEY, N., "Water and rural development", in J.B. Castelino, C.P.M. Khamala, (eds.), The Role of Water Resources in Development, Proceedings of the 13th Annual Symposium of the East African Academy, September 1977, Nairobi (1979), pp. 269-272

SCOTNEY, N., Developing Health Education Component for the Unicef Water and Sanitation Programme in Sudan, African Medical and Research Foundation, Nairobi, June 1980

SEGAAR, T.J., Sociological Activities in Rural Water Supply, Report No. 23, Rural Water Supply West Java, Min. of Public Health/DITH/IWACO, Jakarta/The Hague/Rotterdam, February 1979

SHANAWANY, H., Demonstration Projects in Low-Cost Water Supply and Sanitation, Report on Mission to the Kingdom of Lesotho, United Nations Development Programme Global Projects GLO/78/006, November 1980

SHIFFMAN, M.A., et al, "Field studies on water, sanitation and health education in relation to health status in Central America", Progress in Water Technology, II, 1/2, (1978), pp. 143-150

SHIFFMAN, M.A., et al, "Guatemala study", E.S.E. Notes, 15, 2, (March 1979), pp. 1-6

SHINGI, P.M., MODY, B., "The communication effects gap: a field experiment on television and agricultural ignorance in India", Communication Research, 3, (1976), pp. 171-190

SIMMONS, J., PHILLIPS, T., Towards a Typology of Popular Participation, World Bank, Policy Planning and Program Review Department, Washington, (May 1978)

SINGH, T.R., "Some aspects of ritual purity and pollution", Eastern Anthropologist, 19, (1966), pp. 131-142

SINHA, K.S., BAWA, P.S., Involvement of Community in Health Programmes, An Operational Guide for Health Workers, Central Health Education Bureau, New Delhi, 1978

SKODA, J.D., MENDIS, J. BERTRAND, CHIA, M., A Survey in Rural Bangladesh on Diarrhoeal Morbidity, Water Usage and Related Factors, Unicef/WHO, Geneva, (June 1977)

SPECTOR, P., et al, "Communication media and motivation in the adoption of new practices: an experiment in rural Ecuador", Human Organization, 30, (1971), pp. 39-46

SPRUYT, D., et al, "Demonstration and evaluation project Ethiopian health centre program, its impact on community health in three towns", Ethiopian Medical Journal, Conference Supplement, (July 1967)

SRIVASTARA, P.K., "Acceptance of sanitary composting in rural areas", Indian Journal of Public Health, 13, 1, (1969), pp. 30-35

STEUART, G.W., "Planning and evaluation in health education", International Journal of Health Education, 13, 1, (1969), pp. 65-76

STEUART, G.W., et al, "Sanitation changes in an African community, a study of primary group education, Part I, Part II", The Health Education Journal, 20, 3, (1962), pp. 133-140 and 20, 4, (1962), pp. 198-205

STREEFLAND, P.H., The Social Organization of Nightsoil Collectors in Selected Asian Cities, Paper presented at the conference 'Sanitation in Developing Countries Today', OXFAM/Ross Institute of Tropical Hygiene, Oxford, 5-9 July, 1977

STREEFLAND, P.H., STREEFKERK, H., Brackish Water and Poor People, Royal Tropical Institute/University of Amsterdam, 1980

STROMBERG, J.S., Community Participation in Water Supply and Sanitation Programmes: Suggestions for Priority Research Areas and Strategies, Paper contributed to the Research Study Group Meeting on Appropriate Technology for Improvement of Evironmental Health at Village level, New Delhi, 16-20 October, 1978, WHO/SEAR, (10 October, 1978)

SUBRAMANIAN, R., et al, "Local caretakers for handpumps in Tamil Nadu, India", Assignment Children, 45/46, (Spring 1979), pp. 145-149

SUBBURAMAN, G.R., MUTHIAH, A., Health and Sanitary Conditions in Athoor Block, India, (Draft Paper), Gandhigram Institute of Rural Health and Family Planning, May 1976

TAEN, T.F.M., SPECKMANN, J.D., "Improvement of rural water supply and priority ranking", Proceedings of the Second World Congress, I.W.R.A., New Delhi, December 1975, Vol. II, pp. 549-561

TALBOT, L.M., "Ecological consequences of rangeland development in Masailand, East Africa", in M.T. Farvar, J.P. Milton, (eds.), The Careless Technology, Ecology and International Development, New York, Natural History Press, 1972, pp. 694-711

TENTORI, F.V., "Their needs and knowledge", International Journal of Health Education, 5, (1962), pp. 10-17

THAILAND, GOV. OF, UNICEF, A Communication Strategy for a Rural Water Supply Project in Thailand, Guidelines for Participatory Workshops for Local Government Officials, Dept. of Health/Unicef, April 1979

THORAT, S.S., "Influence of traditional and non-traditional status on the adoption of health practices", Behavioural Sciences and Community Development, 3, (1969), pp. 38-50

TICHENOR, P.J., et al, "Mass media flow and differential growth in knowledge", Public Opinion Quarterly, 34, (1970), pp. 159-170

TIGLAO, T.V., A Re-Evaluation of Health Practices in a Philippine Rural Community, Ph.D. thesis, Columbia University, (1963)

TINKER, J., AGARWAL, A., Water and Sanitation for All?, Earthscan Press Briefing Document No. 22, London, (November 1980)

TOMIC B., NIKOLIC, A., et al, "Ivanjica: a community conquers health", supplement to The International Journal of Health Education, 20, 2, (1977)

TSCHANNERL, G., Rural Water Supply in Tanzania: is 'Politics' or 'Technique' in Command?, Paper no. 52, Annual Social Science Conference of the East African Universities, Dar-es-Salaam, (1973)

TWUMASI, P.A., YANGYORU, Y., BANUAKU, F., A Sociological Study of Rural Water Use, Project Report for Ghana Water and Sewerage Corporation, Rural Water Supply and Environmental Health, Legon, (1977)

U.N.E.P, Rain and Stormwater Harvesting for Additional Water Supply in Rural Areas, UNEP Expert Group Meeting, Nairobi, 30 October-2 November 1979

UNESCO, An African Experiment in Radio Forums for Rural Development: Ghana 1964/65, UNESCO, Paris

UNESCO, Basic Services for Children: a Continuing Search for Learning Priorities, Experiments and Innovations in Education 36/37, Unesco/ Unicef Cooperative Programme, Paris, (1978)

UNICEF/WHO JOINT COMMITTEE ON HEALTH POLICY, Community Involvement in Primary Health Care: A Study of the Process of Community Motivation and Continued Participation, Final Draft, Geneva, (1977a)

UNICEF/WHO JOINT COMMITTEE ON HEALTH POLICY, Water Supply and Sanitation Components of Primary Health Care, Draft Proposal for the next Unicef/ WHO JCHP Study, 1979, Geneva, (1977b)

UNICEF/WHO JOINT COMMITTEE ON HEALTH POLICY, Unicef/WHO Joint Study on Water Supply and Sanitation Components of Primary Health Care, Unicef-WHO JCHP 22nd Session, Geneva, 29-31 January 1979

USAID, Education in Health, USAID Peace Corps, Division of Volunteer Support, Washington DC, undated (ca. 1964)

USAID., Practical Training in Health Education, Project Paper Cameroon, USAID, Bureau for Africa, Washington, March 1977

VARMA, R., et al, Action Research and the Production of Communication Media, Report of the All India Field Workshop on Action Research in Agricultural Information, Udaipur, 10-20 September, 1973, University of Reading, (1973)

VERSTEEG, J.H.F., Motivation and Local Involvement, Paper contributed to the Symposium on Community Water Supply in Development Cooperation, Royal Tropical Institute, Amsterdam, (7-10 February, 1977)

VERTINSKY, P, VERTINSKY, I., ZALTMAN, G. Health innovation diffusion: an integrated model, 15, 1, (1972), pp. 1-24

VERVOORN, J.D., Tropische Gezondheidszorg in Ontwikkeling, (Tropical Health Care in Development), Van Gorkum, Assen, (1972)

VIERSTRA, G.A., Towards a Fuller Appreciation of Community Involvement, Paper presented at the International Training Seminar on Community Water Supply in Developing Countries, Royal Tropical Institute, Amsterdam, (6-10 September, 1976); also published in WHO/IRC Bulletin Series No. 10, The Hague, (November, 1977), pp. 147-158

VIJAYENDRA, T., "Latrines for the urban poor", Health for the Millions, 5, 6, (December 1979), p. 8-10

VIJAYENDRA, T., Sulabh Shauchalaya Sansthan, A Socially Relevant Small Scale Industry, Public Enterprises Centre for Continuing Education, New Delhi, 1980 (unpubl. paper)

VINCENT, L.J., ALGIE, W.E., MARAIS, G.V.R., "A system of sanitation for low-cost, high-density housing", Symposium on Hygiene and Sanitation in Relation to Housing, CCTA/WHO, Niger, Publ. No. 84, 1961, pp. 135-173

WAGNER, E.G., LANOIX, J.N., Excreta Disposal for Rural Areas and Small Communities, Geneva, WHO Monograph Series No. 39, (1958)

WARFORD, J.J., ROSENFIELD, P., "Public utility pricing and pollution control", in C.G. Gunnerson, J.M. Kalbermatten, (eds.), Environmental Impacts of International Engineering Projects and Practices, American Society of Civil Engineers, (1978), pp. 158-172

WARNER, D., "A summary of the Tanzania rural water supply impact study", in D. Warner (ed.), Rural Water Supply in East Africa, Proceedings of a Workshop held at the University College, Dar-es-Salaam, BRALUP Research Paper 11, (17-19 December, 1969), pp. 165-170

WARNER, D., "Evaluation of the benefits of rural water supply projects in Tanzanian villages", Jounal American Water Works Association, (June, 1975), pp. 318-321

WELLIN, E., "Water boiling in a Peruvian town: evaluating the results of a rural hygiene project", in I. Brady, B. Isaac (eds.), A Reader in Culture Change, vol. 2, Wiley, New York, (1975), pp. 231-259; also published in B.D. Paul (ed.), Health, Culture and Community, New York, Russell Sage Foundation, (1955), pp. 71-103

WHITE, A.T., Outline for the Extension Component of the Slow Sand Filtration Project, Working Document No. 1 for the International Meeting on Extension and Community Participation in the Slow Sand Filtration Project, May 29 - June 2 1978, WHO/International Reference Centre for Community Water Supply, Voorburg (The Hague), (March, 1978)

WHITE, A.T., Community Participation and Education in Community Water Supply and Sanitation Programmes: Methods and Strategies, International Reference Centre for Community Water Supply and Sanitation, Technical Paper Series No. 17, The Hague, (February 1981)

WHITE, A.U., "Patterns of domestic water use in low income communities", in R. Feachem, M. McGarry, D. Mara (eds.), Water, Wastes and Health in Hot Climates, London, Wiley and Sons, (1977), pp. 96-112

WHITE, A.U., SEVIOUR, C., Rural Water Supply and Sanitation in Less Developed Countries, a Selected, Annotated Bibliography, Ottawa: International Development Research Centre, (1974)

WHITE, G.F., "Domestic water supply: right or good?", Human Rights in Health, Ciba Foundation Symposium, Elsevier, Amsterdam, 23, (1974), pp. 35-59

WHITE, G.F., "Water supply services for the urban poor: issues", Water Supply and Management, 2, (1978), pp. 425-454

WHITE, G.F., WHITE, A.U., Behavioral Factors in Selection of Technologies, Paper prepared for the American Society of Civil Engineers Convention and Exposition, Chicago, October 1, 16-20, 1978

WHITE, G.F., BRADLEY, D.J., WHITE, A.U., Drawers of Water, Domestic Water Use in East Africa, Chicago, University of Chicago Press, (1972)

WHITING, M., KRYSTALL, A., The Impact of Rural Water Supply Projects on Women, CARE, Nairobi, n.d.

W.H.O., "World health statistics", WHO Report, 26, 11, (1973), pp. 720-283

W.H.O., Provision of Safe Water Supplies to Rural Communities in South East Asia, Report on the Technical Discussions held during the WHO Regional Committee for South East Asia, Denpasar, Indonesia, 3-9 September, 1974.

W.H.O., World Health Statistics Report, 29, 10, (1976)

W.H.O., Health Education with Particular Reference to the Primary Health Care Approach, WHO Regional Committee for the Eastern Mediterranean 27th session, Technical Discussions No. 1, 16 August 1977; also published as supplement to the International Journal of Health Education (1978)

W.H.O., Conversions of Bucket Privies into Sanitary Water-Seal Latrines, Report on a National Seminar convened by Government of India in collaboration with WHO and Unicef, Patna, Bihar, 25-27 May 1978, WHO, Regional Office for South-East Asia, New Delhi, (1978)

W.H.O., Environmental Health and Diarrhoeal Disease Prevention, Report of a Scientific Working Group, Kuala Lumpur, Malaysia, 3-6 July 1979, WHO, Diarrhoeal Diseases Control Programme, (1980)

W.H.O./I.R.C., Water Dispensing Devices and Methods for Public Water Supply in Developing Countries, Interim Report, WHO International Reference Centre for Community Water Supply, The Hague, the Netherlands, (February 1975)

W.H.O./I.R.C., Community Education and Participation in the Slow Sand Filtration Project, Report of an International Meeting held in Voorburg /The Hague), The Netherlands, 29 May - 2 June, 1978, WHO International Reference Centre for Community Water Supply, Bulletin 14, The Netherlands, July 1979

W.H.O./I.R.C., Slow Sand Filtration for Community Water Supply in Developing Countries, Report of an International Appraisal meeting held in Nagpur, India, September 15-19, 1980, WHO/IRC for Community Water Supply and Sanitation, Bulletin 16, The Netherlands, March, 1981.

W.H.O./I.R.C., Slow Sand Filtration in Community Water Supply in Developing Countries, Training Manual for Operation and Maintenance, WHO/IRC for Community Water Supply and Sanitation, Technical Paper 19, The Netherlands, Spring 1982

WHYTE, A.V.T., "Towards a user-choice philosophy in rural water programmes", Carnets de l'Enfance, 34, (1976), pp. 28-45

WHYTE, A.V.T., Guidelines for Field Studies in Environmental Perception, UNESCO/SCOPE, MAB Technical Notes, 5, Paris, (1977)

WHYTE, A.V.T., BURTON, I., "Water supply and community choice", in R. Feachem, M. McGarry, D. Mara (eds.), Water, Wastes and Health in Hot Climates, London, Wiley and Sons, (1977), pp. 113-129

WIDSTRAND, C.G., "Rural participation in planning", in D. Pitt (ed.), Development from Below, The Hague, Mouton Publ. (1976), pp. 139-144

WIDSTRAND, C.G., Some Social and Cultural Aspects of Diarrhoeal Disease Prevention, Paper presented at the WHO Scientific Group on Environmental Health and Diarrhoeal Disease Prevention, Kuala Lumpur, July 3-9, 1979

WIGNOT, R., A Report on the Conditions of Unicef-Assisted Demonstration Rural Water Supplies in Kenya, Unicef, Nairobi, (1974) Paper contributed to Evaluation of the Rural Water Supply Programme, Ministry of Water Development, Nairobi, (February 1977)

WILSON, J.L., The Theory and Practice of Small Farmer Development, Ph.D. Thesis, American University, Washington, (1977)

WINTER, E.R. DE, Health Services of a District Hospital in Malawi, Van Gorkum, Assen, (1972)

WOODS, J.L., Communication: an Integral Element of Administrating Development Progammes, Paper presented at the Asian Centre for Development Administration Workshop on Administrative Support Planning for Development Projects, uncleared Draft (1977)

WORLD BANK, Jamaica Sites and Services Project, World Bank, Washington, (1974)

WORLD BANK, Lusaka Squatter Upgrading and Site and Services Project, World Bank, Washington, (1974)

WORLD BANK, Kenya Sites and Services Project, World Bank, Washington, (1975)

WORLD BANK, Manila Urban Development Project, World Bank, Washington, (1976a)

WORLD BANK, Colombia Urban Development Project, World Bank, Washington, (1977)

WORLD BANK, El Salvador Sites and Services Project, World Bank, Washington, (1977)

WORLD BANK, Village Water Supply, World Bank, Washington DC, (March, 1976b)

WORLD BANK, Socio-Cultural Aspects of Water Supply and Excreta Disposal, Paper prepared for the World Bank Research Project 'Appropriate Technology for Water Supply and Waste Disposal in Developing Countries', PU Report no. RES 15, World Bank, Washington DC, (September, 1978)

WRIGHT, A.M., OWUSU, S.E., HANDA, V.K., Rural Latrines in Ghana, Paper presented at the Conference 'Sanitation in Developing Countries Today', OXFAM/ Ross Institute of Tropical Hygiene, Oxford, (5-9 July, 1977)

YEBOAH, J.O., "Small scale community self-help projects: shallow wells", in Community Involvement in Primary Health Care, Report of a Workshop held in Kintampo, Ghana, 3-14 July 1978, WHO, Geneva, (1979), pp. 48-50

YEBOAH, J.O., "Sanitation", in Community Involvement in Primary Health Care, Report of a Workshop held in Kintampo, Ghana, 3-14 July 1978, WHO, Geneva (1979), pp. 50-52

YOUL-MO-DONG, "Integrated rural development in Korea", in G. Singh, J.H. de Goede (eds.), Proceedings of the International Conference on Rural Development Technology, An Integrated Approach, Bangkok, Asian Institute of Technology, June 1977, pp. 725-732

ZUNIGA, J.M., Planificación y Programación de un Proyecto de Saneamiento Ambiental Rural, XI Seminario de Ingenieria de Centro America y Panama, Tegucigalpa, Honduras, (Noviembre 13-18, 1977)

ANNEX II COMMUNITY PARTICIPATION AND EDUCATION IN DRINKING WATER SUPPLY AND SANITATION PROGRAMMES: A SIMPLIFIED MODEL

PHASE	COMMUNITY PARTICIPATION	COMMUNITY EDUCATION
Allocation	Participation in national surveys and local studies; sending in requests or showing interest in other ways.	Programme Information on selection criteria and procedures; field studies; average duration of decision process; motivation including general sanitation education; alternatives for self-action.
Planning	Consultant/joint decision on choice of technology, scope of project, level of service, siting, agency and community contributions. Joint development of specific sanitation-education programme based on local conditions and culture.	Project Information on allocation, community options and consequences, participation procedures. Initiation on ongoing specific sanitation education.
Construction	Contributions in cash, kind, services, organization.	Scheme of work. Labour instruction.
Operation, Maintenance, Administration	Contribution of local manpower, for regular operation, maintenance, administation tasks; financing of costs; social control; reporting of problems.	User education on the prevention of wastage, pollution, damage; simple repairs. Training of community members for technical, socio-educational and administrative tasks.
Evaluation	Expression of user satisfaction; monitoring of functioning and acceptance; joint discussion of evaluation results and decision of follow-up; self-surveys.	Feedback of evaluation results; technical, administrative and educational follow-up.

ANNEX III EDUCATIONAL INPUTS IN PARTICIPATORY DRINKING WATER SUPPLY AND SANITATION PROGRAMMES

ACTIVITY	OBJECTIVES	TARGET GROUPS	METHODS	ASSESSMENT/EVALUATION
General programme	Create awareness of national and regional programmes; diffuse knowledge of participation procedures; create awareness of health and economic aspects; inform non-coverage community on alternatives for self-action	Local outhorities; local leadership all target groups for environmental health.	Mass information media; networks of government administration, departments and national associations; special support programmes for self-action.	Assessment existing programme; scope and needs non-coverage population; evaluation number and types of participants in various programmes.
Specific project information	Initiate project and motivate participation; present agency choices, community and household options, and mutual responsibilities.	Community representatives; whole community; specific target groups (women, poor).	Meetings, general assemblies; audio-visual media; visits to/from pilot projects; printed material in vernacular language, local press.	Assessment of project needs and capacities. Evaluation of attendance, represenation, acceptibility.
Specific sanitation education	Create knowledge of relation water - diseases; change local water use and hygiene practices and conditions limiting the health impact, ensure equal distribution of health benefits.	All (potential) users; specific user and non-user categories, e.g. school-children.	Community organization, e.g. committees, health groups; meetings; demonstrations; public commitment, campaigns.	Assessment of need for behaviour change; local health culture. Regular joint evaluations, reasons for non-adoption.
Labour instruction	Realize a good cost-effectiveness of participation in construction; recruit candidates for delegated tasks in operation, maintenance and administation.	Community labour; community organization for construction.	Meetings, inspection.	Assessment of labour feasibility. Evaluation of performance; discussion of problems.
User education	Limitation of damage, pollution and wastage; early identification of problems, upkeep and simple repair of user facilities; regular payment; keep users informed on service; motivation of non-users.	All potential users, specific user and non-user categories.	Demonstrations; printed material; material support campaigns; personal contacts.	Assessment of existing behaviour and regulations, tariff studies; evaluation of user feedback, use and payment patterns.
Training of community members	Develop necessary skills for efficient and effective participation in various project stages.	Community members with specific tasks in the various project stages.	On-the-job training, training courses; refresher courses; newsletter; association; annual meetings.	Assessment of experiences in in previous phases, application selection criteria; evaluation of effectiveness and efficiency; user satisfaction.

ANNEX IV MANPOWER FOR COMMUNITY PARTICIPATION AND EDUCATION: EXISTING CHOICES IN RURAL WATER SUPPLY PROGRAMMES *

Community Participation and Education tasks are:

1. delegated to one mobile promotion service within the water agency, that carries out all tasks before, during and after construction; example: Colombia, Guinea- Bissau;
2. delegated to two mobile services within the water agency, one responsible for the process during planning and implementation, the other during operation, maintenance, administration and evaluation; example: Dominican Republic, Peru;
3. delegated to two mobile services, within one or two agencies, the one responsible for participation, the other for health education; example: Nicaragua (proposed);
4. delegated to a mobile or village service in another (sub) sector (agriculture, community development, education, health); example: Niger;
5. added to a mobile technical service in the water agency; example: Malawi, Korea;
6. combined with technical tasks for local services within various agencies; example: Guatemala;
7. supplemented by technical tasks to stimulate self-help for simple technologies; example: Cameroon, Malaysia;
8. shared by a mobile promotion service and local government workers; examples: Ethiopia, Paraguay;
9. partly added to a mobile technical service in the water agency, partly delegated to a mobile service in the health agency; example: Ghana (proposed).

---

* In some programmes, waste disposal is included, in others it isn't.

ANNEX V POSSIBLE NEGATIVE CONSEQUENCES OF DRINKING WATER SUPPLY AND SANITATION PROGRAMMES: A CHECKLIST

A. Health Conditions

1. Increase in public health risk when several traditional supplies each serving a limited number of people are replaced by a collective supply insufficiently protected against pollution.
2. Creation of unsanitary conditions through inadequate drainage of waste water (mud leading to faecal-oral disease; pools of water leading to vector-borne disease, especially malaria).
3. Creation of unsanitary conditions at the water source through failure to provide separately for livestock (animal excreta).
4. Children may play in and drink from unsafe water around supply.
5. Construction work may involve contacts with outsiders who may introduce new infective organisms.
6. Introduction of water supply for domestic and productive use may lead to a deterioration in nutrition, because food crops are replaced by cash crops; milk is sold to milk industry.
7. Deterioration of nutrition due to disturbances in the water ecology affecting fish production.
8. Increased health risks when improperly designed, constructed, used, cleaned or maintained excreta disposal facilities become a source of infection for the users.
9. Increased risk of transmission of vector-related diseases when improperly constructed, used or maintained waste disposal facilities intensify rodent and insect problems.
10. Creation of new health risks by disposing untreated sewage into surface water simultaneously used for other purposes such as drinking, bathing, fishing and crop irrigation.
11. Unintentional contamination of domestic water sources by excreta disposal facilities and systems, e.g. when incorrectly sited latrines or leaky sewage systems pollute groundwater.
12. Creation of unnecessary health risks as a result of unsafe or unhygienically operated nightsoil collection and re-use systems.

B. Economic Conditions

1. Replacement of paid labour by voluntary labour in areas with great unemployment; without using the savings for expanding the programme to other unserved areas.
2. Unemployment and loss of income for people engaged in water selling and waste collection.
3. Failure to plan for a temporarily higher population growth through a decrease in mortality, leading (especially in low-potential areas) to increased un- and underemployment, land shortage and migration.
4. The removal of existing water constraints to cattlekeeping (shortage, taste, high fluoride content) leading to overgrazing and erosion, when people keep more cattle, or neighbouring nomads bring in their cattle for watering.
5. Allocation to growth-point areas leading to a growing gap between low and high potential areas through the mechanisms of:
   a. a still higher productivity;
   b. an increase in population from a decrease in mortality and an increase in immigration leading to more political importance;
   c. allocation of additional services;
   d. further stimulation of organizational and leadership capacities (but see also point 3).
6. Change from dispersed settlement to concentrated settlement around water supply points leading to increased travel time to fields.
7. Increase in value of land (farm-connections) and property (site-and-service projects in slum areas) leading to forced departure of lowest income groups.
8. Lack of coordination between water supply and spontaneous/ planned settlement leading to water shortages and a decreased willingness to pay for supply.

C. Social Conditions

1. Relative weakening of the position of the poor through:
   a. forced resettlement of population groups (e.g. squatters, to provide space, avoid source pollution etc.), often accompanied by a destruction of property;

b. subsidized service to dominant groups;
c. monopolization or restriction of access, including cases where publicly provided water is privately sold;
d. use of this monopoly for getting money or services e.g. when traditional supplies fall dry;
e. project causing changes in land and property value or land tenure system benefitting the rich;
f. equal contribution by each household pressing relatively heavier upon the poor;
g. voluntary labour affecting agricultural (food) crops;
h. loss of jobs for water/waste carriers employment affecting poorest sections;
i. status, travel, jobs and other amenities going to the most powerful or their allies and relatives;
j. increase in labour productivity benefitting employer rather than employee;
k. lowering of groundwater table for service to the most affluent affecting water reliability in shallow wells used by the poor;
l. payment for labour in food facilitating the avoidance of minimum wages in cash and making substantial profits to contractors possible;
m. relatively less health benefits for people who need these most as a result of:
   - a lower level of service,
   - inability to afford additional provisions for optimal benefits such as good water storage,
   - lower coverage by health education services;
n. demand of construction contributions from all, while opening opportunities for speculation and profits from construction for a few.

2. Relative worsening of the position of women through:
   a. limitation of social contacts, especially for culturally-isolated women groups;
   b. heavier labour burden for women:
      - voluntary labour for construction mainly from women,

- more time/effort for collection because number of trips to closer source increases or old, distant source remains to be partly used,
- no more assistance in water collection from men/ children,
- water and time gains leading to increased physical labour for other purposes.

c. making a productive use of water and time/energy gains without sharing in the resulting profits;

d. the automatic allocation of (prestigious) jobs and functions to men;

e. reduction of women's sphere of influence by transferring water supply matters from women to men;

f. unsetting of daily timetable as a result of a poor or unadapted service (queueing, inconvenient collection hours).

3. Increased conflicts between and within villages, especially when competition between water for household and productive purposes is possible.

4. Increased dependence upon outside agencies and decreased possibility to solve problems independently.

References:

D. Donaldson, "Health Issues in Developing Country Projects", in C.G. Gunnarson, J.M. Kalbermatten, eds., Environmental Impacts of International Civil Engineering Projects and Practices, ASCE, New York, 1978, pp. 134-157.

B. Hall, A. Etherington, T. Jackson, Evaluation, Participation and Community Health Care: Critique and Lessons, paper prepared for the American Public Health Association Meeting, November 1979, ICAE, Toronto, 1979.

A.T. White, Checklist No. 4, "Ways in which water supply projects might possibly lead to a worsening of the relative position of the poor", in Health Extension in Phase Two of the Slow Sand Filtration Project, WHO International Reference Centre for Community Water Supply, The Hague, March 1978

Reprinted in: A.T. White, Community participation in water and sanitation concepts, strategies and methods, Technical Paper No. 17, International Reference Centre for Community Water Supply and Sanitation, Rijswijk (The Hague), The Netherlands, June 1981.

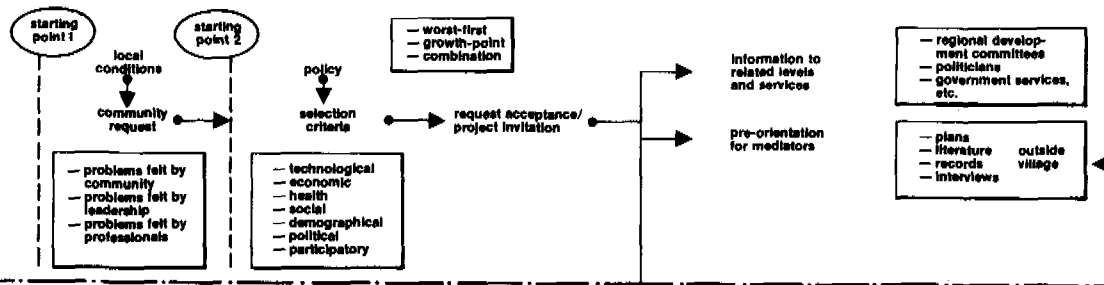
ANNEX VI COUNTRY INDEX

Pacific

ANNEX VII SUBJECT INDEX

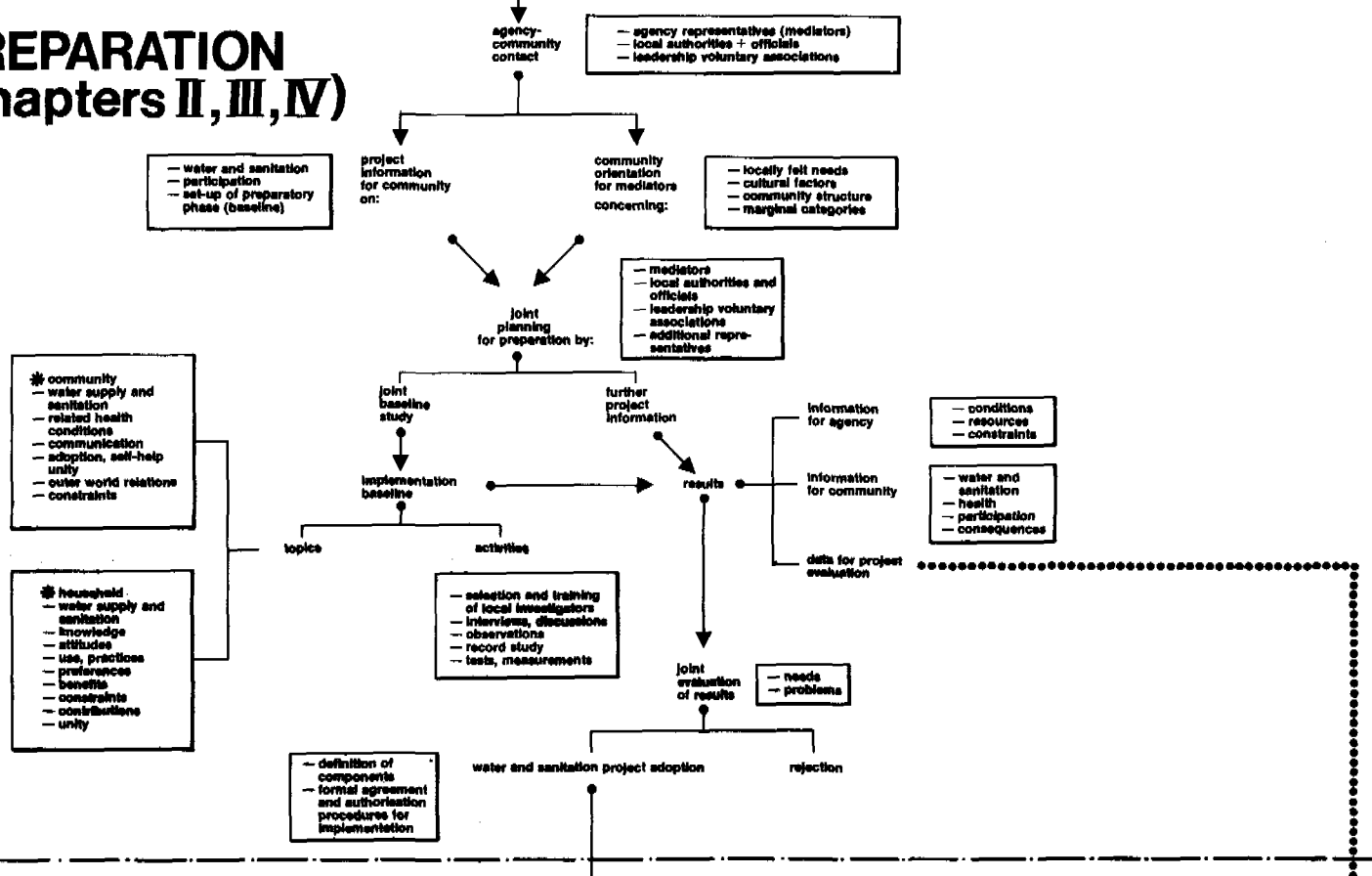
(p) = passing

A: INITIATION (chapter I)

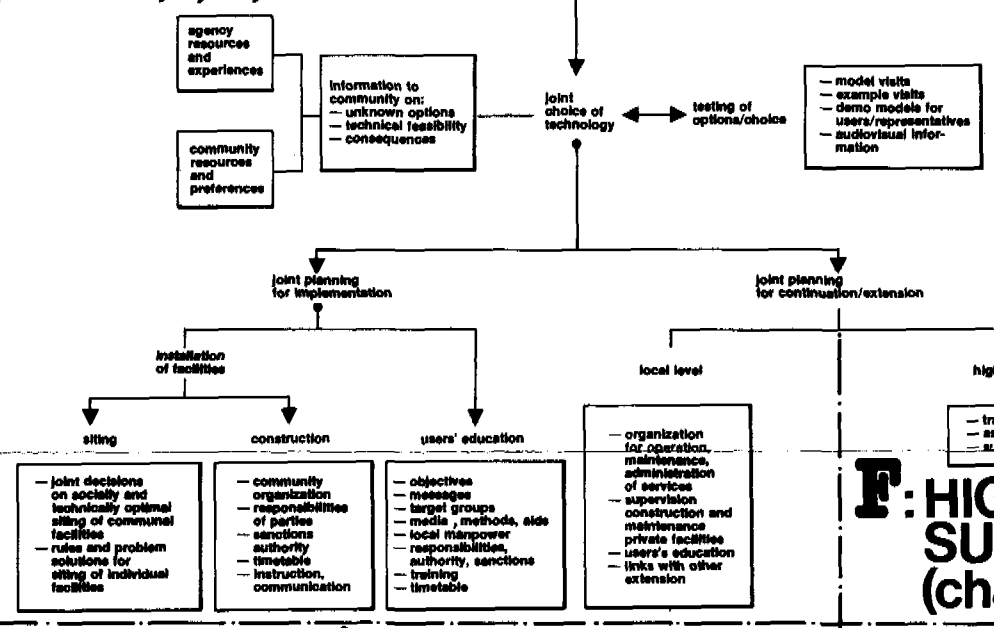


F: HIGHER LEVEL SUPPORT (chapters IV, IX)

B: PREPARATION (chapters II, III, IV)

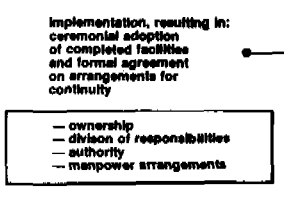


C: PLANNING (chapters III, V, VI, VII)

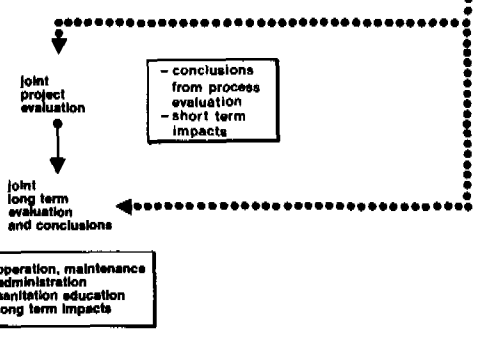


F: HIGHER LEVEL SUPPORT (chapters IV, IX)

D: IMPLEMENTATION (chapters V, VI, VII)



E: EVALUATION (chapter VIII)



SOCIAL ASPECTS OF COMMUNITY WATER SUPPLY AND SANITATION PROGRAMMES: A FLOW DIAGRAM

ANNEX VIII

Colophon:

Editor	: George J. Bedard
Text Processing:	Ms. Hannie Wolsink and Ms. Monick Zijdemans
Printing	: Simonis Grafische Bedrijven B.V. 's-Gravenzande The Netherlands

IRC publications

IRC publishes a Technical Paper Series which provides expertise on topics ranging from the analysis of organic compounds in water to community education and participation.
Technical Papers are the joint efforts of consultant experts and IRC staff and address themselves to solving pressing needs in the community water supply and sanitation fields in developing countries.
These documents are used selectively by all levels of staff in many countries; not only by engineers and top decision-makers at the national level but also public health officials, and technicians at the village levels.
Several Technical Papers have been or are being translated into Spanish and French.
The Centre also publishes a Bulletin Series, comprising reports on international meetings (co)organized by IRC, bibliographic reference lists, and a monthly Newsletter.

Other IRC publications on Community Participation and Education include:

PARTICIPATION AND EDUCATION IN COMMUNITY WATER SUPPLY AND SANITATION PROGRAMMES, A SELECTED AND ANNOTATED BIBLIOGRAPHY
(Bull. 13) 238 pages 1979

COMMUNITY EDUCATION AND PARTICIPATION IN THE SLOW SAND FILTRATION PROJECT, Report on an International Meeting
(Bull. 14) 58 pages 1979

GUIDE FOR THE DESIGN OF A NATIONAL SUPPORT PROGRAMME FOR COMMUNITY EDUCATION AND PARTICIPATION IN WATER SUPPLY AND SANITATION
Prepared by Dr. Anne Whyte
(Draft, photocopy format) 60 pages 1980

COMMUNITY PARTICIPATION IN WATER AND SANITATION, CONCEPTS, STRATEGIES AND METHODS
Prepared by Dr. Alastair T. White
(TP 17) 180 pages