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PROJECT FOR THE DEVELOPMENT OF A
COMMUNITY PARTICIPATION COMPONENT
IN THE TANZANIAN RURAL WATER SUPPLY PROGRAMME

Final Report

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TABLE OF CONTENTS

	<u>page</u>
EXECUTIVE SUMMARY	i
1. Origin of the Project	i
2. Project Objectives	i
3. Methodology	ii
4. Results	ii
5. Conclusions	iii
6. Recommendations	iv
7. Support Material	v
I PROJECT BACKGROUND	1
1. Tanzanian Policy on Rural Water Supply	1
2. Community Participation in Rural Water Supply	1
3. Expansion of Coverage	2
4. PMO/IRC Field Study	3
5. Methodology	3
II METHODOLOGY	7
III SITUATION ANALYSIS	10
1. Water Supply in Served Villages	10
2. Functioning of Improved Supplies	11
3. Use of New Water Supplies for Drinking Water	12
4. Productive Use of an Improved Water Supply	13
5. Hygiene around Water Points	14
6. Contamination of Water during Collection and Storage	14
7. Increased Water Use	15
8. Village Sanitation	15
9. People's Participation in Project Planning and Implementation	16
10. Participation in Maintenance and Administration	22
11. Village Capacity for Contribution to Maintenance	24
12. Village Health Education	24
IV ACTION PROGRAMME: ACTIVITIES AND PROCESS ANALYSIS	25
1. Joint Planning of Participatory Village Programmes	25
2. Village Water Supply Committees (VWSC)	26
3. Sanitation	28
4. Environmental Health Discussions	30
5. Activities in Villages served/being served with Water Supply Projects	32
6. Activities in Villages not to be served with Water Supply Projects	37
V HEALTH BEHAVIOUR STUDY IN EIGHT SELECTED VILLAGES	38
1. Results of Household Survey	38
2. Evaluation of Community Participation Activities in Two Villages	42
VI CONCLUSIONS	49

	<u>page</u>
VII RECOMMENDATIONS	53
1. Ownership	53
2. Allocation	56
3. Planning and Decision Making	57
4. Construction	58
5. Maintenance	58
6. Management	59
7. Monitoring of Evaluation of Community Participation	59
8. Impact on Village Development: Health	59
9. Impact on Village Development: Use of Water and Time Gains	60
10. Manpower	60
11. Manuals	66
12. Training	66
13. Choice of Technology	67
14. Supply of Material and Equipment	67
15. Further Testing of Community Education and Participation Procedures	67

List of Tables

1. Type of supply and service level in villages with an improved water supply	10
2. Level of service of improved water supplies in rural communities in Shinyanga Region	11
3. Status of shallow wells and hand pumps in Shinyanga Region: results of three field-evaluations	12
4. Average annual income and sources of income of study villages in Morogoro and Shinyanga Regions	24
5. Percentage of women participants in village assemblies in five districts	26
6. Number and type of health discussions reported by a 15% household sample in two detailed study villages	44
7. Number and type of messages recalled and understood correctly	45

List of Figures

1. Distribution of project villages in Morogoro Region	5
2. Distribution of project villages in Shinyanga District	6
3. Risks of water contamination between source and cup of 90 households	41

List of References	68
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- Annex 1 Manual "Procedure for Village Participation in Rural Water Supply, Health Education and Sanitation: Step by Step Programme for Hand-pump Well Projects".
- Annex 2 Training/Job Manual on understanding and improvement of village hygiene for village caretakers, village water sub-committee and other village workers.
- Annex 3 A series of posters on the various points where transmission of water-related diseases may occur, as an aid to group discussions on how these transmission will be prevented.

ABBREVIATIONS AND ACRONYMS

AFYA	Ministry of Health
BRALUP	Bureau of Resources Assessment and Land Use Planning, University of Dar es Salaam (now IRA)
CCM	Chama Cha Mapinduzi, the National Party
CD	Community Development
CDD	Community Development Department
CDTF	Community Development Trust Fund
CEP	Community Education and Participation
DANIDA	Danish International Development Agency
DGIS	Directorate General of Development Cooperation, Ministry of Foreign Affairs, The Netherlands
DWE	District Water Engineer
DP	Distribution Point (of piped water supplies)
IRA	Institute of Resources Assessment, University of Dar es Salaam
IRC	International Reference Centre for Community Water Supply and Sanitation, The Hague
MAJI	Ministry of Water and Energy
MP	Member of Parliament
PMO	Prime Minister's Office
RWE	Regional Water Engineer
TAZARA	Tanzania Zambia Railway Authority
VWSC	Village Water Sub Committee
10-cell leader	Elected leader of a group of 10 households

1 US\$ = 12 Tsh (1984)

EXECUTIVE SUMMARY

1. Origin of the Project

Under the National Rural Water Supply Programme new supplies are being built every year. As a consequence, an ever-growing burden is being put on MAJI to operate and maintain all the supplies, even though many of them, especially handpumps and gravity systems could easily be maintained and operated by villages with a minimum of outside (government) help. This would not only reduce problems of long periods of breakdown and high maintenance costs, but also stimulate village self-reliance through training in technical, administrative and analytical skills.

This approach of village self-reliance, which has always been part of the Tanzanian policy, has been emphasized again by President Nyerere in his speech during the Second Ordinary Party Conference, October 20th, 1982:

"Whatever the technology used, it must be adopted in consultation with the local people and from the beginning the responsibility for looking after the facilities must clearly be theirs. Government cannot finance the maintenance and repair work of basic village equipment if new developments are to go ahead."

However, there are no specific national guidelines on how this policy should be made operational when allocating, planning, constructing and managing village water supplies. This issue was discussed in a National Workshop on Village Water Supply and Community Participation in Tanzania in July 1981 with participants from MAJI, AFYA, PMO, and donor agencies involved in rural water supply and sanitation. As a result PMO (CD Department), in cooperation with the International Reference Centre for Community Water Supply and Sanitation, and with financial assistance from the Directorate General for Development Cooperation (DGIS) of the Netherlands Ministry of Foreign Affairs, decided to carry out a special project on people's participation in the national rural water supply programme of Tanzania.

2. Project Objectives

The objectives for this project were:

- (1) to assess the ways in which the people are involved in the various phases of rural drinking water supply projects in Tanzania;
- (2) to find out if an adaption of the existing structures and procedures is needed to ensure that the local socio-economic, cultural and health behaviour aspects are incorporated in the technical projects.

Depending on the results of this first phase, further objectives would then be:

- (3) the development of practical models for such a community education and participation (CEP) component;
- (4) their field-testing, including the development of organizational structures;
- (5) their appraisal for implementation in future programmes.

3. Methodology

The project was organized in two phases. The first phase consisted of the assessment of existing CEP procedures in 12 of the 20 Regions in the country. Thereafter various community participation models were developed. The models were discussed in a conference organized in December 1981 resulting in the selection of one model for field-testing.

During the second phase the selected model has been field-tested in 60 villages in four districts of Morogoro Region and one district of Shinyanga Region. Three types of villages have been selected, 20 villages that had already been served with an improved supply, 20 that were being served and 20 that cannot be served within the near future. Besides, a household survey has been carried out in 9 villages, 3 of each type to determine water use and hygiene. The villages have been selected in such a way that different socio-ecological zones have been represented.

To give a national scope to the study an extensive literature survey was carried out of publications and reports on social aspects of water projects in different parts of Tanzania. Close contact has also been kept with water projects in all regions.

Three reports which have been written between February 1983 and August 1983 were widely circulated for comments and review.

An Interministerial Meeting between MAJI, AFYA and PMO inviting different donor agencies was organized in Morogoro in December 1983 to discuss and adopt the procedure for community participation developed in the above named reports.

4. Results

From October 1982 to December 1983, 56 villages have been covered and all data were available at the time of writing this report. In four villages no field-testing could take place for various reasons (p. 7). All villages were very interested in discussing the water supply project in their community. Attendance at village assemblies was generally good. However, some practical steps are needed to encourage the attendance of women and their participation in discussion and management committees.

Discussions resulted in adaptations of project designs to local needs, local arrangements for participation in construction and maintenance and planning of local health education programmes. The implementation of the assemblies was organized and supervised by the village water sub-committee. It was found that where specially elected committees were involved, they functioned better than where the existing committee for Education, Health and Social Services carried out the improvements.

As a result of the project, environmental sanitation (latrine construction, improvement, etc.) and hygiene education were successfully linked to water supply improvements, using existing field-staff and a group-discussion approach.

Also traditional water points were improved by the local community in villages that were not yet served by external water supply projects. Villages were found to be willing and capable to take responsibilities for their water supply (operation, maintenance and repair). A higher level support system is however essential and needs to be developed further.

5. Conclusions

- (1) Not all villages have been adequately served. In the field study, all villages with an improved water system had more than the prescribed design criterion of 250 people per water point and some village sections were not served at all.
- (2) Although the water provided is adequate and safe and could have a positive influence on village health, such an impact is not achieved at present because:
 - not all sections have been served;
 - long periods of breakdown occur;
 - people continue to use also unprotected sources;
 - latrine conditions, latrine use and general hygiene are not improved at the same time.
- (3) Problems of attitudes that have affected some projects are:
 - a low felt need for a better domestic supply in villages with permanent traditional sources;
 - unrealistic expectations from a domestic supply (e.g. free irrigation of crops),
 - no consideration of village desires for a combination of a domestic and productive water supply system, even when villages offer to bear all extra costs themselves.
- (4) Involving the villages in the planning stage of a water project has led in particular to a better distribution of water points over the village, which is one of the conditions for a better water use and resulting public health impacts.
- (5) At present there is no particular village organization which has specific responsibilities for the village water supply. Water supplies in the villages have been poorly kept. Establishment of village water sub-committees has led to better operation and maintenance, but without authorization and higher level support only marginal and short-term effects can be achieved.
- (6) The way in which most water projects have been carried out in the villages does not contribute to a further village development because it does not
 - help villages to analyze their own situation and plan additional improvements in village hygiene;
 - increase technical, administrative and leadership capacities in the village by training selected villagers for basic technical and organizational tasks;
 - provide an entry point for women in village decision making, as water and hygiene are major concerns of women;
 - stimulate the economic use of water (brick making, vegetable gardening, etc.) and developmental use of time gains (adult education classes, women groups, etc.).

- (7) Voluntary labour in construction has only been beneficial when self-help activities were well-organized (clear standards of work, some labour instruction and technical aids, regular supervision, set schedules but with some flexibility, etc.).
- (8) Maintenance remains a serious problem. Of the 259 water-points surveyed, 127 or 49% were not functioning at the time of the study. This problem is fully realized by the villagers, who are willing and sometimes even insist on taking some responsibility for local maintenance. However, the training, authorization and spare parts supply necessary for such a greater self-reliance does not exist at present.
- (9) At the moment environmental health education programmes have not been linked to the water projects. The field study shows that this is necessary and can be successfully done, using group discussions on behaviour change instead of one-way lectures and regulations.
- (10) Evaluations of village water supplies have been carried out in Tanzania in the past but their results have not been used to improve the existing procedures, because the studies were carried out independently from the government.

6. Recommendations

Based on the results summarized above, major recommendations are:

- village ownership of the water supplies or water supply parts within their boundaries, and joint ownership when the supply is serving more than one village;
- high priority in allocation of projects to villages which have to spend a long time on water collection, especially in the dry season, or have a great health risk;
- people's participation in planning, construction, maintenance and management including involvement of women (for manuals, see section 7 below);
- establishment of a simple monitoring system and integrated evaluations and feedback of results to the villages and the agencies concerned;
- linkage of sanitation and participatory hygiene education to increase the public health impact of improved water supplies,
- stimulation of productive use of water and time gains for village development;
- integration of community education and participation tasks into the existing manpower structure (MAJI, AFYA, PMO/CCD),
- organization of an on-the-job training programme and integration of training on people's participation into the existing institutional training programmes,
- establishment of a spare parts supply system and recycling of used parts,
- appropriate technology for greater village self-reliance (piped gravity water supplies, hand pumps),
- further testing of the guidelines and procedures in cooperation with the various donor projects on rural water supply and coordinated by a national water committee of the departments concerned (Dev Plan; MAJI; Treasury; AFYA and PMO/CDD).

7. Support material

As part of the project, the following material has been developed on people's participation and education in community water supply projects:

- manual on participation procedures in handpump well projects (annex 1);
- training/job manual on understanding and improvement of village hygiene for village caretakers, village water sub-committee and other village workers (annex 2);
- a series of 12 posters on the various points where transmission of water-related diseases can occur, as an aid to group discussions on how these transmission routes can be blocked (annex 3).

I PROJECT BACKGROUND

1. Tanzanian Policy on Rural Water Supply

In 1980, when the International Drinking Water Supply and Sanitation Decade started, no change of direction was needed in Tanzania. Already in 1971 the Tanzanian government had decided on a national policy to provide safe and dependable drinking water within walking distance (max. 4 km) to every registered village by the end of 1981. In the Decade these targets were readjusted to the provision of safe and reliable drinking water through one public water point (tap, hand pump) for every 300 people at a maximum distance of 400 meter.

2. Community Participation in Rural Water Supply

The history of community participation in rural water supply goes back to even before the time that the country embarked on its ambitious programme of providing the rural population with clean and potable water within a short walking distance. People have been involved in constructing their own water supply since early 1960 by siting and digging wells fitted with rotary pumps with technical assistance from the Rural Construction Units of the Community Development Department and financial support from UNICEF and CDTF. The Ministry responsible for water supply constructed the more sophisticated water supplies without community participation.

The programme for rural water supply was launched in 1971 under MAJI. It included an element of community participation, but MAJI did not know how to implement this component because there were no clear guidelines as to how and when to involve the people. At the same time the Community Development Department which has always been concerned with the participation of the people in their own development merged with the Department of Cooperative Development and Ujamaa Villages Division under the decentralization programme, forming a new Department of Ujamaa and Cooperative Development. The new department did not emphasize self-help projects which involved people's participation.

Under the interpretation of MAJI community participation was limited to getting free unskilled labour from the people for trench digging. Consultation of the people on issues that concerned them directly, such as siting of public taps and information on water sources depended on the personal attitudes of MAJI personnel. Maintenance of the rural water schemes like that of urban schemes was vested under MAJI, without participation of the communities concerned.

3. Expansion of Coverage

The national policy on drinking water has brought a tremendous increase in efforts to serve everyone with clean water. However, the increased construction of piped water schemes and handpump wells spread over large areas has brought an ever growing burden of operation and maintenance. Frequently the population is forced to return to the old contaminated water sources and long periods pass before repairs can be carried out or a supply of diesel brought. This situation has increased the necessity to involve the rural population in the rural water supply programme. But because there are no clear guidelines as to how this should be done, different methods have been tried by different donor agencies engaged in constructing water supplies in rural areas.

To unite the efforts being carried out in the various regions, a National Workshop on Village Water Supply and Community Participation in Tanzania was organized by the Bureau of Resources Assessment and Land Use Planning (now Institute for Resource Assessment) of the University of Dar es Salaam and the International Reference Centre for Community Water Supply and Sanitation (IRC) (Ref.1).

One of the resolutions of the workshop was that the Prime Minister's Office (PMO) through its newly created Community Development (CD) Department should be in charge of community participation in the rural water supply programme and that regional and district technical departments should be responsible for providing technical support at village level. Other workshop resolutions were:

- a. An essential prerequisite for community participation is that the people are made aware of their rights as well as their responsibilities. In order to achieve this,
 - the rights and responsibilities have to be defined,
 - a mechanism for informing the people of their rights and responsibilities has to be established.
- b. There must be a much broader approach to rural water supply. Rather than focusing only on domestic supply, village water requirements for other economic purposes, such as livestock and small scale irrigation, should be taken into account in planning a village water supply with the villages.
- c. Additional costs of providing a water supply above a basic minimum level should be borne by the community opting for that higher level of supply and the costs of water supply for economic purposes should be borne by those benefitting economically.
- d. For a community participation programme to be effective, transport and other back-up support to field-staff should be provided by MAJI and PMO.

- e. Where action is to be taken over village water supply, appropriate Village Water Sub-Committees should be established and the participation of women in village water management should be emphasized.
- f. In the construction phase of a village water supply, education should be emphasized and training extended to village level to ensure proper operation and maintenance.
- g. Monitoring and evaluation should be part and parcel of water supply projects and the community must participate in these activities.
- h. In order to assist the Government and beneficiaries, a campaign should be carried out on rural water supply, sanitation and health. The campaign should be followed up periodically.

4. PMO/IRC Field Study

The CD Department accepted a coordinating role in the rural water supply programme, because one of its traditional roles is the promotion of the spirit of self-help and people's participation. The Department also wanted to get additional experiences in the field. Hence an agreement was reached with the government of The Netherlands and IRC to carry out an evaluation and field-testing project (Ref.2).

The objectives for this project were:

- (1) to assess the ways in which the people are involved in the various phases of the rural water supply programme in Tanzania;
- (2) to find out if adaptation of the existing structures and procedures is needed to ensure that the local socio-economic, cultural and health behaviour aspects are incorporated in technical water supply projects.

Depending on the results of the first phase, further objectives would then be:

- (3) the development of practical models for such a CEP component;
- (4) their field-testing including the development of organizational structures;
- (5) their appraisal for implementation in future programmes.

5. Methodology

Previous experiences had shown that medium-depth and shallow wells with hand pumps can be a low-cost solution to provide safe and reliable drinking water within a reasonable walking distance to many parts of Tanzania. Morogoro Region was chosen for the evaluation project because of the large-scale hand pump and shallow wells projects in the region. Shinyanga District was added to account for its longer experience with a shallow wells project and to widen the socio-economic variation of the study areas. Some piped water supply systems were also included in the study.

The field study has been carried out in 12 villages in each of the following districts: Kilosa, Morogoro, Ifakara, Mahenge and Shinyanga District - a total of 60 villages. Of these, a total of 20 villages had already been served with an improved supply, 20 were in the process of being served and another 20 will not be served in the next few years. In addition, a household survey has been carried out in 9 villages (two of each type in Morogoro Region and one of each type in Shinyanga District) on water use and hygiene behaviour. In two villages bacteriological tests have been carried out to get an indication of contamination of drinking water during collection and storage. As far as possible the villages selected have been chosen in different socio-ecological zones, to ensure the greatest possible representativeness (Fig. 1 and 2).

The selected zones were:

Morogoro region

- a. the catchment area of the upper course of the Ruvu River
- b. the swampy area of Ruvu River basin
- c. the Miyombo valley
- d. the upper catchment area of the Mkondoa River
- e. the dry plains in southern Kilosa and Mahenge
- f. the southern river basin of the Great Ruaha River

Shinyanga Region

- a. flat open grassy plains with agriculture and animal husbandry, no land shortage (V)
- b. flat to undulating plains with relatively dense settlement and mixed economy (agriculture, animal husbandry, trading, some industries) (I)
- c. open mbuga plains with heavy grazing, erosion problems and cotton growing in the western parts (IV).

In addition to the field study, secondary sources (reports, field visits, meetings) were used to incorporate experiences and research results from other areas of Tanzania.

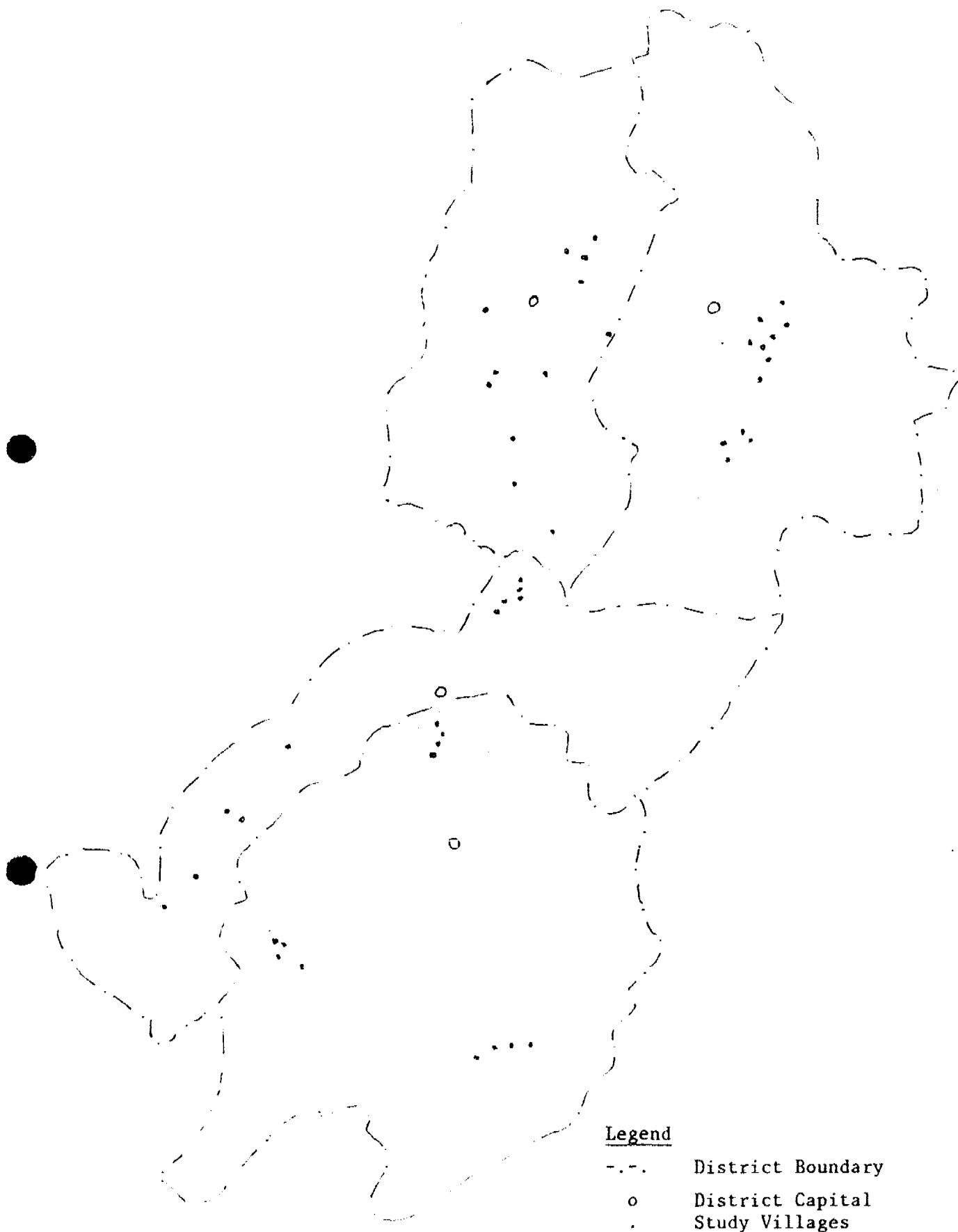
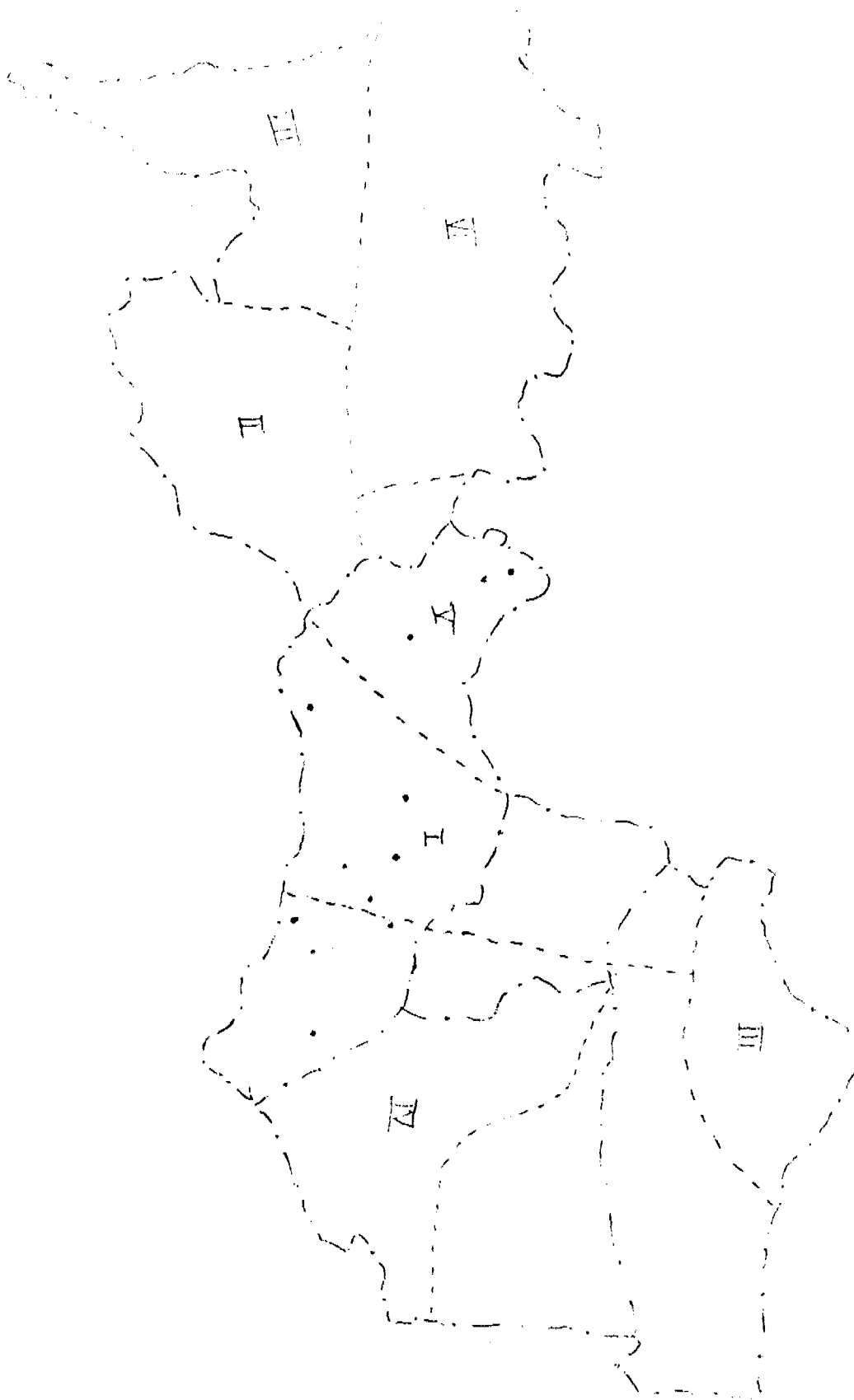


Fig. 1. Distribution of project villages in Morogoro Region



Legend

- .-.- District Boundary
- Socio-ecEconomic Area
- . Study Villages

Fig.2. Distribution of project villages in Shinyanga District

II METHODOLOGY

During the first phase of the project a general assessment of the existing socio-educational procedures was carried out in 12 of the 20 Regions. Various community participation models were developed and a national workshop was organized on community participation in rural water supplies (Ref.1). The workshop resulted in the selection of one model for field-testing and the transfer of the project from the Ministry of Water and Energy (now Ministry of Water, Energy and Mineral Development) to the newly established Community Development Department in the Prime Minister's Office (Ref 2).

The field-testing of the selected model was planned to be carried out in 60 villages in 5 districts. Four of these, Kilosa, Morogoro Rural District, Kilombero/Ifakara and Mahenge, are in Morogoro Region. Because of the longer experience with a shallow wells project and to widen the socio-economic and cultural variation, Shinyanga District in Shinyanga Region was included in the field-testing. Of the selected villages, 20 villages have had improved water supply projects for three years at least, 20 were in the process of being served with improved water supplies and another 20, for one reason or another, were not expected to be served in the near future.

During the implementation programme four villages had to be dropped from the original list. Two villages could not be reached because rivers could not be crossed due to heavy rainfall in the area and one village did not want to participate in the project because of an unsurmountable leadership problem. In Ifakara District construction activities were limited to three village. This means that field testing in practice took place in 56 of the selected villages (20 served, 19 being served and 17 not to be served).

The field-testing was carried out from September 1982 to November 1983 by regular Community Development (CD) field-workers. They were given a three-week theoretical and on-the-job training for the study and follow-up work. They started by staying for one week in each project village to evaluate the existing water supply and sanitation situation and the economic use of water through informal discussions and observations. A six-page checklist for each type of village was used to collect the following information:

A. In villages already served with water supply projects

- (i) The history of the water supply project, including the initiation of the project, the participation of the community in local planning, construction and maintenance of the water supply, the satisfaction of the community with the participation process and the perceived socio-economic impacts.

- (ii) The present water supply conditions, including the adequacy of the new water supply in terms of number of users per water point, ease of access, reliability and purposes of use, and the degree of and reasons for continued use of traditional water sources.

B. In villages being served with water supply projects

- (i) The present water supply conditions, including the sources used for different purposes, reasons for use and existing maintenance arrangements.
- (ii) The need for and expectations of the village about the planned water supply project.
- (iii) The participation of the village in local planning, construction, maintenance and management.

C. In villages not to be served with water supply projects in the near future

- (i) The present water supply situation.
- (ii) Whether any improved water project had been requested, and if the village would be interested in considering ways to improve the traditional water supply with locally available resources.

In all three types of villages the environmental sanitation and health situation in the village was also reviewed. Aspects included were hygiene around water points, water drawing and storage practices, latrine situation (both at household and public level), and water and sanitation related diseases that are common in the village. The socio-economic and cultural situation of each village was studied to determine the potential for village participation in operation, maintenance and repairs of water supplies, improvement of traditional sources and improvement of village sanitation.

At the end of six days the village information collected was summarized and a report was given in a general village meeting organized by the village authorities. The report was discussed fully and the meeting adopted resolutions on how to improve the existing situation in each village.

To start the local action programme, a special village water sub-committee (VWSC) was elected at each village meeting. The election of women as well as men was stressed since water is an important women's affair.

With this committee the CD field-staff planned a local action programme in each village that included:

1. Village organization for maintenance for the improved water supply (selection of village caretaker for further training in maintenance; reservation and creation of village funds for the acquisition of tools and spare parts and honorarium and supervision of caretakers);
2. Village improvement of traditional water sources;
3. Village improvement of household and public hygiene conditions;
4. Participation in planning and construction of new water supplies;

5. Productive projects to raise maintenance funds (e.g. vegetable growing, beer-making);
6. Local health education programmes to improve hygiene conditions and behaviour patterns;
7. Liaison of CD field-staff with outside agencies for clarification of previous decisions and/or possible support to solve village problems.

In the health education activities on the use of group discussions with especially women was emphasized. The purpose of this approach was to help the villagers to identify and avoid local risky conditions and behaviour patterns and plan and implement local improvements to reduce these risks. The theoretical health knowledge that the villagers already have acquired through the existing health education programmes (cholera control campaigns, lectures at health centres and clinics, radio) would in this way be shared among the members of the group and applied to the particular conditions and behaviour patterns in their village. To facilitate these discussions a series of 12 discussion posters were developed. A set of these were kept in each village for use by the village government and voluntary workers (adult educators, dispensary staff, primary school teachers etc.).

A detailed study on environmental health conditions and behaviour was carried out in a sample of eight villages selected from the main project sample (Ref.3). The aim of this study was to get more insight into the various risks of transmission of water and sanitation related diseases that continued to exist after the construction of an improved water supply and to establish a baseline for the estimation of the impact of the project on health behaviour. Methods used for data collection included (1) general observations and informal interviews with women and girls at traditional and improved water sources, (2) observations and interviews in a 10% at random household sample, and (3) observations on hygiene conditions at public places with the help of a checklist.

Project reports

During the project three reports have been prepared for circulation: (1) "Maintenance and Repair System for Handpump Wells", February 1983; (2) "Preliminary Report, March 1983" and (3) "Impact of Water Supply on Hygiene Improvement in Rural Tanzania: a study in eight villages in Morogoro and Shinyanga Regions, August 1983".

The reports have been widely circulated in the Ministry of Water and Energy, the regions where field-testing was carried out and the donor agencies assisting in the implementation of water supply programmes in the other regions of Tanzania. An Interministerial Meeting of PMO, MAJI, AFYA, the two field testing Regions and donor agencies was organized in Morogoro in December 1982 to adopt procedures for village participation in water supply and sanitation programmes. The procedures are reported in "Proceedings of the Interministerial Meeting on Community Participation and Health Education in the Tanzanian Rural Water Supply Programme, Prime Minister's Office, 1984".

III SITUATION ANALYSIS

1. Water Supply in Served Villages

Out of 56 villages 39 had already been served or were being served with an improved water supply. The type of improved supply and level of service is given in Table 1.

Table 1. Type of supply and service level in villages with an improved water supply

Type of supply	No. of villages	No. of people served	No. of waterpoints
Handpumps only	24	43,278	147
Taps only	10	20,437	73
Taps and Handpumps	5	12,623	39
Total	39	76,338	259

In the villages which had an improved water supply, one improved water point was found to exist for an average of 295 people. The number of persons per water point in all 39 villages included in the survey was above the Tanzanian design criterion for public water points (250 people per tap or handpump). A resurvey has started in some villages to bring the service up to design standards.

Not all completed water points were well-distributed over the village area. In 24 villages with handpumps and 1 village with both taps and wells it was found that one or more sections had not been served. In one of the piped schemes, all standposts were situated along the main road. As shown below (section 3) this lack of even distribution is one of the reasons why people go on using the traditional sources. One of the conditions for the improvement of village health is that everybody uses the improved source in all seasons, at least for drinking and food preparation.

Similar findings have been reported from an evaluation study in Shinyanga Region (Ref. 4). As indicated in Table 2, out of the total of 617 villages in the Region, just over half had an improved water supply at the end of 1981. However in only nine villages the level of service reached the prescribed level of one water point per 250 persons.

Table 2. Level of service of improved water supplies in rural communities in Shinyanga Region (N = 617)

No. of villages	No. of persons per water point
67	1250
101	625-1250
72	415- 625
27	310- 415
15	250- 310
9	250
29	no data
297	new points planned.

Based on Ref. 4, p. 10.

2. Functioning of Improved Supplies

At the time of the field survey, 127 out of the 259 water points (or 49%) were found not to be functioning. Reasons for this were: wells dry (27), hand pump out of order (85) and main pipe damaged (15). Reported duration of breakdown varied from 1 to 18 months, with an average of 6.9 months. In addition, 44 water points (or 17%) were found to function poorly (13 low yield, 31 leaking taps).

Data from other studies show that maintenance is a general problem for domestic water schemes and handpumpwells, because:

- a steadily growing number of facilities has to be served over increasing distances, which puts a heavy burden on the RWEs and DWEs who have to cope with shortages of funds, manpower, means of transport, fuel and spares (Ref. 5);
- at village level, scheme attendants are employed by MAJI but they can only operate the scheme and have to report even the most minor problems, as they have no tools, spares, training and authorization for repair; also, the village governments have no control whatsoever over their functioning (Ref. 5, 6, 7);
- so far, experiences with community participation in hand pump maintenance (the so-called three tier system) have not been satisfactory, as shown in Table 3 (Ref. 4, 8, 9).

Table 3. Status of shallow wells and hand-pumps in Shinyanga Region: results of three field evaluations

Month and year of study	Area visited	Nr. of wells visited	% of total	Nr. of wells abandoned	% pumps not functioning	% pumps needing repair	% problems reported	% caretaker not funct.	% unhygienic surroundings
May 1979	whole region unsystematic sample	70	8	-		50 *	20	-	60
January 1982	whole region stratified random sample	57	6	7	34	60	-	-	70
May-June 1982	whole region random sample	66	7	2	48	65	-	74	74

* No distinction made between pumps that need some repair and pumps that do not function at all.

These disappointing results may to a large extent be due to the fact that village level maintenance is not part of the village organization. During construction one or two people from the - paid - village labour force were trained for minor preventive tasks such as fastening of nuts and bolts and sweeping round the well. They have been expected to do this every day at all the wells in the village (Ref. 9). Although this has not been evaluated in the field, the following social factors may have interfered with the proper functioning of the village caretakers (Ref. 10):

- selected people are young village men; factors such as (i) economic ties to the village, (ii) a personal interest in the work e.g. as water user (mostly women), plot owner (so drainage water can be used for vegetables) or village technician, and (iii) willingness to do cleaning jobs were not taken into account;
- they function as the lowest level of a government system, but without salary or career opportunities and little supervision;
- the village is not involved in their selection, supervision and compensation, and does not sufficiently appreciate the importance of preventive maintenance;
- at a breakdown of the facility when the village needs the caretaker most, he cannot do anything else but report to MAJI and wait until the mobile service comes for repairs. This does not contribute to the village's appreciation of the caretaker's work.

In Mtwara and Lindi Regions, experiences are similar: the caretakers do not do their work satisfactorily and regular maintenance by a mobile maintenance team is too expensive (Ref. 10).

3. Use of New Water Supplies for Drinking Water

The most important reason for women to select a source for water collection is the distance from the home or time needed to collect

the water. The second criterion (but not reported in all areas where research has been carried out) is the perceived quality of the water, and the third "no problems with other users", such as, queuing (Ref. 3, 7, 11, 12). This shows that women make a reasoned choice in selecting their sources and will not automatically change their water collection pattern when a new and safer supply is provided, unless it is more accessible than the nearest sources that they used for their drinking water in the dry and wet season.

The above pattern of decision-making explains the findings of the present study that some improved supplies are not generally used. Of the 51 functioning hand-pump wells, 12 were not generally used due to high salinity, 8 due to smell and colour problems and 4 due to great distance to the pump. The quality of tap water was generally found acceptable.

This does not mean that the quality of tap water is always good. However, users are not always made aware of this risk. Tap water is frequently rated as the best type of water, even though it may be pumped from a river in an already settled area without any water treatment (ref. 5, 11, 12).

Nevertheless, there are also cases where villagers have shown a fairly good understanding of water safety. In the present study, many women in one of the villages with a piped supply preferred to continue using their open wells which they shared with a few other households. They did not like to use the tapwater as it came straight from the nearby river without purification or chlorination (Ref 3). Their attitude was found to originate with the village chairman who was a retired officer of the public health service and very active in the promotion of health knowledge and sanitation improvements.

In a high proportion of villages traditional water sources were still used for drinking purposes. Of the 39 villages served, 7 or 18% had no choice but to use unimproved sources because all improved water points in the village were out of order. The other villages had one or more new water points in working condition. However, in 15 of these villages people were still using traditional sources (river, unprotected wells, water holes) to draw drinking water. Of the remaining villages, 11 had completely switched to improved sources. In the 6 others the women were either collecting their drinking water at the tap while using traditional sources for other purposes or said they boiled their drinking water from traditional sources.

4. Productive Use of an Improved Water Supply

In one village, a salty well was used for making bricks. In two other villages, the pump caretaker was allowed to use the drainage water to irrigate a vegetable garden. No productive use was reported for the other villages.

In the present systems (hand-pump wells, domestic schemes) little productive use of water is possible. In general, this is no problem since a better domestic water supply is a felt need of the villagers as investigated for at least seven regions (Ref. 7, 13).

However, a domestic water system does not always get the highest priority. Men in particular have said to prefer a supply for productive purposes (Ref. 14), and this may in practice affect the willingness of male decision-makers to spend village resources on upkeep and repair of domestic water supplies. Realization of the potential advantage of an improved supply for everybody's health (including their own) may make a difference.

On the other hand, studies in Rukwa and Kigoma show that people expect a very great impact of the water supplies, not only on crop irrigation but also on their health (Ref. 11, 12). The studies indicate a need for a more realistic understanding of the benefits of an improved water supply, and the additional conditions that must be fulfilled to achieve such impacts.

A combination of a domestic and productive water supply is generally recommended for areas where irrigation schemes are planned or being implemented and for areas where domestic and productive uses of water can lead to conflicts between different user groups, e.g. cattle owners and women in dry areas or areas with a high fluoride content in groundwater and a shortage of fluoride-free surface water.

5. Hygiene around Water Points

In all villages but six, surroundings of the water points were insufficiently kept. Puddles and long grass around water points contribute to insect breeding and vector related diseases (malaria, filariasis). The standing water can also contaminate the source especially when there are cracks in the well cover, through seepage along the well casing.

The six villages with good surroundings either had a village caretaker who kept the sites clean or a 10-cell leader who looked after the well, or the users were adhering to the rules given by the construction team (no washing, bathing and cattle watering). However, according to a health assistant at a local health centre, this has as negative side effect that in one of the villages with a bilharzia problem in the dry season, this problem has persisted due to continued use of an infected stream for washing and bathing. The detailed study in 8 project villages gives further confirmation of this effect (Ref. 3).

6. Contamination of Water during Collection and Storage

Tests of bacteriological water quality have shown a significant increase of faecal contamination of water in collection and storage vessels (Ref. 7, 15). Although the relationship between the type of water source, type of vessel and user behaviour in collecting, storing and drawing water is not yet clear (Ref. 3), the studies show that safe water from a tap or handpump may no longer be safe by the time it is drunk.

7. Increased Water Use

An improvement of public health from an improved water supply not only depends on a general, continuous and proper use of safe water for drinking and food preparation. It also depends on the use of more water for personal and household hygiene.

Contrary to expectations, an improved water supply does not always lead to the use of more water. Average consumption is between 10.2 and 15.3 litres per capita per day (Ref. 7, 11, 12, 16, 17). Factors contributing to a slightly higher consumption are high socio-economic status, low distance to water points, public taps as water points and a large number of adult females in the household. The present study found a reported average of 22 liters per capita per day for improved sources against 14.4 l/c/d for traditional sources. This difference was partly explained by the same factors mentioned above, and by religion (Ref. 3).

Water use at the source can vary considerably within one region: in Rukwa and Kigoma Region 7.6 to 35.3% of all users wash only at the source and 18.3 to 57.7% do so occasionally. Bathing at the source also varies but is less frequent: 10.6 to 41.8% do so occasionally (Ref. 11, 12). A similar variation was found in the present study (Ref. 3). This indicates that in some villages women may have a real need for a laundry and child-bathing facility at the handpump or tap, which will contribute to a higher water use for hygiene and thus a reduction of water-washed diseases.

However, it is also possible that intensive use, poor drainage capacity of the soil, and blockage of drainage channels and pits through lack of user maintenance and poor quality of soap lead to unhygienic conditions and even well pollution. Where washing facilities are installed, involvement of women in design for optimal user appropriateness and organization of users for site upkeep will therefore be important.

8. Village Sanitation

A further condition for a public health impact from an improved water supply is that sanitation conditions are improved at the same time. In villages with an improved supply, latrine coverage was observed to be high in 14 villages (70%) and poor in 6 villages (30%). Of the 19 villages that were being served, 10 had a high latrine coverage, and 9 had a poor coverage. In the 17 villages that are not to be served at present, latrine coverage was high in 6 villages, and low in 11. Although no systematic household data were collected, it appears that villages with an improved water supply have a slightly better sanitation than villages without a water supply. Nevertheless, coverage and observed latrine hygiene were below average in over half of the villages.

Another problem is the use of the latrines. Observations showed that in five villages with a high coverage latrines were not always used by everyone. In one case this was explained to stem from a reluctance to share the same latrine with one's in-laws. In two other villages, sanctions (fines) had been used to stimulate

the construction of latrines, but this did not convince everyone to also use the latrines. For the other two villages, no particular reason could be identified why people were not always using their latrines.

Condition of public latrines (schools, dispensaries and health centres) were observed to be rather poor. In most cases there were not enough facilities to match the number of users. Also the present method of health education and maintenance in schools and clinics is not effective as far as use and upkeep of latrines are concerned.

Refuse is generally thrown around the houses. In two villages, household refuse was said to be thrown into the fields as fertilizer, but no compost pits were made.

Other studies also show that, with some local exceptions, latrine coverage in Tanzania is generally high (Ref. 7, 18). However, investigations of their conditions and people's felt problems indicate that there is a need for village improvement of existing pit latrines and of patterns of use. Addition of sanitation and health education projects to rural water supply projects and training programmes is therefore generally recommended (Ref. 4, 5, 6, 7, 11, 12, 18).

9. People's Participation in Project Planning and Implementation

In 23 of the 29 villages with hand-pump wells, the village government and users were not involved in the planning phase. There had been no discussion with the village on options or consequences for village behaviour when the survey showed that not all sections could be served with hand-drilled wells. In such a case, options for the village are the following:

- The village accepts the few suitable sites and other village sections agree to use them for their drinking water; for other uses, these sections go on using the traditional sources nearer to their homes. Meanwhile, the village remains eligible for an additional supply (e.g. gravity) as the design criteria are not fulfilled.
- The village accepts the suitable sites and agrees on the installation of several wells in that area, each to be assigned to one village section. As the criterion for number of users is fulfilled and the larger distances have been accepted by the village, there is no chance for an additional supply.
- The village provides self-help for a hand-dug hand-pump well in places where the capacity of the water table is too low to have a hand-drilled well.

In almost all cases where no full coverage was achieved people from the unserved areas were using the traditional sources nearest to their house, instead of walking to an improved source in another part of the village.

Another consequence of a lack of village consultation during the planning stage is that the village may have environmental and cultural knowledge that would be useful for the technical team but remains unused. Thus, in one village hand-pump wells were

constructed in an area which according to the older villagers occasionally gets flooded. In another village with a scattered settlement pattern, two wells sited by the survey team fall dry while in another part of the village some traditional wells do not dry up. The women said they did not inform the survey team of this fact because they had not been asked.

In 5 of the 6 villages where the village representatives have been involved in siting, the sites were well distributed and no problems were reported. In the sixth village, one section could not be served, but this section was already using the traditional wells of the neighbouring section and enough new wells have been sited in that part to serve everybody's needs. However, in none of the villages there has been any education and village decisions on exclusive use of safe water sources for drinking. A household survey would be necessary to determine if participation in well location has contributed to the abandonment of all traditional water sources for at least drinking water.

Participation in construction and installation of the handpump wells was limited to paid labour recruited by the village chairman or secretary. In three villages, village caretakers had been selected from this paid labour by the construction team, getting on-the-job training for preventive maintenance. The villages had not been involved in this selection and no social criteria, such as suitability for non-technical tasks (upkeep of well hygiene, user education) and socio-economic ties to the village had been applied.

Participation also varied in the seven piped supplies that were covered by the field study. In two schemes, the sites for distribution points (DPs) were selected by the project staff but subject to approval by the village. In both cases the DPs were well-distributed over the village and all households were using the taps. In these schemes all construction was done with voluntary labour organized by the village government in cooperation with MAJI.

In the other schemes, the village had not been involved in siting and paid labour was used to construct the schemes. In these cases, the DPs were not well-distributed over the area. In one case, they were all sited along the main road. In another, only the village centre was served by the scheme.

Not all villages that are to be served were found to have a felt need for the planned project. Two villages did not welcome a hand-pump well project. The first village wanted a piped gravity supply instead of the allocated wells. But when the consequences of a piped supply were discussed (distance to mountains, safety of groundwater) they changed their opinion. The second village said to be more in need of a milling machine, as the women have to walk 10 kilometres to mill their flour. They had already collected Tsh. 10,000 for this purpose. The CD worker informed them that with this money they could obtain a loan from the Rural Development Bank, a fact of which they were not aware and explained the procedures of a milling project. Thereafter they were interested in also discussing the water supply problems.

Villagers participate in government water projects by sending in requests. There is no systematic participation in the local planning as no need is seen for informing the villagers and consulting them on matters which will concern them or on which they may have useful information. This has also led to the unnecessarily poor functioning and use of supplies, e.g. because of flooding of well sites, siting of facilities in graveyards and use of sources that are unacceptable to the villagers (Ref. 7, 14, 19).

The only way in which villagers have been involved further is by giving free labour. This voluntary labour has sometimes caused problems of delay and poor construction. This can however mostly be attributed to a lack of clear work guidelines and standards, insufficient supervision and assistance to the village government in organizing the work, coincidence of the work with agricultural labour peaks and lack of consideration of psychological factors (e.g. starting the backfilling of trenches when water is already flowing through the pipes) (Ref. 7).

In the donor-supported projects, community participation was initially also limited to giving self help.

In Mtwara and Lindi Region for instance no participation has taken place in the planning and construction of hand-pump wells. In piped schemes there has been no involvement in planning, but trenches have been dug with voluntary labour. However, for each metre of digging and backfilling, Tsh. 1/= is paid into the village fund. Usually this money has been used to organize a party at the official opening of the scheme').

In Morogoro Region community participation has been introduced in Phase II of the piped water supply project. However, there are no general guidelines. The procedures followed are developed as the schemes progress, based on the personal initiatives and attitudes towards community involvement of the various site engineers.

The case study presented below shows that when certain conditions have been fulfilled, such as a felt need for better domestic water and adherence to the use and supervision of unpaid village labour and full involvement in work planning, community participation in construction can be successful. Experiences in several other schemes are less positive. This was attributed exclusively to the attitudes of the villagers and not to a lack of procedures and training on how to achieve community participation in the various stages of the projects ²).

¹) Personal communication from M. Rantala, former Project Manager and H. Savukoski, present Manager.

²) Many villages were said to be unwillingly to participate in construction, because:

1. the men are not interested in domestic water supply;
2. the women have no shortage of water and their opinion on possible other water problems has not been asked;

continued on next page.

Case Study of Changarawe and Zombo-Lumbo Scheme, Kilosa District
(four villages)

Allocation

The projects were allocated on the basis of the domestic water supply plan (priority for villages with the greatest need in terms of distance to and water quality of existing supply) and discussions with the regional and district authorities.

Although 3 of the 4 villages to be covered already had a supply, it was decided that new schemes were appropriate, because

- the river water used for the existing piped supply is heavily polluted; the new supply uses a borehole next to the river;
- fuel supply to the existing diesel pump and control over its correct use by the operator was a problem; the new pump runs on electricity;
- in Zombo-Lumbo, only one hand-pump well could be made as a safe water source, this well is far from the village;
- there are no villages in the district with a greater need according to the district authorities and consultants.

Planning

At the introduction of the project in the villages of Changarawe scheme, the following steps were taken:

- contact with village authorities (first with a heavy delegation, later with technical staff only);
- information on proposed scheme and gauging of attitudes of villages towards the project;
- discussion of consequences for village participation: (i) voluntary labour and (ii) organization of voluntary labour by village governments according to their own system but within the time schedule and according to the standards set by the project.

Initially the village men wanted payment for all jobs they did, including the voluntary work agreed upon. However, after some joint planning sessions with the village leadership and the joint development of a system for voluntary labour, the work proceeded in a satisfactory manner.

As a result of this experience the site engineer of the scheme decided that in Zombo-Lumbo the community would be involved more intensively in the planning and design of the project. For this

footnote 2 of previous page continued:

3. the village government knows that the work has to be completed in time and that the unskilled labour will be paid to save investments already made;
4. the national policy is free water, with no firm conditions or regulations on how this is to be achieved;
5. other villages have also been paid, by MAJI as well as the consultants;
6. even with payment, many other activities are more profitable than trench digging.

purpose, the formation of a special water board was proposed that would review the design, organize voluntary labour and select a suitable villager for on-the-job training as (MAJI-paid) scheme attendant. As water is the concern of women, two of its five members were to be women.

After two weeks the village government had formed this board, composed of the village chairman, secretary and one 10-cell leader. When the absence of women was commented upon, the secretary left the meeting and after ten minutes came back with two women. According to the site engineer, they have played no active role in the board. Neither is it clear if they informed and represented other village women on issues of the water supply that concerned them directly.

Otherwise, the involvement of the water board has been very successful:

a. They provided useful local information.

- The main transmission line as originally planned ran through a graveyard. On indications of the villagers the design was therefore slightly adapted. Also information was given on the situation of three other graveyards within the settled area.

b. They achieved a better distribution of DPs over the village.

- The original design had been made several years ago so that it was not in accordance with the present settlement.
- All DP's had been planned along the main road. The new sites selected by the board within the technical criteria given by the project were well-distributed over the whole village. The area planned for village extension was also taken into account.
- One hamlet also belonged to the village but had been overlooked by the design engineer as it was situated at some distance from the main village. This has also been served in the new design made with village involvement.

c. They organized the voluntary labour for unskilled tasks.

- The organization of the voluntary labour was left to the village leaders. All three villages used a different system, suited to the particular village conditions.
- Before starting the work, standards were explained, a schedule agreed upon and some aids given (a measuring stick indicating depth and width of the trenches, and string and sticks for marking of the trenches). Regular supervision was also provided by the project.

d. They recruited paid village labour for skilled tasks

- For the construction of the storage tanks and DPs more labour continuity is needed than for trench digging. This work has therefore been done by paid labour, recruited by the board. Review of the monthly attendance lists shows that the composition of the teams varied from month to month, so that financial benefits were not limited to a few privileged households.

- In coordination with the site engineer, a suitable villager has been selected to be proposed to MAJI as scheme attendant ¹).

e. They have started preparations for village maintenance.

After several weeks of participation in the planning of the scheme the water board itself raised the matter of maintenance. They have requested that a small stock of spares is left in the CCM office so that the scheme attendant can repair leaks and replace tap washers. However, such action will only postpone maintenance problems for a short time, as a formal policy and provisions for village participation in maintenance is lacking.

f. They will have some responsibility for village maintenance and water use.

No experience exists as yet with the supervision of the caretaker and the users by the water board. However, the water board has been trained on the importance of keeping the DPs clean. As they are very aware of the importance of safe water there is good hope that they will also be successful in the upkeep of DPs ²).

It has also been proposed that the scheme attendant will be responsible to the village as well as to MAJI. For this purpose a weekly log sheet has been developed, a copy of which is to be given to the village government every week and sent to the DWE every month.

As reported in documents and seminars experiences in other pilot projects in Iringa, Mbeya and Ruvuma Regions showed that the establishment of village water committees composed of village leaders and some elected women members facilitated people's participation. In particular, cooperation with the Village Water Sub-Committee led to a better distribution of water points over the villages. Experiences with the organization of self-help varied. In general, self-help was successful when there were no delays in the technical programme (supply of materials, back-filling directly after pipelaying); when the labourers were instructed and supervised, and when it was made very clear that there would be no scheme when the villagers did not prove their

¹) Before the piped water scheme was built the village had already decided that it would use only the hand pump for all its drinking water. A by-law to this effect had been passed and a fine of Tsh. 125/- was imposed on the use of the river for other purposes than washing and bathing. In discussions with the women they said this by law was generally adhered to. The women had a very good understanding of the risks involved in drinking unboiled river water.

²) The ultimate decision rests with the DWE. He can reject the village choice and employ another scheme attendant, with the disadvantage that this person has no practical knowledge of the pipe network and no use can be made of village knowledge of personal qualities.

interest by a good labour attendance. It was also found that the water committees reduced patronage and gave useful suggestions for the design of washing slabs and cattle troughs. Less successful were the committees as communicators and health educators: contacts with the villages as a whole were limited to the organization of the self-help labour only. As hygiene around the water points and in the households was poor, the project started to train local women as environmental health educators, and involve existing health staff (Ref. 7, 20).

In Rukwa Region a pilot project was carried out in community participation consisting of the following steps: (i) village authorities show interest and willingness to participate, (ii) a village water sub-committee, including some women, is elected at a village assembly, (iii) the committee assists in design of the distribution net (village expansion plans, DP siting) and presents a plan for self-help, (iv) during construction villagers do all unskilled jobs, (v) a scheme attendant selected by the committee is trained during construction and (vi) he/she is given some tools and spares by MAJI, (vii) MAJI supplies fuel and spares, attendant does all jobs, but when unable to do so he/she reports to MAJI.

Experiences reported so far have been positive, but voluntary labour must be closely supervised for good results. However, no further details on the effects of community participation have been given, and no experience has been gained on the effectiveness of the maintenance system, which is the most crucial element of participation.

10. Participation in Maintenance and Administration

In none of the 56 villages of the present project had a village organization assumed any specific responsibility for looking after the village water supply and stimulating water-related development.

In three villages with broken handpumps no action had been undertaken at all. One village had reported the problem to MAJI, but without result as yet. In a fourth village, 2 of the 4 broken pumps had been removed from the wells to draw water, with all the risks of source pollution and pump vandalism. In a fifth village, where all five hand pumps have been out of order for over 18 months, the village council is using a diesel pump installed by MAJI to pump river water to the village. There is no distribution network so a hose at the water tower serves as DP for three villages. Water collection is organized by groups of households, using ox carts. The water is sold at Tsh. 12/= per 200 litre drum (last year: Tsh. 6/=). The revenue is used by the village government where the water tower is situated to buy diesel and pay a local mechanic who operates the pump at fixed times and does simple repairs, using tractor tools. The necessity of ox carts, drums and payment makes the system only affordable for the richer households of the three villages. The poor either rely on unprotected water sources or buy smaller quantities of water at a high price from richer neighbours.

Another case of self-reliant maintenance was found in a village where two hand-pump wells had been constructed in 1976. At that

time one of the paid labourers from the village had also got some training in preventive maintenance. He was told to report all problems to MAJI. However, when no attention was paid to his reports, the village government told the caretaker that he should try to repair the pumps himself, using some tractor tools. This he has done successfully until now. In exchange for his services he has been allowed to use the drainage water for a vegetable garden on the village land around the well. The water maintenance team has only come once - in 1979 when somebody had intentionally contaminated one of the wells. One month after the report had been sent, the well was disinfected by MAJI. However, the villagers did not use the well until the village government decided to seal the manhole cover with cement. Since then, the well has been used without problems.

Responsibility for maintenance of the seven piped schemes is vested under MAJI (6 cases) and TAZARA (one case). The latter gave no problems, as there is a TAZARA workshop in the next village. In three villages maintenance has been a problem. In the first village three washers are needed. This had been reported three months earlier to the water department, but no action had been taken. The two operators could not do this job, as they had no tools, spares and authorization to do any repairs or replacements.

In the second case four taps had been missing for at least six months. Here the operator had first reported the problem at district level, but was told that there were no spares. The village government then decided to purchase the taps from a TAZARA workshop in the next village. MAJI was informed to come and fix them. The operator was then told that there was no transport. The village decided to wait for MAJI as MAJI had told them that they should not do any repairs themselves.

In the third village, the supply has been in existence since 1976 but the village has never really benefited from it. The pump is frequently out of order for months and in the rainy season the intake gets clogged and is not cleaned. Three months before the field study the main line was destroyed by a road construction firm. This had been reported to MAJI but nothing has happened. There is a MAJI-paid operator, but he is only trained to operate the pump and report problems.

Other studies also report this village dependency on outside help. Because the communities have not been involved in local decision-making and maintenance of their water supplies, they have not developed feelings of ownership and responsibility. No village organization has been made formally responsible for the way in which the villagers use the supply and no training for such responsibilities has been organized (Ref. 14, 19). A handing-over certificate and ceremony has been used to fill this gap in a number of cases, but this substitute for a real village involvement and training has had little effect (Ref. 21).

Although these and other evaluations (Ref. 5, 6, 7) all point at the need to adapt existing procedures, they have so far not had

any influence. This may be due to the fact that the studies were not carried out on request of and in cooperation with the national technical and policy-making departments.

11. Village Capacity for Contributions to Maintenance

Specific information on village income is hard to get as detailed accounts are rarely kept. The information that could be obtained so far is presented in Table 4.

Table 4. Average annual income and sources of income of study villages in Morogoro and Shinyanga Regions

No. of villages	Net average income per year in Tsh.	Sources of village income
13	400,00 and above	village crops, sales taxes, levies, milling fees, fines
28	50,000 - 400,000	village crops, sales taxes, levies
15	below 50,000	sales taxes, fines

In addition to the sources of income listed in the table, many villages obtain revenues from other sources, such as agency fees. The table shows that most of the villages are in the middle category and above, indicating that a maintenance and repair budget can be financed. In the villages with an income below Tsh. 50,000 a subsidy from the District Council may be necessary, however.

12. Village Health Education

The field study showed that 22 of the 39 villages served or being served had a rural health centre or dispensary in or near the village. However, in none of these villages had any health education on water and hygiene been linked to the technical projects. The only health education on water and hygiene carried out in the majority of these villages (14) has been during cholera campaigns in 1977/1978, March 1981, October 1982 and January 1983. For the rest, the staff at the clinics has given lectures to the patients waiting for treatment. Only one clinic organized home visits on mother and child health. In none of the villages had any health staff visited the traditional and improved water points to discuss safe water use and further village hygiene. Three villages had a Village Health Worker, but in two cases he had left the village for another job. In the third case, the Village Health Worker was only engaged in curative work.

Linking of health education to rural water supply projects has also been recommended in other studies (Ref. 7, 11, 12, 16, 18). A pilot project using a participatory approach (informal group discussions) by existing village institution in Ruvuma region and by trained village women in Mbeya region led to considerable hygiene improvements. However, it was found that involvement of male household heads in health education is important on those aspects that concern male tasks and decisions (Ref. 20).

IV ACTION PROGRAMME: ACTIVITIES AND PROCESS ANALYSIS

1. Joint Planning of Participatory Village Programmes

Analysis of the existing literature shows that water projects are more likely to succeed under the following conditions (Ref. 22):

- a. The community is fully aware of costs and benefits of alternative systems and helps in the selection process.
- b. A local committee helps to set priorities and management procedures.
- c. Communication is fluid between the community and the project personnel.
- d. Tariff structures are understood and accepted.
- e. The project design has allocated funds or a feasible process for collection of funds to meet recurrent expenditures has been established.
- f. The plan includes a training programme for maintenance manpower.
- g. The project uses and strengthens local political and/or indigenous organizations whenever feasible.
- h. The village kinship and stratification structure is considered in the supply scheme.
- i. There is assurance of good utilization of facilities by discussion and local understanding of the link between water, sanitation, personal hygiene, environmental hygiene, and health.

As shown in the previous chapter, these conditions could not be fulfilled under the existing procedures. After contacting the village authorities the community development workers therefore reviewed the existing situation as described in Chapter II and reported back to a general village assembly called by the village government.

Issues discussed at the assemblies were, in villages already served:

- conditions of and satisfaction with the existing water supply;
- adaptation of the water supply to the needs of the community through communication with the technical departments and/or local activities;
- contribution of the village to maintenance;
- productive uses of water and/or timegains;
- links between water, sanitation and health;
- perceived importance of the improved water supply for village health;
- other local risks of transmission of water and sanitation related diseases;
- perceived need for a local, participatory health education programme on water and hygiene;
- establishment of a representative committee with a special responsibility for water and water-related development.

In the villages that were being served, the assembly also discussed the proposed technology and project design and how the subcommittee could be involved in local design and in organization of self-help labour.

In the villages that could not yet be served the assembly discussed the existing water supply and sanitation conditions and possible improvements the community itself could make while waiting for an external project.

In almost all villages a general village assembly was held. However, in six villages meetings were confined to the village council only, because the project coincided with the agricultural peak season and people were too busy in the fields.

Attendance at the village assemblies varied from 39% to 89% of the total adult population. Average involvement of women, who as the main water collectors and managers of water and waste disposal in the home are a particular interest group for discussion on water and health related development amounted to 29.1% but varied considerably between villages and districts (Table 5).

Table 5. Percentage of women participants in villages assemblies in five districts.

Women participants	Project Districts					Total no. of Villages
	Morogoro Rural	Kilosa	Mahenge	Ifakara	Shinyanga	
less than 5%	6	-	1	2	-	9
5-19%	2	1	2	3	-	8
20-34%	1	5	4	3	2	15
35-49%	1	3	-	1	7	12
50%	-	1	-	-	3	4
no assembly	2	-	2	2	-	6
no data	-	-	2	-	-	2
Total	12	10	11	11	12	56

This data shows that in future, more specific attention must be paid to involving women fully in discussions of village projects that concern fields in which women have special responsibilities and knowledge. Participation of women was especially low in some, but not all, villages with a predominantly Moslem population in Morogoro and Ifakara Districts. In the present project involvement of women was one of the points discussed with the village leadership, but no special efforts were made to facilitate their participation, e.g. by having the assembly at a time and place convenient for both men and women, inviting husbands to bring their wives and consulting women and men separately on their respective fields of concern and knowledge.

2. Village Water Supply Committees (VWSC)

The formation of VWSCs was one aspect discussed in the general village meetings or village council meeting. It was suggested to the meeting that five villagers would be elected on the committee of which at least two members would be women.

The women on the committee were to see that women's special interests in water supply and sanitation were considered in planning the local projects and the village action programme. The village could also retain the existing Committee on Education, Culture and Social Services. The new sub-committee would function under an existing committee, usually the Committee on Education, Culture and Social Services so that their activities were in line with village policy regulations. The responsibilities of the VWSC included:

1. To monitor all aspects of water supply and sanitation improvements;
2. To select two villagers to be trained by MAJI as village caretakers during construction or rehabilitation. These caretakers also to carry out user education;
3. In villages to be served, to locate water points in cooperation with MAJI;
4. To select water point caretakers for each DP.
5. To select sites for additional water supply facilities such as washing slabs, cattle troughs, etc.;
6. To arrange for the village mobilization of self-help as needed in the improvement of water supply and sanitation facilities;
7. To see to that village-interests in water supply and sanitation facilities are fulfilled;
8. To advise the Village Government to allocate each year sufficient funds for the operation and maintenance of the water supply project in that village.

Without further influence from the community development fieldstaff 41 villages selected a new committee. In 15 cases the existing Committee on Education, Culture and Social Services was retained.

Women have been less frequently represented on water committees when the existing Committee on Education, Culture and Social Services was chosen to represent village interests in water supply and sanitation. In 10 of the 15 cases where the existing committee was retained women were not present, while in the remaining five only one woman was present in each committee. Of the 41 new committees formed, 35 had at least two women as committee members while 6 committees had no women members. The latter concerned predominantly Moslem villages.

The village water sub-committees have been very active in stimulating the implementation of the resolutions agreed upon in the village assemblies. Regular committee meetings were held to discuss and solve problems in project implementation. In 20 villages VWSCs organized meetings on their own. Three-quarters of these committees met more than once. In 20 other villages meetings were organized with the CD workers. Meetings of the VWSC and MAJI took place in only 3 cases.

The involvement of the VWSCs has been most successful in the siting of water points (16), and the planning and implementing village hygiene improvements (see section 3-6 below). In villages where the Committee on Education, Culture and Social Services was chosen for the extra task to carry out water supply and sanitation improvements besides their normal activities in the village, the

work had been slightly less successful. They met less frequently or not at all, and were reluctant to participate in health education discussions.

Committees that were well-motivated, were particularly effective in organizational work, such as, improvement of the operating hours of a piped water scheme and arrangement of source and site improvements. Training of village caretakers has been started in eight villages. The functioning of the village caretakers depends however on the authorization of a reliable and financially viable system for the distribution of tools and spare parts. This demands a change in national policy and organizational arrangements which are still under discussion.

3. Sanitation

The action programme agreed upon for sanitation improvement in the project villages included:

- (a) improvement at household level;
- (b) improvement at public level.

(a) Sanitation improvement at household level

Discussions on this topic in the village assemblies showed that although there is already a high coverage of latrines in every village, there is a great need for improvement. (better hygiene, fly covers, stronger latrine slabs and handwashing facilities). Better roofing was also found to be necessary, especially in Shinyanga District (all 12 villages). Here caving in of latrines is very common as a result of leaking roofs. In one village in Kilosa District caving in of latrines was caused by floods during the rainy season. Some households had therefore constructed their latrines on hills, especially abandoned ant hills. This local solution was discussed in the assembly and adopted as a general strategy where possible. Large hills have been shared between households, accommodating two or more latrines.

The evaluation also showed that in 25 villages all households which did not have a latrine had constructed one. A special case was a village where many households had no latrine since the village chairman also had not built one. Through discussions in cooperation with the headmaster and the CD worker, the VWSC succeeded in convincing the chairman to build a household latrine. His example was thereupon followed by the other households. A few households of very old people or women household heads who are financially not well off, still did not have a latrine, however. The possibility of village action to help these households construct a latrine should be a special point of discussion in the ongoing CD programme.

Latrine use is a problem in Shinyanga District, due to the belief that mothers and sons or daughters and fathers should not use the same latrines. On this particular issue a hot debate was held in four villages. The suggestion that two latrines are constructed in each household was received negatively as building materials are scarce, especially trees for the construction of latrine floors. It was

thereupon decided that another type of latrine would be constructed with two entries and two pits, one side to be used by the women and the other by the men of the household.

Other sanitation improvements agreed upon in all the villages included: having handwashing facilities in or near the latrines, construction of compost pits for household refuse, drying frames for household utensils and general household cleanliness including cutting long grass and bushes around the houses.

The implementation of these improvements has been supervised by the VWSCs. During the evaluation of the project, it was found that in every village latrine improvements had been made. This included the use of fly covers in all villages and strong floors in most. Interesting local techniques were revealed during the evaluation visits, e.g. women using hot ashes on latrine floors to get a stronger and smoother surface which is easier to clean, and in the pits to counteract smells. Improvement of roofs and wall of the latrine huts has been less successful, except for Shinyanga District where many latrines had caved in because of leaking roofs. Main reasons for this low interest were the necessity of capital investment and the fact that these improvements are mainly made by men, while group discussions on health and hygiene involved especially women.

Handwashing facilities in latrines had been introduced less frequently. Their introduction has been particularly difficult in Shinyanga District, because of water shortage in the dry season. Drying frames on the other hand, have become very popular in Shinyanga and Mahenge District while not so popular in Morogoro, Kilosa and Ifakara District.

(b) Sanitation Improvement at Public Level

At public level the improvement of sanitation has been the main activity. In many village schools a single latrine was used by the whole school. Action programmes were drawn up in all villages to have at least five latrines, two to be used by boys, two by girls and one for the members of the staff. It was also decided to have latrines at the village office, godown, flour mill, and beer hall. At the village dispensaries (10), a second latrine has frequently been constructed.

Other resolutions concerned the upkeep of water points of improved and traditional water sources. Local action programme were decided on such as fencing of traditional water points, especially in Shinyanga (8 villages), where livestock greatly polluted the sources; cutting of long grass and sweeping the area of rubbish, and promotion of washing and bathing away from water points or at home.

The field evaluation showed that sanitation in public places had improved considerably. In all the villages additional latrines had been constructed in the local schools. All villages but two had added more than two latrines. In 52 villages the public latrines are kept clean by the school

pupils. In four villages, other arrangements have been made, which included the village chairman telling somebody every day to clean the latrines at the village office, or the miller at the milling machine etc.

In all villages served (39) a person or a group of persons has become responsible for looking after the site of each water point. Observations showed that hygiene around water points had benefitted from these arrangements. An exception was the water point where an old lady was in charge that week. In villages where traditional sources are used (30) or where the improved sources do not cover the whole village (6) arrangements have also been made among the users to keep the sites clean.

4. Environmental Health Discussions

During the village assembly, discussions were started on how the knowledge already acquired by the people could be applied to their own situation. Discussions were guided by existing health staff in the village or ward ¹⁾. In cases where no health staff were present, or felt they could not assist, the community development workers guided the discussions.

The discussions were also used to introduce the group discussion posters developed and tested for the project (Annex 3). The posters were thereafter kept in the local school, office or dispensary to be borrowed for small group discussions led by village workers. In eight villages however, the posters were not used for group discussion but put on the walls of the village office or school, because potential discussion leaders such as schoolteachers and health assistants could not be mobilized.

In the other 48 villages, various types of group discussions were held:

a) At Primary Schools

Primary school teachers were very active in the programme. In 38 villages the posters were used in the classrooms by the teachers, and in five other schools local health staff used them for health education. In most cases grade VI and VII students were thereafter actively involved in small group discussions in the village. However, in six villages school staff did not want to cooperate as the work was beyond their official task.

b) With Women Drawing Water

In 26 villages, group discussions were organized with women drawing water at both traditional and improved water collection sites. Grade VI and VII students were most actively involved (14 cases) followed by the VWSC (8 villages). Health staff (4) and caretakers (4) were sometimes also involved.

¹⁾ After discussing a two-way communication approach with the CD worker. If this was not done, a one-way lecture was usually delivered.

c) Village Groups and Organizations

The discussion posters were also used in 10-cell households (13), local adult education groups (19), women groups (5), youth group (1) and village council (2).

In most cases students trained by either the school teachers or local health staff organized these discussions. Other local workers involved were health and education staff and 10-cell leaders.

d) At Health Centres and Dispensaries

In nine villages group discussions based on the posters were held before starting treatment or mother and child health clinics by the local health staff. However, in three villages, health workers did not want to participate actively in the activities without directives from the Ministry of Health.

VWSC members were only active in health discussions in those villages where the headmaster, health staff or CD worker were able to train them in the use of discussion posters. Where no special training could be organized, they did not feel up to carrying out such discussions and limited their work to occasional home visits to promote latrine construction. Most committees have however expressed a need for some training so that they can also support the education work. This would be very useful, since changing human behaviour is a long-term activity that can best be done by using as many different and local workers as possible. In this way more people can be involved and messages be reinforced by the various workers.

Also, training for more regular tasks can stimulate the continued functioning of the committee, when the first novelty of the issues has worn off.

There is also a need for higher level support for local participation in health education by schoolteachers and health staff. Although the majority of the local workers has been very cooperative and instrumental in the results achieved in the village programmes, refusals have also occurred. The CD workers thereupon contacted the Educational and Medical Officers at Divisional or District level, but were told that directives from the regional or national levels are needed first.

During the evaluation it was found that the posters have had no effect when they were put on the walls of public buildings. In all eight villages concerned few people, and especially few women, had seen them and their messages could not be recalled.

In the other villages, many people, especially women, had seen and discussed the posters. The ones best recalled and understood were:

- (1) Risky water collection and storage;
- (2) Latrine: fly cover, children excreta;
- (3) Ways of contamination of river water;
- (4) Upkeep of well sites;
- (5) Transmission of bilharzia;
- (6) Handwashing before meals.

The evaluation also showed a need for further adaptations. Oral rehydration was frequently recalled but understood to be a cure in itself. The posters on hand-pump maintenance, site upkeep and (in

one village) the productive use of water were the only ones recalled by the men. However, the one on maintenance was sometimes misinterpreted as referring to repairs by MAJI only. Evaluation of content recall and effect of health education discussions in a systematic household sample is reported in Chapter VI.

For application on a larger scale it is also necessary to have separate sets for hand pumps, foot pumps and piped water supplies. With the present single design of a foot pump, the misconception sometimes arose that standing water around hand pumps and taps does not matter as much as it does with foot pumps.

It was further found that because there were no men in the posters performing traditional male tasks (such as latrine roofing and floor improvements) the men said that the messages did not concern them. In three villages women commented that the posters should show some men doing men's work. Also pointed out was the need for an extra set of posters in larger villages with many groups.

5. Activities in Villages served/being served with Water Supply Projects

a) Planning

The main resolutions made in the assemblies of the villages that were being served concerned the duties of the VWSC to ensure an equitable siting of water collection points, the election of village candidates for preliminary caretaker training during construction, financial arrangements for the acquisition of tools and spare parts, caretaker supervision and organization of self-help labour during construction.

In ten villages that were to be served with hand-pump wells surveys were carried out without community involvement. In nine cases, the survey had been carried out before the community started to be involved. In the tenth case only the village chairman had been involved. In five of these cases, including the one in which the village chairman had participated, it turned out at the village assembly that one or two village sections had not been served. Three of these villages were yet fully served after the CD worker had contacted the DWE on request of the assembly. As a result, the remaining wells have been sited jointly by the VWSC and survey or construction team. In the other two cases the villages were informed that they should wait for the return of the survey team to the area. In three cases the survey had taken place but had not been followed by construction. The DC worker was therefore requested to contact the regional authorities. Having learned that no adequate well-sites had been found and no piped water supply was planned in the area, the CD workers discussed the situation in a village assembly. In Seseko village, the VWSC decided that the village would improve the situation with its own resources. In the dry season, women walked seven miles to the nearest water source, a dam. Oxes from the village herd have now been trained to draw an oxcart for communal water collection from the dam in the dry season.

In the two other villages, the CD worker liaised with the Regional Integrated Development Project (RIDEP) for the

construction of dams to which the villages contributed financially. However, it has not yet been decided if presence of the dams will make it feasible to install some of the hand pumps originally allocated to these villages near the dams for the extraction of safe water for domestic use.

In five villages, VWSCs have been involved in the survey right from the start. In four villages this led to a satisfactory distribution of wells over the village area. In the fifth case, eight sites were identified but all were found unsuitable for well construction due to a high manganese content. The VWSC had great problems in explaining this situation to the villagers, who had difficulty in understanding why the next village could get three more wells. However, through discussion it was achieved that a hand pump in the neighbouring village was shared by women of both villages living closest to this pump.

The remaining villages were waiting for the survey or construction teams to arrive. The CD worker could inform these villages about the delay in the ongoing programme, because a rehabilitation programme had meanwhile got first priority in the Regions. In these villages, a programme of community self-improvement was carried out which consisted of cleaning of traditional wells, establishment of regulations on water use, improvements in public and household sanitation and hygiene, and in one case, the organization of daily collection of 200 containers of safe drinking water from a nearby cotton ginnyery.

In the piped water supply schemes, three villages were not satisfied, because not all parts of the village were served. In two of these cases, the VWSC through the CD worker successfully applied for two more standpipes. In their turn the villages contributed voluntary labour and cement for the extra standpipes. The third village is still awaiting the outcome of its request. In one of the villages a laundry facility has been planned with financial and labour contributions from the community. In a fourth village, it was found that some construction was going on (storage tank) but that the villagers did not know its purpose. After contacting MAJI the CD worker was able to inform the community about the coming water supply scheme and the three sites selected for DPs. As the latter were not well distributed (two sections were not served) the VWSC in cooperation with the construction team adapted the design on this point. They also organized the necessary self-help labour for trench digging and decided that the water flow would not start before all construction was completed, because voluntary labour can no longer be obtained once the flow of water has started.

On the whole, the involvement of the VWSC and the liaison of the CD workers with the technical department has thus led to more satisfactory water supply systems. A more equitable distribution of water points has been achieved and misuse of leadership positions has been prevented. Communities have been informed better on ongoing water projects and improvements made in problem cases, with local resources and/or assistance of other services. In its turn the technical team has occasionally

supported the CD workers in their tasks. In one village, all attempts to organize an assembly failed due to a village leadership conflict. When the water project told the village government that no rehabilitation could take place until an assembly was held to discuss important water matters, the assembly was yet organized and a successful village action programme was carried out ').

b) Maintenance

Discussing maintenance, the majority of the villages were very outspoken on the need for a greater self-reliance in maintenance, urging the government to arrange for training and a place where they could acquire spares to replace broken handpump parts, pipes and taps. All villages but two were willing to support maintenance financially from the village income.

In 21 villages with hand-pump wells, village caretakers have been selected to get their first on-the-job training during the construction. Arrangements have been made for their compensation in cash or kind by the village government. Only in one case did the VWSC fail to agree on suitable candidates in time for the first training. In two cases, the village did not want to compensate the caretakers but insisted on the work being done voluntarily. In the remaining villages, the caretakers will be selected by the VWSCs in cooperation with the village governments when construction or rehabilitation starts in the area ²⁾.

In most cases the caretakers selected are older males, with strong ties (land, family) to the village. In several villages, men were chosen with some technical experience, e.g. in bicycle repair. So far, five villages selected a team of a male and female caretaker for training. In one case, the village chairman had already selected two relatives to be trained as caretakers. This choice was successfully challenged by the VWSC. Two other candidates will now be chosen by the committee based on their technical and social suitability.

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- ') Selection and employment of caretakers who until the full training has been done already kept well sites clean and gave user education at one-third of their future salary; health education and training of local health educators by dispensary staff; latrine improvement programme; irrigated vegetable gardening at the primary school; compost pits.
- ²⁾ So as to avoid having to pay the caretakers before they are trained. Four villages made an exception here: they decided that instead of organizing site upkeep through the users the caretakers do the preventive maintenance while awaiting training. For this work the villages are paying them one-third of the compensation which they will pay after technical training.

With piped water supply schemes, regulations are that a MAJI-employed operator is present. Because this person is only responsible to the DWE and not to the village(s) he serves, the villagers have no ways of correcting his functioning when they are not satisfied with it. Issues discussed during the assemblies were interruption of service when the operator leaves the village; no tools or spares to do simple repairs so that the system deteriorates from e.g. intake clogging, pipe breakage and broken taps, which has resulted in flooded distribution points.

For a more self-reliant water supply systems the CD workers were asked to contact the technical department to obtain support in training and authorization for village involvement.

As a result, the following improvements were made on an experimental bases in 3 villages:

- agreement to have a second operator on the scheme, elected and paid by the community;
- training and tools for simple repairs provided by the DWE;
- village financial support for the acquisition of basic tools and spares;
- authorization from the DWE to carry out simple but essential repairs such as replacement of taps in DPs;
- communication from the DWE to the operators that they are also responsible to the villages they serve;
- village providing operators with transport fares to collect diesel from MAJI instead of waiting till MAJI has got transport to bring the diesel to the village.

These arrangements have already lead to noticable improvements: In two schemes broken taps were replaced by the village blacksmith or handyman. In three villages authorization of village supervision, training, supply of tools and (in one case) an additional village-paid operator, were reported by the villagers to have improved the regular functioning of the scheme. Upkeep of DPs was also found to have improved. However, in three other schemes, the DWE told the villages to wait for a national policy on the issue. The only improvement achieved in these cases was that the one non-functioning scheme was repaired, something which had not been done earlier despite many requests from the village concerned.

The absence of a national policy on the forms and degree of community participation has been a serious constraint in the setting up of a self-reliant maintenance system. Long-term effects of village-based maintenance can only be achieved and evaluated when the caretakers have been properly trained and a good distribution system of spare parts and tools has been set up. Higher-level support will remain necessary, for refresher or replacement courses, periodic supervision and evaluation by the technical departments responsible for rural water supply, procurement and local production of spare parts and tools etc.

At present, the impact of community participation in maintenance can not yet be evaluated beyond the upkeep of

hygiene around the wells. Local training courses have been limited to on-the-job training during well construction in a small number of hand pump villages, and in three villages with a piped system. In these villages, the VCTs have functioned satisfactorily for a period of 6-7 months. In a few cases they have carried out simple repairs using the tools of the village tractor or flour mill. A system for supply of spare parts and tools has not yet been institutionalized. Other villages which have contacted the authorities concerned on the possibilities of training and selling of tools and spare parts for preventive maintenance and simple repairs (11) have been informed that training could not be given until a policy decision has been taken.

When the planned change in the national policy as described in Chapter II is implemented, the foreseen village-based integrated training courses for VCTs and seminars for VWSC can go ahead. This in turn will make it possible for the departments concerned to measure its effects and where necessary adapt the training programmes. Within this evaluation, special attention should be paid to the influence of women as members of the VWSCs and as VCT, because they are likely to be the most motivated to keep a domestic water supply functioning.

c) Use of traditional sources for drinking water

In 11 of the 13 villages where unprotected traditional sources were used for drinking water, environmental health discussions were organized with a group of users. In four cases the women were found to be aware of the health risk but said they could not do anything (hand pump too far, no time and firewood to boil drinking water). In one case, they said they boiled their drinking water, while in the other case the women did not trust the tap water and relied on private dug wells. In the remaining six cases they were not aware of any health risk or used an effective or assumed protective measure, such as digging shallow wells next to the river for drinking water or waiting until disturbed water had settled again. However, in the dry season the women have to dig in the river bed itself because the river dries up at that time and frequent conflicts arise with cattle owners about access to and contamination of these water sources. Solving such local problems in areas where not all sections can be adequately served should be a part of all projects for an improved water supply.

d) Productive use of water

As a result of the discussions on the productive use of surplus and waste water of the improved systems, eight primary schools started a vegetable gardening project for income-generation at a tap or hand-pump well. One school had so far realized an output of Tsh. 497, another of Tsh. 3,000. On the other projects, no data were obtained. Three villages started a brick making project for public building, including of school latrines. In four villages, village caretakers have been allowed to use village land and/or surplus water for irrigated vegetable gardening as a compensation for site management or

pump unkeep. In three other villages, a local women group has started beer brewing. Part of the proceeds will be used to support the maintenance of the village water supply. A fourth women's group has started a communal vegetable gardening project.

6. Activities in Villages not to be served with Water Supply Projects

Self-improvements decided upon by community meetings in villages where improved water supplies were not yet constructed included washing or bathing away from the water source (17); boiling and separate and safe storage of drinking water (13); periodic cleaning of traditional wells (6); construction of drainage channels at traditional wells (6); using long-handled scoops to draw water from wells used for drinking (9); fencing of waterholes used for domestic water (14); improving traditional wells by constructing a brick lining (9); and constructing a protective mound around the wells to prevent water from entering.

In most cases all the improvements decided upon have been carried out according to plan. In all 17 villages bathing and washing in traditional water sources had stopped. Such activities were done either away from the water point or in the households. The greatest problem in self-improvements presented villages with rivers flowing in hard-rock areas. Here, the only solution appears to be the filtration of drinking water through communal or household sand filters. Although women in some of these villages were skilled potters, the CD workers and the Rural Construction Unit of the CD department were insufficiently familiar with the technique to warrant its introduction. Boiling of drinking water, although greatly promoted, is often not carried out because of a lack of firewood, lack of time to boil water in advance, and lack of storage vessels.

In the villages where a health behaviour study was carried out about half of the women who use traditional sources said they did not boil their drinking water. In the four villages in Shinyanga District where there is an acute problem of firewood households also do not boil their drinking water. However, separate storage of drinking water is common. The construction of drainage ditches around traditional wells, the use of a long-handled scoop to draw water used for drinking from both well and storage pots, fencing of traditional pools used for domestic water supply and lining and protection of wells with burnt bricks were successfully carried out.

One case worth mentioning is that of a village where in the meeting the villagers suggested that the mission in the village should allow people to draw water from the borehole in the mission grounds. Although the mission did not endorse this idea, an agreement was reached on the extension of the existing system with a pipeline and two domestic points in the village. The design was made by an engineer of the mission's congregation, the DWE supplied the pipes, and the village contributed financially and in labour. The two DPs were subsequently constructed and are used extensively.

V HEALTH BEHAVIOUR STUDY IN EIGHT SELECTED VILLAGES

As part of the initial evaluation in the first phase of the project, a detailed study was carried out on environmental hygiene conditions and behaviour in a subsample of 8 villages from the main project sample. The same type of follow-up programme was thereafter carried out in these villages.

Purpose of the detailed hygiene study was to find out if under the existing technical and health education procedures the improved water supplies would have a beneficial impact on village health and whether adaptations were necessary. Because the existing village health statistics could not be used to determine the health impact for various reasons (Ref. 3), a comparison was made between observed and reported environmental health risks in 4 served and 4 unserved villages with otherwise comparable conditions.

Methods used for data collection included (1) general observations and informal interviews with women and girls at traditional and improved water sources, (2) observations and interviews in a 10% at random household sample and (3) observations on hygiene conditions at public places with the help of a checklist. The main findings are reported below.

1. Results of the Household Survey

1.1 Rational source selection and non-use of improved sources

A major finding was that women made rational choices about the places where they collected their domestic water for different purposes. The main criterion was the distance to the source. Preferably, the source within easiest reach was chosen. Health considerations also played a role, although the women did not always have a sufficient understanding of all factors involved. In one village, for instance, all the water was collected from a permanent river. When asked about the possibilities of contamination, the women pointed out that drinking water was always collected early in the morning, before other, contaminating activities, such as bathing and clothes washing took place¹⁾. Other findings included (1) the rejection of taps in favour of unprotected hand-dug wells, because the tapwater originated from a river where many people bathed and was untreated, whereas the wells were shared between only a few and familiar households, and (2) the preference for traditional wells with slow-welling water for drinking purposes, as this water was considered to be purer. However, in most cases proximity carried more weight than perceived quality.

The result was that a large percentage of women were not using the improved sources provided by the technical agencies because of the greater distance involved.

¹⁾ Such basic knowledge was found to be a good basis to build upon in local health discussions. During the training, for instance, a group discussion was held with women about the practices of other women in upstream villages. The group concluded that these women would do the same as they did and that their water in the morning was after all less clean than they had thought.

1.2 Consistency of choices

The study also showed that once a new pattern was built up, it was adhered to. When the women changed to an improved source they would seldom go back to another source for their drinking water. The only reasons for temporary non-use by some households were the presence of a seasonal traditional source nearer by which the women judged to be acceptable in quality, or the breakdown of the improved supply.

1.3 Problems of boiling drinking water

Nearly half of the women using unprotected sources said they did not or not always boil their drinking water. Of these only 20% said that they didn't see any need for boiling drinking water. The others mentioned practical constraints, especially lack of time. Some women said that during the agricultural peak season they did not even have time to cook more than one meal a day, let alone boil and cool their drinking water. The beginning of the rainy season when the fields must be planted is the period when women are busiest. This is also the period when children are most susceptible to diarrhoeal diseases because of dietary cutback and contamination of unprotected water sources due to surface drainage. On the other hand, it was found that some of the women who were using safe hand-pump water were boiling their drinking water. An additional problem connected with water boiling as observed in the study was the risk of serious burns to children. In over half of the households with one or more children under five risky cooking conditions were observed.

1.4 Reliability of improved water supply

In all villages but one, women were completely dependent on outside agencies to keep the improved water supply functioning. This usually meant long waiting periods between breakdown, reporting and repair, even for very simple repairs. The villages with piped water had a local operator who had neither tools, spares, training nor authority to do the simpler jobs on his own and who was not responsible to the village government. Hand-pump caretakers were only taught how to fasten nuts and bolts, keep the surroundings clean and report breakdowns to the district water authorities. Because the caretakers had been selected from the self-help labour recruited by the village chairman during the installation of the pumps and were all young males, they had little personal interest in the functioning of the pump. Their motivation was further reduced by the lack of compensation, appreciation and local supervision of their work. They could not do anything as soon as the pump gave problems although the women were in serious need of their services. The villages were therefore not much motivated to compensate the caretakers for their work and preventive maintenance also suffered. Agency supervision of the caretakers was found to be rare. In one exceptional case of good maintenance, the village government gave the caretaker some tractor tools for pump maintenance and repairs and also gave him the right to use the village land at the end of

the drain to grow vegetables in compensation for his work. This system had functioned satisfactorily since 1978, depending solely on the initiative of the village in question.

1.5 Water contamination through human practices

Major health risks observed were unhygienic conditions at the source (no village body had specific responsibilities for the organization and supervision of site hygiene) and during the drawing of drinking water from the storage vessel (e.g. a communal cup placed on top of the covered pot). Other hygiene practices (bucket rinsing and hand washing before water collection, a separate and covered storage vessel for drinking water and reported frequency and intensity with which storage vessels were washed) were generally good, although considerable differences were still found between individual villages.

1.6 Other environmental health hazards

Other points of risk that were noted to constitute health hazards whether households were using an improved water source or not were, in particular, absence of water for hand washing in or near latrines, absence of a fly cover over the latrine hole, unkept latrine slabs, unroofed latrines (contributing to non-use of latrines and collapse of clay slabs in the rainy season), non-use of latrines, poor public hygiene facilities at schools, dispensaries and other public buildings and few drying frames for household utensils in some villages. The actual situation was found to vary from village to village; each village seemed to have its particular mixture of positive and negative practices in water use and sanitation.

1.7 Limited impact on disease incidence

In the absence of reliable health statistics, two questions were asked on disease incidence: one about any diseases that had occurred during the week preceding the interviews and one about the incidence of serious water-related diseases during the preceding six months. Because this method has its weaknesses (it depends on a correct and complete memory recall and diagnosis) its outcome must be viewed with some reservation. Nevertheless, the data showed a significantly higher reported incidence of serious stomach disorders with fever in those households that used a traditional source of drinking water, reported no regular boiling of drinking water or were observed to have risky methods of drawing boiled water. Women using traditional sources also reported significantly more cases of diarrhoea in their household during the preceding week (all in the dry season) than women using improved sources, but the samples were too small to differentiate further, e.g. according to water use and sanitation practices. Reported cases of diarrhoea were particularly prevalent among children under five.

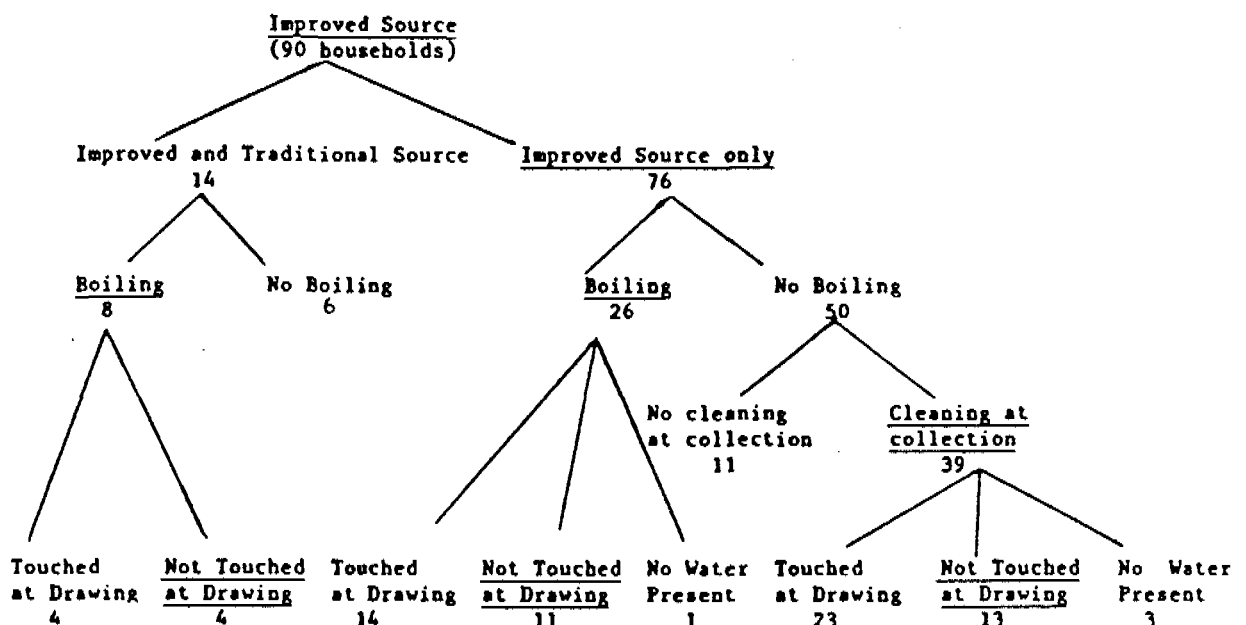
Noticeable was also the high frequency of cases of schistosomiasis reported in the three villages with hand-pump wells. Specification of the cases according to age and sex and correlation with reported bathing and laundry sites showed that

those infected were mainly boys between the ages of 6 and 18 and girls and women of 11 years and older. Of the 26 girls and women for whom schistosomiasis was reported, 23 were using surface water sources for bathing and/or clothes washing. For boys, recreational swimming is probably the main reason for prolonged contact with infested water, but this assumption was not further investigated.

Remarkable was further that a high proportion of households in these villages (96, 96 and 57%) had a special secluded area in their compound for bathing. However, these sites were frequently only used by the men, for whom their wives brought bathwater every day. The women themselves often bathed in a river or other unprotected source, which reduced their workload but posed a serious health risk. Also, a small proportion of women reported bathing less frequently (twice a week) than the men, who bathed daily.

Water supply projects can have a positive impact on village health when there is a general change to the use of safe water in a safe way (Fig. 3) and when other routes of transmission of water related diseases are cut off at the same time. From the present study it can be concluded that such an impact will not be achieved with the current technical and health education procedures.

Fig. 3: Risks of water contamination between source and cup of 90 households using improved water sources in 4 villages in Morogoro and Shinyanga Regions, Tanzania. (Safe water practices are underlined)



Three steps were therefore taken to increase the chances of an impact of the water supply programme on village health:

- (i) A greater involvement of the community in the local planning and decision-making on village water supplies. On the one hand this should lead to a better adaptation of the

technical projects to the local needs and behaviour patterns as far as this is technically and financially possible. On the other hand, a better communication between the village and the technical agency, directly as well as through the CD workers should lead to a better understanding by the villagers why some adaptations are not possible and what this means for their patterns of behaviour.

- (ii) More involvement in local maintenance and simple repairs for a more continuous functioning of the water supplies. Long periods of breakdown after some months or years of functioning not only affect the work of the women in many cases, but also enlarges public health hazards as the natural resistance to diseases caused by contaminated water that have been built up in the past will have decreased.
- (iii) Linkage of locally specific health education programmes to the water projects, using the existing structures for this purpose, but introducing a more participatory approach.

2. Evaluation of Community Participation Activities in two Villages

The results of the three activities in all project villages have been reported in chapter IV. A more detailed evaluation of particular the participatory health education programme has been carried out in two of the health study villages, one served and one not (yet) to be served¹). The main results of this evaluation are summarized below.

2.1 Local planning and decision making

In both communities general assemblies were organized to report the findings of the local evaluation and invite corrections, comments and discussion. Attendance at the meetings was fairly high: 206 men and 90 women out of 880 adults in Mhenda and 417 out of 819 adults (with over 200 of them women) in Kihelezo.

Decisions taken in Mhenda village (served) concerned (1) the organization of a village maintenance system for the existing hand pumps, including the election of two caretakers for training, reservation of village funds for tools, spares and honorarium and arrangements for site cleaning; (2) the promotion of a more general use of hand pumps (only one out of 3 was generally used) and (3) productive use of well water for brick making (e.g. for schoollatrines).

The main topic discussed in Kihelezo village (unserved) concerned the liaison with water project and government authorities. The women in particular urged the CD worker to get clarification about

¹) Shortage of trained staff made it impossible to carry out a detailed household evaluation in all 8 villages. The other 6 villages were therefore included in the general village-level evaluation.

the reason why their village had not got pumps and if they still could get an improved supply. They attributed the earlier project failure to a political problem (late registration as an Ujamaa village). In reality however, there had been sufficient water found for hand-dug ringwells only. The village had not been informed about this as the water project no longer constructed dug wells, but only hand drilled wells, which needed a higher recharge. The CD worker thereupon contacted the authorities concerned and learned that a piped supply was planned in the neighbourhood. He subsequently advised the village government to send in an early request for a connection, so that the water department could adapt the dimensions of the scheme. The village government did not know about this scheme, and a connection would have been unlikely without village request since the scheme is meant for an agricultural estate. The final decision now lies with the regional planning authorities. A second topic in the discussion was the improvement of the existing traditional wells with locally available means, provided that this would not reduce the chances of the village for a government project later on. Finally, a local solution was identified for the generally felt problem of latrine collapse due to flooding and unstable soil conditions ').

Both meetings also made recommendations on specific improvements in village and household hygiene, depending on the particular local situation, and elected a village water sub-committee for their implementation. In Mhenda, this committee consisted of 2 elder women and the 3 ten-cell leaders living nearest to the 3 wells. In Kihelezo, the existing Committee for Culture, Education and Social Services (4 men, 1 woman) was chosen.

2.2 Participation in technology aspects

In Mhenda, the VWSC was actively involved during a second survey to find more well sites. Eight more sites were identified but only one (on the border with the next village) was technically acceptable. The VWSC had problems in explaining the reason (high manganese contents) to the other villagers. Their position on the technical aspects was not strengthened by the fact that no authorization had yet been given to the village to acquire the necessary tools and spares for hand pump maintenance, pending a central policy decision on the issue of a greater village self-reliance. The two village-elected caretakers have however received a first on-the-job training. They also serve the next village and get a mutually agreed honorarium for simple repairs on request. Although the period concerned (one year) is too short to draw conclusions, the system has functioned satisfactorily so far, and wells were observed to be kept better than before.

')

The CD worker had noticed that some households had built their latrines on ridges or anthills. The meeting decided that this example should be followed wherever possible, with as many neighbours sharing one hill as could be arranged.

In Kihelezo, protective mounds and drainage channels were made to protect the traditional wells used for drinking water in the village. The wells were thereafter emptied so that clean water could well up from their depths, and the women committed themselves to use only long-handled scoops to draw water. As the village has a high flooding risk, it is yet to be seen if these improvements are effective enough or if a parapet of burnt bricks is needed, but a first step has been made already in concerted village action.

2.3 Local health education activities: attendance and health knowledge

As part of the household level evaluation the number and type of local health education activities were investigated. The results have been summarized in Table 6. In all cases, interviews were held with an adult woman, preferably the female head of the family.

Table 6: Number and type of health discussions reported by a 15% household sample in two detailed study villages

Type of activity	Reported participation	
	Mhenda (n = 55)	Kihelezo (n = 53)
Village meeting(s)	34	33
Adult Education group	19	1
Group discussion at clinic	18	-
Group discussion with VWSC	6	-
Group discussion with health staff	4	-
Home visit CD worker	5	1
Home visit health staff	2	-
Home visit VWSC	2	21
Discussion after interview	2	8
No education attended	14	12

About one quarter of the women interviewed had not participated in any local health discussions. One-third of those not reached were older people (single or couples and completed families), while two-thirds were women in fairly large households with small children. No relationship was found between non-attendance and the economic status of the households.

In most of the health discussions, the discussion posters were used. Recall and understanding of their contents are summarized in Table 7.

Table 7: Number and type of messages recalled and understood correctly by a 15% household sample in two detailed study villages

Poster subject	Mhenda (n = 55)		Kihelezo (n = 53)	
	recalled	understood	recalled	understood
River pollution	41	41	32	32
Hygienic well surroundings	37	35	31	31
Pump breakdown	30	27	not applicable	
Unsafe collection and storage	38	36	31	31
Disposal of babies' waste	29	29	28	28
Washing children, clothes, utensils	28	27	32	32
Handwashing before meals	25	25	31	31
Schistosomiasis	17	17	30	30
Source protection	13	13	2	2
Hookworm	1	1	-	-
Spillwater use	1	-	not applicable	
Oral rehydration	-	-	-	-

The posters were not used for home visits. This explains the lower recall figures in especially Kihelezo. Recalled and understood best were those posters that referred to familiar situations and daily behaviour patterns. The use of the posters on a larger scale (they were pretested in only one village) also demonstrated the need for some further adaptations, e.g. adding water for handwashing at the latrine. The more abstract and complex concepts such as source pollution and oral rehydration were remembered and understood less frequently. This kind of subjects probably needs to be covered more thoroughly, in combination with demonstrations and adapted training for village workers.

2.4 Educational approach

The women in the household sample were also asked to describe in what way the various village workers had communicated with them. In Mhenda village, a discussion approach was reported for all cases except one home visit by a VWSC member. In Kihelezo, where the VWSC did not feel capable to organize small group discussions without special training and only did home visits, the majority of women who had received a visit (16 out of 21) said that they had just been explained what improvements to make and why. Two women said they had only been given instructions, two said there had been a discussion on what could be done best and one could not answer the question.

2.5 Cost-effectiveness of the participatory programme on environmental health behaviour

Costs made for the health education component at village level amounted to Tsh. 100,- or US\$ 8 per village for the development and production of the discussion posters. In future programmes however there will also be a need to give a short training to VWSC members and to integrate the present material in health education in the village-based training material. Costs of this material are estimated at US\$ 12-15 per village. Costs are based on the assumption that five local institutions will be involved in local environmental health activities: dispensary, primary school and adult education classes, village caretakers and village water sub-committee.

Regarding effects, exclusive use of hand pumps in Mhenda increased from 16% to 48%. Three-quarters of the women concerned reported to have changed their water source because the new pump on the border of the village was nearer to their house than the other pumps, and one quarter changed as a result of health education (even though they had to walk farther). All women concerned said the pump water needed no boiling because it came from a safe source, but that water from open sources needs to be boiled for drinking. One-third referred to a particular occasion where this subject had been discussed.

Reported cases (with probing) of boiling of unsafe water had remained the same in Mhenda (71%), but improved in Kihelezo (from 76% to 85%). Reported reasons were explanation by VWSC (25%) and killing of bacteria (75%)¹⁾.

All traditional wells used for drinking water in Kihelezo had been cleaned and protected, and long-handled scoops (cans on poles) were used to draw water. In Mhenda, all pump sites but one were observed to be well kept²⁾.

Extra latrines had been built at the school in Mhenda and were under construction in Kihelezo. Previously, 100-150 students had been sharing one pit latrine, which greatly hampered the cleanliness. In Mhenda, the latrines had been well-built, were clean and had long-handled fly covers observed to be in place, but handwashing facilities were still lacking. New or extra latrines were also under construction at other public buildings (dispensary, village office, flour mill). However, upkeep of the

¹⁾ Water boiling nevertheless remains a difficult issue since it is so tempting to give an "ideal" answer. Also the women face many practical constraints in keeping up this habit. This was clearly illustrated in Mhenda, where the number of "new boilers" was equal to the number of women who previously insisted that they always boiled their water and who now said they didn't.

²⁾ At this well, cleaning during the preceding week had been the task of an old lady who had not done any work. In future training, the task of the VWSC in noticing these things should be more emphasized, not only for the sake of well maintenance, but also to stimulate the VWSCs to function regularly and work out appropriate local solutions rather than just imposing tasks.

existing ones (including the one at the dispensary) still left much to be desired.

A substantial improvement was also found in the drawing and storage of drinking water. Of the 38 households (or 46%) which previously used risky methods, 34 had changed their methods. Of these, 31 explained that touching the water could contaminate it. There was a clear relationship between participation in local health discussions and improvement in handling drinking water: 30 women of those who had changed water drawing practices in their households had participated in one or more health discussions.

Household sanitation was another area where improvements were made. Disposal of the waste of small children was already fairly good, but the few households which did not deposit cleansing materials (grass, leaves) in the latrine said they were now doing so. Most women however used water for cleansing.

The changes most noticeable in waste disposal were the reported practice of burying of human waste when working in the fields in Mhenda (from 16% to 60%) and the construction of temporary or permanent field latrines by 25 out of 32 households in Kihelezo, where the fields are up to 3 hours walk from the village, so that people often stay there during the agricultural season. Latrine hygiene was also observed to have greatly improved. Previously 54 latrines had been observed to be soiled. The resurvey showed only 3 unkept latrines (2 old cases, 1 new). Fly covers had increased from 51% to 92%, with all but one observed to be in place. Also, many makeshift covers (e.g. a piece of a pot) had been replaced by covers with a handle.

The percentage of latrines in Mhenda was already high (98%) before the project started. The resurvey showed that latrine coverage in the sample had increased to 100%. Existing latrines had been improved and the few unused latrines were found to be in use. In Kihelezo, absence of latrines was higher due to the caving-in problem, but the two households in the sample that had no latrine were able to construct them (without knowing that a follow-up survey would take place). Five sample households had constructed a new latrine on an anthill where the problem of caving-in would be avoided. One household in the sample had however given up its already poor latrine and had not constructed a new one due to unsolvable caving-in problems.

Improvements made least of all were roofing of latrines and presence of water for handwashing (3 households in Mhenda, 11 in Kihelezo and none in public latrines). Mention of handwashing after latrine use (in an open question) increased from 36% to 99%, but this may just reflect a better knowledge rather than improved practices.

At the end of the faecal-oral chain, food and kitchen hygiene improvements consisted mainly of the construction of drying frames for household utensils (increase from 48.2% to 90.4%) and kitchen improvements. However, risky cooking places for children were still prevalent, especially in Kihelezo where in many cases there is no separate place for cooking, and all cooking is done in the living space.

To prevent bilharzia infections the women in 13 households in Mhenda had stopped bathing and/or washing in the river, an improvement of 54%. However, there had been no discussion if the women had a need for a special laundry and bathing facility at one of the wells, and if so, how such a facility could be made and maintained. The VWSC had just permitted the washing of clothes at a distance of 20 m. from the pump. It is therefore still to be seen if the present change is the most appropriate one, for the women and the water supply, since dirty water may seep back into the well.

Finally it was found that there was a high positive relationship between the changes that were deduced from the observations in the villages and the changes reported by the women themselves: of the 73 observable improvements that the women themselves mentioned only 8 were not confirmed by the observations of the researcher.

VI CONCLUSIONS

1. Not all projects have been carried out in accordance with Tanzanian design criteria on number of and distance to public water points. This has contributed especially to continued use of traditional sources, which may have a higher contamination risk. Community participation in the decision making procedures was found to lead to a better adaptation to village circumstances and needs, especially with regard to the balanced distribution of water points and prevention of misuse of influence. Where it has been technically impossible to adhere fully to the design criteria (e.g. in siting of hand-pump wells) community participation has contributed to finding acceptable compromises, such as sharing of water points between villages.
2. A positive impact of an improved water supply on village health is unlikely as long as
 - a. safe water supplies are out of order for prolonged periods without possible and actual use of other safe sources;
 - b. many people continue to use contaminated sources for drinking water;
 - c. relatively low quantities of water are used, which decreases the possibility that incidence of water-washed diseases is reduced. These diseases include not only skin and eye infections; there is growing evidence that faecal-oral diseases, too, are more water-washed than water-borne;
 - d. unhygienic conditions exist at water points contributing to mosquito breeding (and source pollution in case of wells);
 - e. water from a safe source is contaminated during collection, storage and drawing from the storage vessel;
 - f. other routes for the transmission of water-related diseases are not eliminated at the same time, e.g. proper latrine use and maintenance, handwashing, food protection and safe disposal of children's excreta and excreta in the field;
 - g. risks of intake pollution due to expanding settlement and water use at the source are not controlled.
3. Not all villages have a high felt need for a domestic water supply. Some prefer a supply for irrigation purposes. Others indeed expect to use the supply for this purpose. Again others give priority to quite another type of project, either because they have sufficient water or because other problems (road, flour mill) are perceived as more serious than an improved water supply. This information about a village is particularly important for the allocation of projects (should high-need villages be given priority?) and for information, motivation and negotiation in the villages in the first phase of a project ').

') It may for instance be technically possible to have a combined irrigation and domestic scheme. In such a case it can be proposed that the village applies for a loan to pay for the irrigation part and works out a water rate for those amounts of water that are used commercially.

4. There is a need to link a health education programme directly to the water supply projects in the villages. Didactic programmes, imposed changes and latrine campaigns implemented separately from the water projects have not been effective in eliminating practices and conditions in project villages that constitute a continuing risk to health after the completion of the improved water supply. A more cost-effective health education programme can be based on:
 - a. a participatory approach, whereby project villages are involved in the identification of local risks and the planning and implementation of local action programmes using village mobilization and small group discussions;
 - b. involving existing village workers after orientation on the appropriate approach;
 - c. involving the VWSC after a short training course.

5. The way in which many projects have been carried out does not contribute to village self-reliance. Often the only way in which villagers have been involved is by providing some (paid) labour for unskilled tasks. This means that the projects have not contributed to the analytical, organizational and technical skills in the villages. Where self-help is used, it is more successful when:
 - a. clear standards are set for voluntary labour;
 - b. some simple aids (measuring sticks, string) are used;
 - c. the reasons for certain standards of work are explained to the voluntary workers;
 - d. the village government is assisted in organizing the labour;
 - e. some flexibility is given within a set timetable;
 - f. the work coincides as little as possible with agricultural peak seasons;
 - g. the work is not spread over too long a period;
 - h. all voluntary labour is completed before the water starts running through the pipes.

6. As no clear procedures exist, the degree of information and consultation of the future users in water supply and sanitation projects depends on the personal attitudes of the technical staff involved. This has led to unnecessary cases of poor functioning and use, because in local planning
 - a. relevant village knowledge was not taken into account:
 - (i) environmental, e.g. site flooding risks, variations in source capacity and water-table;
 - (ii) cultural, e.g. on siting and sharing of latrines;
 - (iii) socio-economical, e.g. settlement pattern, proposed expansion areas and possible conflicting uses of water, washing and bathing practices;
 - (iv) health, e.g. quality perceptions of traditional and improved sources;
 - b. adaptations of the project to village needs were not considered; even though this was technically and economically feasible (e.g. where cattle owners offered to bear all extra material and labour costs of adapting the design to their needs).

7. Due to various constraints, maintenance of rural water supplies is poor. An alternative is a greater decentralization of maintenance from regional level to district and village level, with agency support for increased village self-reliance in local management of the water supply and stimulation of water-related village development.

Village willingness for self-reliance was found to be generally high because the villages were very much aware of maintenance problems. Issues that remain to be solved include:

- a. village ownership of supply and authorization for maintenance and repair;
 - b. aspects on which villages, as future owners, will have a say during local planning and decision-making;
 - c. village organization for participation in all project phases;
 - d. training for local technical and organizational skills in construction, maintenance and management;
 - e. supply of spare parts;
 - f. division of responsibilities between villages and MAJI;
 - h. system for adaptation to the varying financial capacities of the villages;
 - g. mechanisms of sanctioning both parties when they do not carry out the responsibilities agreed on.
8. Although women are the main users and managers of domestic water use and sanitation, they have been hardly involved in rural water supply and sanitation improvements. Their involvement is important in:
- a. planning and decision making: as users, they are the group with the greatest interest in a domestic water supply project and they may have special needs and useful knowledge and suggestions based on their long experience with domestic water supply and hygiene;
 - b. maintenance and management, as they are likely to have a strong feeling of responsibility for the proper functioning and use of the supply;
 - c. user education, as the main users of the water points are women;
 - d. organizing an additional hygiene education and action programme, as women are the protectors of household hygiene.

In addition, their participation is in line with the national policy, which advocates a more active involvement of women in village development. The traditional roles of women in water make their involvement in water projects more acceptable than in other public decision-making and provide a suitable entry point for their further participation in village affairs.

9. No full use has been made of the possibilities offered by a domestic water supply project to stimulate the use of water and time gains for further village development, e.g. through the organization of a village hygiene improvement project; brick making and building projects; communal and private vegetable gardens and village nursery for fruit, timber and firewood trees using excess drainage water; and women classes and other women projects in villages where they no longer have to spend long hours in collecting water.

10. Villages have sometimes formed unrealistic expectations, e.g. enough water for large scale irrigation from a domestic water supply, or the disappearance of all water-related diseases. Disillusionment can be prevented if there is enough two-way communication in the initial stages of the projects.
11. The projects have not organized periodic evaluations of user satisfaction with the installation and functioning of the systems. This means that there are no lessons learnt that could be put to good use in subsequent projects. Also results from independent studies (e.g. university studies) have not been used by the project agencies.
12. In communities where standard solutions for an improved water supply system were impossible, CD workers have liaised effectively to obtain information and identify alternative solutions. In some cases, improvements were implemented with outside support, in other cases with locally available means. The most difficult cases were single villages with hard-rock riverbeds and no possibility of a connection to a piped water supply. More expertise in low-cost filtration techniques is necessary for such cases.
13. At present, procedures and systems of community participation in the rural water supply programme differ between and even within regions. The disadvantages of the present situation are:
 - a. continued confusion over what people's participation means in practice;
 - b. no exchange of valuable experiences between regions;
 - c. lack of incorporation of results of successful pilot projects into the national programme.
14. A successful programme on community participation demands a gradual development through organizing experiments with an evaluation of general procedures. Such an approach presupposes the establishment of a general policy framework that allows and favours learning-by-doing, and establishes a system of feedback of the experiences in the field.

VII RECOMMENDATIONS

During the Second Ordinary Party Conference, October 20th, 1982, President Nyerere in his function of Chairman of the National Party CCM made the following statement regarding rural technologies:

"Whatever the technology used, it must be adopted in consultation with the local people and from the beginning the responsibility for looking after the facilities must clearly be theirs. Government cannot finance the maintenance and repair work of basic village equipment if new developments are to go ahead."

What is needed now is to translate this general policy into specific procedures and structures by the Tanzanian departments concerned. Based on the experiences of the PMO/IRC field study and the review of experiences and studies in other regions in Tanzania the following recommendations for policy formulation are made:

1. Ownership

- (a) It is recommended that the Village Governments should be the formal owners of the village water supplies. Water supplies serving more than one village should be owned jointly with a joint agreement drawn between the Village Governments concerned. As part and parcel of this ownership the village government(s) should be responsible for:

- raising and allocating funds for operation, maintenance and repair of the water supplies in their villages and ensuring that the funds are properly used;
- appointing VCTs and arranging for their training and remuneration;
- ensuring that spare parts and other necessary items for operation, maintenance and repairs (fuel, tools etc.) are stocked in village stores for immediate use;

In water supplies serving more than one village, village governments should ensure that village contributions are paid into the joint water supply fund in time. Village(s) failing to raise sufficient funds should apply timely for subsidy from the District Government.

- (b) In order to carry out the above-mentioned tasks it is recommended that the Village Government(s) elect a Village Water Sub-Committee which should consist of five members. Both men and women should be present in the committee. The composition of such a committee should be:

- The Chairman of the Committee for Education, Culture and Social Services who should be the Chairman of the VWSC.
- One member should be drawn from the committee for construction.
- Three (3) members should be elected during a general village meeting.

N.B. At least two members of the VWSC should be women.

Responsibilities of VWSC

- i) Mobilize the self help labour according to the workplan of MAJI and keep the records of attendance.
- ii) Play a supervisory role and report for action to the Village Government in case of non-compliance.
- iii) Select VCTs at the start of construction to be trained by MAJI.
- iv) Select water point caretakers to be trained by MAJI and AFYA.
- v) For village water supplies covering more than one village the VWSC should receive instruction for village contributions i.e. self-help labour, from the joint committee.
- vi) The VWSC should be an executive agent for the operation and maintenance of the village water supplies. This should include:
 - Selection of water-point caretakers and arrangements for their training;
 - Selection and supervision of VCTs and arrangements for their training and remuneration;
 - Arrangements for procurement of required spares and tools;
 - Advice to the Village Government to allocate sufficient funds for operation, maintenance and repair each year.
- vii) The VWSC should report monthly to the village government (copy to District Water Committee) on:
 - general performance and sufficiency of the supply in relation to the population of the village;
 - problems encountered, action undertaken and outcome;
 - consumption of spares and the need for (replacement) new spares;
 - running costs, i.e. fuel consumption, remunerations, transport etc.;
 - activities started to generate funds;
 - impact of users education on hygiene around water points;
 - requests for advice and support and their outcome.

Joint Water Supply Committee:

- (a) The Committee should be responsible for the coordination of the management, administration and financing of the joint water supply operation, maintenance and repair.
- (b) The joint committee should be composed of all chairmen of all Village Governments concerned and all chairmen of the Village Water Sub-Committees.
- (c) The joint committee should elect its chairman who should preferably come from the village where the scheme source is and where the scheme attendant stays.

Responsibilities of Joint Water Committee:

- Should divide the work and the workload of the communal facilities over the individual villages.
- When problems arise in relation to inter-village coordination the joint committee should make recommendations for action to the Village Water Sub-Committees.

- Should elect scheme attendants at the start of construction to be trained by MAJI.
- Supervise and remunerate scheme attendant(s). In case the scheme attendant is a government employee he/she should also be responsible to the Joint Committee.
- Coordinate in establishment of bye-laws by village governments governing the water supply.
- Should be responsible for the joint funds, including:
 - (i) budgeting of the annual requirement and allocation of village contribution by each village;
 - (ii) ensuring that the collection of village contribution is done in time;
 - (iii) accountability for every expenditure from the joint fund.

Responsibilities of Water Point Caretaker:

- Be in charge of a water point.
- Take care of general cleanliness of the water point.
- Act on any misuse and report to the VWSC on non-compliance of the users with his/her directives.
- Report to and obtain assistance from VCT on any malfunctioning of the water point.
- Report to VWSC in case VCT does not work properly.

N.B. The water point caretaker should be selected preferably from among the villagers near the location of the water point, such as:

- the 10 cell leader;
 - the owner of the plot in which the water point is located.
- At water points near homes the person selected will preferable be a women.

Responsibilities of Village Caretaker (VCT)

The village is responsible to select one or more VCTs. The VCT should be charged with the following responsibilities:

- responsible to the Village Government through the VWSC;
- responsible for upkeep and repair of the village water supply facilities within the village boundary;
- ensure that water point caretakers are taking care of water points;
- in case of a single village piped supply, VCTs should be responsible for the operation and maintenance of intake/borehole/pump/engine, the main line(s) and all tanks. In case of piped supply more than one village, this function will be taken over by the scheme attendant;
- assist in the training of water point caretakers together with community development and health staff;
- complete a monthly report using a pre-printed format and forward one copy to the Village Government through VWSC and forward one copy to the District Water Engineer (DWE) (MAJI).

N.B. The following qualification must be considered in selecting a VCT:

- approved technical ability i.e. bicycle repairer, flour mill operator, blacksmith etc.;
- resident of the village.

Responsibilities of Scheme Attendants:

- Should be responsible to the village governments concerned, through the joint water committee.
- Should be responsible for operation, maintenance and repair of the water supply. Anything beyond his capacity he should report to the chairman of the joint committee who should then make the required arrangements.
- Should be the supervisor of the VCTs in villages supplied by the scheme.
- Should complete a monthly report using a pre-printed format and forward:
 - (i) one copy to the governments of each village within the Scheme through the VWSC;
 - (ii) one copy to the DWE;
 - (iii) one copy to the Chairman of the joint committee.

N.B. Points to be considered in selection of scheme attendants should include:

- he/she is selected by the village government concerned;
- preference should be given to the person who is living in the village nearest to the source;
- preference should be given to people who have proved technical skills e.g. in bicycle repair. The minimum education should be STD VII but preference should be given to some one with higher qualification;
- women should be considered;
- should be a permanent resident of a village covered by the scheme.

N.B. Presently scheme attendants are employed by MAJI. The future employer may be the village government or District Government. Meantime the scheme attendants should also be answerable to the VWSC.

2. Allocation

- a. For allocation, it is recommended that priority is given to villages which have the greatest objective need for water, that is, villages which have to spend much time on water collection in the dry season, or have a great health risk.
- b. It is recommended that at the beginning of each new construction cycle, all Village Governments are informed which villages have been allocated a project, and which have not, what general criteria were applied and what the type of technology and cost to the government is.
- c. To ensure that the villages which have been allocated a project are really interested in it, it is recommended that before any construction is started every village has to make a formal request according to the existing procedures and start community organization for taking on its responsibilities after construction (see also 5 a and g below). Villages which are not sufficiently interested or have problems in community organization should be motivated and assisted before any construction is started.

3. Planning and Decision Making

- a. It is recommended that during the planning of the supply, the village is informed about the type of supply and design criteria, the reasons for MAJI to choose the particular technology, the potential benefits and the way the village will participate in the various stages. Special efforts should be made to actively involve the women in discussions and decision-making, as they will be the main users of the system.
- b. For optimal planning of the supply, it is recommended that the Village Government assists MAJI in noting and recording the village settlement pattern, including planned expansion areas, the existing water sources, the purposes for which they are used, and the existence of any further water needs in the village.
- c. For an optimal health impact, it is recommended that new water points are where possible sited at a closer distance than existing water points used for drinking water. In case no suitable sites can be found in every village section, it will be important to discuss the reasons with the villagers, and especially the women concerned, and work out a possible solution that is acceptable to all parties.
- d. The water quality of the new water supply, too, must be acceptable to the women. With a piped supply, the opinion of male and female villagers should be obtained about the perceived quality of the water at the intake. With groundwater changes in the chemical quality may occur (e.g. an increase in salinity). In the more risky areas, this issue should therefore be a point of discussion with the women, so that the possibility can be considered of sharing one or two good wells for drinking water with all village households.
- e. Under the present programme water supplies are built for domestic purposes only. For a better answer to village needs, it is suggested that villages are also given the option to have a higher level of service for combined economic and domestic use when those benefitting from this extra service bear all additional costs of material, provide the extra labour, and pay for those amounts of water that are used for purposes other than domestic water supply.
- f. Additional facilities for clothes washing, child washing and bathing can increase health benefits by reducing the incidence of water-washed diseases. It should therefore be investigated whether the women in particular have a desire for such facilities, and if the environmental circumstances allow their construction. If so, it is recommended that their construction be promoted, with the users participating in design, construction, management and financing.

- g. It is recommended that at the end of the planning stage, a project agreement is drawn between the village and MAJI, defining the rights and responsibilities of both parties.

4. Construction

- a. For construction, the village should agree to carry out all unskilled work. A list of activities is included in Annex 1. The Village Water Sub-Committee should be assisted to organize this self-help. During construction, technical training to village caretaker candidates selected by the Village Water Sub-Committee should be started. In no case should unskilled village labour be paid by the project as this has a negatively effects on the community motivation and skills-learning process and sets a bad example for other villages.

5. Maintenance

- a. For piped supplies, it is recommended that the village will be responsible for all operation and maintenance and repairs of the distribution system within its borders through the Village Water Sub-Committee . For pumped schemes, the villages served may share the fuel costs according to the number of households per village.
- b. It is recommended that MAJI assists the village on the rest of the scheme by executing and paying the full cost of maintaining the intake/borehole, pump, engine, main lines and/or storage tanks.
- c. For hand-pump wells, it is recommended that the village through the Village Water Sub-Committee is responsible for the proper operation and maintenance of the pumps and wells. Broken or poorly functioning parts should be replaced by the caretakers and exchanged for new spares at regional centres (see also d and 13 below). MAJI can check upon the functioning of the caretakers and disinfect/repair wells where necessary during annual scheduled visits (see e below).
- d. As part of a self-reliant maintenance system, it is recommended that spare parts for acquirement by individual villages are supplied through the RTCs and secondary cooperative societies at district and ward level or are directly purchased from the procurement centres.
- e. To assure the necessary government support to village self-reliance and evaluate functioning, it is recommended that schedules for an annual maintenance visit are drawn up by the DWE and distributed to the villages concerned. The annual visits can also be used to give refresher and replacement training to village caretakers.

- f. To ensure an equitable access to self-reliant maintenance, the financial capacity of the villages should be reviewed, and the option given to villages to apply for a temporary subsidy for maintenance, according to the existing mechanisms; meanwhile these villages can be helped to strengthen their leadership and economic capacities.

6. Management

- a. It is recommended that the Village Water Sub-Committee should be the responsible organization to see that the village water supply are properly managed. This includes the granting of a honorarium to and supervision of village caretakers, procurement of fuel, tools and spares and stimulation of water-related village development.
- b. Where necessary, the Village Water Sub-Committee should be assisted by the appropriate government workers.

7. Monitoring and Evaluation of Community Participation

- a. It is recommended to have periodical evaluations of the rural water supply programme (e.g. by Tanzanian research and training institutions) in close cooperation with the government departments concerned (MAJI, AFYA and PMO) to ensure proper feedback.
- b. It is recommended to assess in particular the costs and benefits of participatory projects for domestic water supply. For this, it will be necessary to establish baselines on water supply, sanitation and water use patterns in the villages that are served and to keep track of extra inputs made to obtain community participation, in terms of time, material, manpower and transport.
- c. It is recommended to include the communities in those aspects of evaluation that concern them directly, e.g. user satisfaction with existing situation, feedback of results and discussions of what the village itself can do to improve the situation and where outside help will be needed.
- d. As part of evaluating effective maintenance there is a need to compare the maintenance performance of male and female caretakers and scheme attendants.

8. Impact on Village Development: Health

For a better impact of domestic water supplies on village health it is recommended:

- a. To achieve total coverage according to Tanzanian design criteria in each village where a project is carried out.

- b. To site water points where possible nearer to the users than where traditional drinking water sources are; if this is technically/ economically impossible, to discuss the health consequences with the intended users.
- c. To get the approval of the Village Water Sub-Committee and village assembly for all selected sites before the construction work starts.
- d. To promote understanding of how water-related diseases are transmitted and to stimulate village action to prevent transmission (e.g. through source protection; upkeep and quick repair of supplies; promotion of proper water use practices; facilitation of more water use; expansion of number of latrines and improvement of existing latrines; safe disposal of excreta, including those of children and in the field; promotion of handwashing; etc.).
- e. To start a participatory health education programme in every village where a water supply project is carried out, discussing local cooperation and improvements in small groups.
- f. As one of the mechanisms, to include training on understanding and improvement of village hygiene in the training of caretakers and Village Water Sub-Committees (see Annex 2).
- g. To provide outside help in those cases, including sanitation, where no local solutions can be found.

9. Impact on Village Development: Use of Water and Time Gains

For a greater impact of domestic water supply projects on socio-economic development it is recommended:

- a. To stimulate villages to use water from wells on private and public land for productive purposes, such as, brick and tile making, tree nurseries and irrigated vegetable gardens and to use time gains for women for strengthening women's group activities.
- b. To better coordinate existing experience and expertise on the productive use of water so that their results will become more accessible to the water project agencies and villages.

10. Manpower

For carrying out community participation and education in rural water supply it is recommended:

- a) To retain the existing division of work for rural development and community participation in rural water supply and sanitation between MAJI, AFYA and MAENDELEO.
- b) To develop specified skills for each manpower category to work effectively at project, District, Regional and National level to support the Village Government in the programme activities as follows:

I Project Level:

1. MAJI field-staff should be able to:
 - prepare and timely communicate work schedules to the VWSC;
 - monitor the progress of work and daily attendance and report to VWSC or the joint Committee if any action is required;
 - check and ensure that standards of work are maintained;
 - ensure that all required tools and materials for the work are on site in sufficient amounts and are looked after and stored properly;
 - involve the village caretakers and scheme attendants in the construction activities.

2. At project level the Community Development field-staff should:
 - involve the village in local planning decisions through village assemblies and VWSCs;
 - motivate and mobilize village self-help in collaboration with VWSC and joint committee;
 - assist MAJI in monitoring and boosting self-help attendance;
 - in connection with the election of VCT, CD field staff should explain the duties of the VCT and discuss what type of person will be suitable for the function of VCT:
 - a. assist the VWSC to arrange for the selection of suitable candidates;
 - b. start with on-the-job training;
 - c. encourage the water-point caretakers to keep the water points clean and possibly suggest activities which could help e.g. construction of soakpit, or a development of a small plot for crop production (KILIMO advice may be sought).

3. At project level, AFYA field-staff should carry out the following activities:
 - cooperate with VWSC in a programme for health education and improvement of hygiene at village level;
 - discuss with VWSC which water related diseases occur in the village and what can be done to eliminate transmission;
 - tour the village with VWSC to observe environmental sanitation (water resource used, condition around sources, number and condition of school latrines etc.);
 - assist VWSC in organizing village group discussions on safe water use and hygiene behaviour and monitor and evaluate its effects;
 - assist the village to elect and train a village health worker and involve him/her in hygiene education in relation to water supply and sanitation;
 - assist and advise on construction of latrines, washing slabs drying racks, bathing facilities and water storage facilities.

II District Level:

The District Government should have a supportive role towards the Village Governments for effective management of planning, design, construction, operation, maintenance and repair of their water supplies.

1. Responsibilities of District Water Engineer

a. In Project Preparation:

- prepare a priority list for surveying on the basis of the village requests and on the basis of information in the office of the DWE and/or RWE, which should subsequently be brought into the DWC for planning a work programme for execution;
- prepare a budget for the survey;
- on the basis of the survey data, decide on the technology to be used;
- design the projects including cost data;
- inform the village government on the implementation plan of rural water supply for the financial year;
- ensure that proper coordination and cooperation is maintained between his staff, Community Development Staff, Health Staff and the villages;
- monitor progress, standard of work, proper care of material, equipment, and transport and take corrective action if required;
- prepare a monthly report covering construction progress, supply of construction materials, equipments, tools, transport, expenditure, etc.

b. In Operation and Maintenance:

- help the villages to develop their system of operation, maintenance and repair.

2. Responsibilities of District Community Development Officer

- monitor the performance of his/her staff through regular reporting from project level and through occasional supervisory visits;
- routinely report on project progress and problems to DWC.

3. Responsibilities of District Health Officer

- monitor the performance of his/her staff through regular reporting from project level and through occasional supervisory visits;
- routinely report on project progress and problems to District Water Committee (DWC).

4. District Water Committee (DWC)

At District Level there should be a District Water Committee which should be composed of:

1. Chairman - District Planning Officer
2. Secretary - District Water Engineer
3. Members: (a) District M.P.
(b) District Health Officer
(c) District Community Development Officer

NOTE: Whenever required any functional officer of the District may be invited to attend the meeting, i.e. Agricultural Livestock Officer, Natural Resources, etc.

5. Responsibilities of DWC

a. During project preparation the DWC should:

- make a work plan for survey in which MAJI, AFYA and MAENDELEO cooperate;
- communicate the workplan to the field-staff for execution as well as to chairmen of the village governments;
- ensure that the survey data are complete and the scope of requested water supply is in line with the development programme of the district.

b. During construction the DWC should monitor progress and problems in construction on all village water supplies in the district and suggest appropriate action during its quarterly meeting if necessary.

c. During maintenance and repair the DWC should:

- coordinate district assistance to the village water supply operation, maintenance and repair organization. This includes recommending subsidy requests from the village governments to the District Council, channelling assistance such as pipes, training staff, sanitation assistance etc.;
- advise and arrange on the ways and means of raising funds for maintenance, operation and repairs of the village water supplies;
- advise the VV'SL on supply of material and spare parts to the villages;
- advise the District Development Committee on any issue related with operation, maintenance and repair of village water supplies.

III Responsibilities at Regional Level

1. MAJI should be responsible for:

- accounting of the regional water projects;
- ensuring that materials are used as planned and that standard of work are maintained;
- improvement of design and costing of piped supplies designed by the district;
- preparation of training programmes and refresher programmes for staff of the District Water Engineers;

- organization of occasional seminars for DWEs;
 - planning of manpower and manpower training for regional and district level;
 - on request from the Districts, providing technical assistance i.e. advice and assistance to the district in maintenance and repair which are beyond district capacity;
 - preparation of initial training programmes for DMOs and VCTs and refresher training when and where required;
 - preparation of an annual budget which will cover the operational expenses;
 - assistance to the districts with procurements, supply and repair of plants and spares.
2. The responsibilities of Regional Community Development Officer should include:
- advice and assistance to DCDOs on community development issues related to planning, construction, operation, maintenance and repair of village water supplies;
 - organization of short training courses and seminars for district level staff which should include community participation aspects of water supply and sanitation which are relevant to the regional situation;
 - preparation of visual aids for the extension staff which are relevant to the needs of the region.
3. Responsibilities of the Regional Health Officer should include:
- advice to the District Health Officers on health issues related to the operation, maintenance and repair of the village water supplies;
 - organization of short courses and seminars for District level staff which include health education and sanitation aspects in relation to rural water supplies;
 - preparation of visual aids relevant to the regional situation to be used by extension workers in the field.
4. At Regional level there should be a Regional Water Committee which should consist of:
- | | | |
|-----------|---|--|
| Chairman | - | Regional Planning Officer |
| Secretary | - | Regional Water Engineer |
| Members | - | Regional M.P. |
| | - | Regional Community Development Officer |
| | - | Regional Health Officer |
| | - | All District Executive Directors |

The functions of the Regional Water Committee should include:

- to prepare and submit, for approval to the Regional Development Committee (RDC) any plans, budget estimates and implementation programmes for water supply in the Region;
- to monitor and make proposals for adjustments to the programme when this is deemed necessary;
- to account to the RDC on a quarterly basis for progress and disbursements of funds (local and foreign) in the manner agreed upon during bilateral consultations and/or in conformity with the Tanzanian Government Regulations.

IV National Level

1. At National level, the responsibility for regional water supply instruction programmes should lie with the Ministry of Water, Energy and Minerals. This responsibilities should include:
 - approval of design and costing for regional and national level projects;
 - arranging for the financing of the projects which should include:
 - (1) assisting regional and district projects with procurement of material supplies;
 - (2) allocating national funds for national projects;
 - (3) supervision and control of construction activities, disbursement of funds and monitoring of expenditure and project progress;
 - development of technical skills in relation to operation and maintenance of rural water supply to be designed and incorporated in the national training programmes for field staff;
 - assisting the regions to develop short courses and seminars on technical aspects in operation and maintenance of rural water supplies;
 - assisting the regions and districts to develop an evaluation programme on technical aspects;
 - assisting the regions and districts to produce and supply materials and spare parts for plant repair and plant replacement.

2. At National level the Community Development Department should:
 - ensure that the training course for CD workers includes community participation in water supply, sanitation and related development and that training materials are available;
 - assist the regions and districts to plan and organize short courses and seminars on community participation in water and sanitation;
 - plan and carry out an evaluation programme on the impact of community participation in water supply and sanitation;
 - advise the regions and districts on manpower and financing;

3. At National level the Ministry of Health should:
 - ensure that training courses for health field staff include health education and skills development in water supply and sanitation and that training materials are available;
 - assist the regions and districts in planning and organizing short courses and seminars on health education and sanitation;

- design and carry out a limited and relevant evaluation programme on the impact of health education and sanitation in rural water supplies;
- advise regions and districts on manpower and financing;
- design a training programme for VHWS and assist the regions with training of village health workers at district level.

4. National Water Committee

The responsibilities of the above Committee should include:

- scrutinizing the programme and identify relevant source of local and donor funding;
- forwarding the programme proposal to DevPlan.

Composition of the above Committee should include:

DevPlan	- Chairman
MAJI	- Secretary
Treasury	- Member
AFYA	- Member
PMO-CDD	- Member

Non-voting members should include:

- Representatives of the Governments of donor countries and International Organizations which are assisting in the implementation of the Tanzanian Rural Water Supply Programme.

11. Manuals

It is recommended to translate all community education and participation activities into more detailed procedures, adapted to the type of technology and participation in the regions concerned along the lines of the manuals already prepared for piped water supply projects, hand-pump well projects and health education (see Annex 1-3).

12. Training

To prepare current Government staff for a participatory rural water supply and sanitation programme, it is recommended:

- a. To design short courses and seminars for fieldstaff in the three manpower categories involved. For this purpose, assistance can be sought from the various donor agencies supporting water implementation projects in the individual regions.
- b. To incorporate training on community participation in the existing institutional training for field staff in the country (e.g. Water Resources Institute, Community Development Training Institutes, and training institutes for Health Assistants) to ensure continuity of the programme.
- c. To include one-day orientation courses on community participation for higher level staff in the regions, national institutions, and post-graduate training courses.

13. Choice of Technology

To facilitate village self-reliance in water supply maintenance, it is recommended to choose, and where possible improve upon equipment that is suitable for village-level maintenance and repair. This goes in particular for the type of hand-pumps that are installed.

14. Supply of Material and Equipment

To facilitate village self-reliance in water supply maintenance, it is recommended:

- a. To establish, in cooperation with the various implementation projects, procurement centres to ensure a reliable supply of material, equipment and spare parts for maintenance and repair to the villages through secondary cooperative societies at district and ward level.
- b. To stimulate local production of spare parts, tools and equipment for rural water supplies.
- c. To study the need for and possibility of subsidizing some of this material and equipment by Tanzanian and donor organizations, especially where foreign exchange is concerned.
- d. For lower recurrent cost and in recognition of the environmentally beneficial practices of recycling used parts, it is recommended to establish small workshops under the district water engineers where villagers can bring and collect major parts or hand-pumps for repair.

15. Further Testing of Community Education and Participation Procedures

To ensure that experiences in communication participation in the National Rural Water Supply and Sanitation Programme are evaluated and refined further, it is recommended:

- a. To make new projects started in the various Regions further test cases for the presently developed procedures
 - to test their value under as great a variety of circumstances as possible;
 - to identify the need for adaptations to specific technical, financial and socio-economic conditions in the different areas;
 - to provide on-the-job experience for field-staff and allow evaluation of training.
- b. To evaluate these experiences after an agreed period of time through the National Water Committee.

LIST OF REFERENCES

1. BRALUP/IRC Village Water Supply and Community Participation in Tanzania, Report of a National Workshop held in Dar es Salaam, Tanzania, July 14-16, 1981, Dar es Salaam Tanzania, BRALUP and The Hague, The Netherlands, IRC, July 1982.
2. MAJI/PMO/DGIS/IRC Project for the Development of a Community Participation Component in the Tanzanian Rural Water Supply Programme. Profile for Field-Testing and Application of Results, July 1982.
3. Kirimbai, M.
van Wijk, C. Impact of Water Supply on Hygiene Improvements in Rural Tanzania: a study in 8 Villages in Morogoro and Shinyanga Regions. Dodoma, Tanzania, PMO and The Hague, The Netherlands, IRC, August 1983.
4. Andersson, I. Wells and Handpumps in Shinyanga Region, Tanzania, Level of Service from Small-Scale Water Supplies, BRALUP Research Paper No. 77, Dar es Salaam, Tanzania, November 1982. X
5. Mujwahuzi, M. A Survey of Rural Water Supply in Dodoma District, BRALUP Research Paper No. 57, Dar es Salaam, Tanzania, 1978.
6. Bantje, H. Sociological Aspects of Improved Water Supply in the Coast Region, BRALUP Research Paper No. 32, Dar es Salaam, Tanzania, June 1978. X
7. URT/DANIDA/BRALUP/CDR Water Master Plans for Iringa, Ruvuma and Mbeya Regions, Socio-Economic Studies, Vol. 12, Dar es Salaam, Tanzania and Copenhagen, Denmark, 1982.
8. Harderwijk, W. van Een Technies Project als Ontwikkelings-samenwerking, Een Studie: Hoezo Samen? (A Technical Project as Development Cooperation, A Study: What Cooperation?), Werkgroep Waterbeheer, Delft, The Netherlands, April 1980.
9. DGIS/DHV Shinyanga Shallow Wells Rehabilitation Project. First Progress Report January-June 1982, Amersfoort, The Netherlands, 1982.
10. PMO/IRC Maintenance and Repair Systems for Handpump Wells: An Appraisal Study Dodoma, Tanzania, PMO and The Hague, The Netherlands, IRC, February 1983.

11. BRALUP Socio-Economic Aspects of Water Master Plan of Rukwa Region, BRALUP, University of Dar es Salaam, Dar es Salaam, Tanzania, 1981.
12. BRALUP Socio-Economic Aspects of Water Master Plan of Kigoma Region, BRALUP, University of Dar es Salaam, Dar es Salaam, Tanzania, 1981.
13. Lomøy, J. "Feasible strategies for community participation in rural water supply" in Village water Supply and Community Participation in Tanzania, Report of a National Workshop held in Dar es Salaam, Tanzania, July 14-16, 1981, BRALUP, Dar es Salaam, Tanzania and IRC, The Hague, The Netherlands, July 1982, pp. 63-67.
14. Kauzeni, A.S.
Konter, J.H. Institutionalization of Shallow Wells under Tanzanian Administration, BRALUP, Dar es Salaam, Tanzania, 1981.
15. 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, Research Paper no. 11, University College of Dar es Salaam, Tanzania, BRALUP.
16. NEDECO Shinyanga Water Supply Survey, Water Master Plan Study for Shinyanga Region, Technical Annex D, Sociology, Final Report, The Hague, The Netherlands, October 1974.
17. Bantje, H. A Water Consumption Survey in Mbezi Village, Dar es Salaam Region, BRALUP Research Paper No. 30 (new Series), Dar es Salaam, Tanzania, September 1978.
18. Gearheart, R.A. et al Environmental Sanitation Master Plan for Training and Education in Tanzania, WASH Field Report No. 58, Arlington, Virginia, USA, WASH, September 1982
19. Hordijk, A. et al Evaluation of The Netherlands Sponsored Water Projects in Morogoro Region, (draft), Utrecht, The Netherlands, April 1982.
20. URT/DANIDA/BRALUP/CDR Water Master Plans for Iringa, Ruvuma and Mbeya Regions, Socio-Economic Studies, Vol. 13, Dar es Salaam, Tanzania and Copenhagen, Denmark, 1983. X

21. Ausi, H.

Rural Water Supplies and Regional
Development A Case Study of Shinyanga
Wells Programme in Bariadi District,
Shinyanga Region, Tanzania, MDS Thesis,
Institute of Social Studies, The Hague,
The Netherlands, December 1979.

ANNEX 1

PROCEDURE FOR VILLAGE PARTICIPATION
IN RURAL WATER SUPPLY, HEALTH EDUCATION
AND SANITATION: STEP BY STEP PROGRAMME
FOR HANDPUMP WELL PROJECTS

Step 1

Inform Village on Allocation

Purpose

- To give feedback to village on project request.

Participants

District Authorities inform all the villages which have sent in requests for a water project whether they will get the water project or not and the reason why they cannot get the project.

Preparation

- Determination of priority criteria for implementation.
- Screening of village requests and masterplan data.

Task in the Village

None.

Duration in the Village

Not applicable.

Documentation

Circular letter.

Step 2

Well Surveying

As soon as it is known that a survey team is to start surveying for handpump wells in a certain village, the village government is to be contacted immediately.

Purpose

- To be known to the village.
- To inform the village government of the activities that would take place in the village, procedures and risks that would be expected.

Participants

Surveyors.

Task in the Village

- Be introduced to the village leaders.
- Briefly explain leaders about the forthcoming activities in the village (water supply, health and sanitation improvement, economic activities that can be organized).
- Get permission for survey to be done.
- Tour village with village leadership and collect information on population, settlement and traditional sources in use for various purposes, consulting both men and women.
- Make test drills.
- Arrange baraza to discuss results of survey at some future date.
- Promote participation of women as primary users of the water supply.

Duration in the Village

The whole survey may take from 1 to 3 weeks. The discussion of results in the baraza should be combined with step 3.

Documentation

- Village map with settlement patterns, traditional sources (incl. approximate distance and whether seasonal or permanent) and positive well sites.

Step 3

Collect other Village Information

Purpose

Information needed for:

- (1) Organizing self-help labour.
- (2) Getting basic picture of health and environmental sanitation in the village.
- (3) Communicating effectively with villages:
 - leadership problems, if any, must be dealt with first;
 - felt need for the projects, both men and women should be contacted.
- (4) Village income for determining village position toward maintenance organization.

Participants

- Afya, CDD, Kilimo.

The activities above can take place before, during or after the survey. The ideal situation - for logistics and cooperation - is that survey and collection of village information should be done at the same time, that is Maji, Afya, CDD and Kilimo working simultaneously. In which case a time schedule should be drawn up prior to any visit to the villages.

Task in the Village

- Collect information about labour force and existing village organizational activities (days set aside for communal work etc.) - CDD.
- Collect information about health behaviour and environmental sanitation in the village - Afya.
- Any felt need for water supply - water for domestic use, livestock use, irrigation, brickmaking etc. and willingness to contribute - CDD.
- Leadership organization and composition - CDD.
- Village income - CDD.
- Collect information about possibilities for development projects in the village - Kilimo.

Duration in the Village

- One to two days.
This can be combined with Step 2 so that the whole team can use one means of transport.

Documentation

- Report on community capacity and attitudes - CDD.
- Report on health and sanitation situation - Afya.
- Report on economic and income situation - CDD.
- Report on possible development activities to be included in the water supply projects - Kilimo and others.

Step 4

Inform the Village and Discuss the Project

Purpose

- To inform the village about the projects:
 - (1) Maji about project design,
 - (2) Afya about hygiene and environmental sanitation,
 - (3) CDD about village organization,
 - (4) Kilimo about possible development activities.
- To answer village questions about the proposed projects.
- To get the baraza to discuss and approve the positive well sites.
- To get the baraza to discuss additional facilities, (washing slabs, cattle troughs, etc) and the consequences of such additional facilities to the village.
- To identify issues necessitating changes in the well sites.
- To elect the Village Water Sub Committee (VWSC).
- To sign an agreement when projects are approved.

Participation

- The whole village population (Baraza)
- Maji
- Afya
- CDD
- (Kilimo)
- Other Government employees - the village Primary School teachers etc.

Preparation

- Based on information collected during 2nd and 3rd step Maji finalizes the project design (number of wells and location) together with additional facilities.
- Maji, CDD and Afya arrive at objective common stand on how to run the baraza.
- CDD prepares a draft village project agreement.

Task in the Village

- Maji, Afya, CDD worker (Kilimo) inform the village baraza about the project.
- CDD reads draft agreement to the baraza.
- One and two above is discussed in the baraza.
- CDD lists issues on which agreement has not been reached. These are further discussed to reach an agreement.
- CDD informs the baraza what changes have been made. When agreement is reached it is written out nicely and the village chairman signs on behalf of the village.
- Election of Village Water Sub-Committee.
- Possibly an extended survey should take place.

Duration in the Village

- Half to one day.

Documentation

- Accepted agreement.
- Village map with project design.

NB. If village and project continue to disagree despite the changes that have been made, the village should be given more time to think and step 4 should be repeated.

Step 5

Organizing the Self Help Work

Purpose

- To construct the water supply.

Participants

- CDD
- Village Water Sub-Committee

Work in the Village

- CDD helps the VWSC register all able persons according to village settlement and according to the well sites.
- The list is made in such a way that each day of the construction there are people present for self help and other activities.
- CDD/Maji monitors and steps in to assist VWSC if attendance is low.
- Cleaning of access roads to and surroundings of the well sites.
- Collection of gravel (when available), sand and bushes for fencing.
- Sieving of gravel pack in case of shallow tube wells.

Duration in the Village

- According to work plan.

Documentation

- List of all able bodied persons according to settlement and according to which well sites they will supply self help labour. The list is kept by the VWSC. It must be understood that the self-help group does not change every day.
- List of day-to-day attendance.

If there is a village contribution, it may be used for two purposes:

- to pay the village labourers,
- to start a maintenance fund.

Step 6

Selection of Pump Attendants

Purpose

- To select capable and reliable villagers as pump attendants.

Participants

- VWSC members
- Village government
- Maji
- CDD

Preparation

- Select among the list of names of attendance in self-help labour suitable candidates to be pump attendants.

Task in the Village

- Explain the duties and training of pump attendants.
- Discuss what type of person will be suitable as VCT for daily maintenance.
- Ask the VWSC to select 2-4 people to be trained.
- Start on-the-job training of candidates.
- Demonstration of assembling a complete water lifting device:
 - .. cylinder,
 - .. rising main and pumprod,
 - .. pumphead.
- Discuss village procedure for O & M.
- Maji organizes with VWC for follow-up training (Step 11 and 12).

Duration

One to two days.

Step 7

Construction of Wells and Additional Facilities

Purpose

- To complete the wells.

Participants

- Villagers, according to work plan
- Maji technicians
- CDD (in case of problems)

Preparation

- VWSC notifies villagers to be involved.
- Maji brings the necessary tools/materials to the site.

Task in the Village

- Maji explains the importance of good workmanship.
- Villagers assist in construction of apron and drainage channel.
- Maji assists villagers in constructing washing slab/cattle trough when these are part of design.
- Maji starts on-the-job training of village caretakers.
- Maji gives assistance in construction of VIPs and in drainage works.

Duration in the Village

- According to work plan.

Practical Hints

- The VWSC, Maji and CD worker should agree on each particular location of additional facilities, to assure fair assess and prevent public health risks.

Step 8

Introducing Health Education

Purpose

- To plan with VWSC a village programme for Health Education and Improvement of Hygiene.

Participants

- Afya
- VWSC

Preparation

- Health Education Manual, posters, etc.

Task in the Village

- Discuss with VWSC what water and sanitation related diseases occur in the village and what can be done to block transmission routes.
- Tour village with VWSC, observing environmental situation (water sources used, conditions around sources, number and conditions of school latrines, human excreta around village etc.).
- Assist VWSC in organizing village discussions on safe water use and hygiene behaviour.

Duration in the Village

- One week.

Documentation

- Agreement reached with VWSC on steps to be taken towards improving the village health and sanitation programme.

Step 9 Introducing Productive Use of Water and Timegains

Purpose

- To encourage productive use of water and timegains in the village.

Participants

- VWSC
- Other interested groups such as women groups, irrigators, cattle owners, brick and tile workers.
- CDD
- Kilimo or other extension workers concerned.

Preparation

- Outline of what development is possible in accordance with the design.

Task in the Village

- Discuss the possibilities of productive use of water with VWSC and the leaders of different interested groups.
- Note down proposed projects agreed upon.
- In case the time used for water collection has been reduced, it can be discussed with the people concerned (women especially) if time gains can be used for special women programmes (women classes on nutrition, child health, child spacing, handicrafts etc.).
- Help the VWSC and other groups to draw up plans for these developments.

Duration in the Village

- As it is necessary.
Visit the village from time to time to see and help where necessary (Kilimo, CDD, other extension workers).

Documentation

- The types of projects to be undertaken in each village.

Step 10

Review of Maintenance Procedure with VWSC

Purpose

- To establish a supply management and maintenance procedure in the village.

Participants

- VWSC
- Pump attendants
- Maji
- CDD

Preparation

- A procedure for village maintenance (tasks of VWSC and pump caretakers).
- A schedule for village support visits from the district service.
- A monitoring system for well-maintenance.

Task in the Village

- Discuss the procedure for maintenance with the VWSC.
- Discuss the organization of the area training course in cooperation with neighbouring villages.

Duration in the Village

- Two days

Documentation

- Handbook for VWSC (Management of Village Water Supply).
- Well logbook.
- Suggested training place.

Step 11

Establish System of Area Course for
Pump Caretakers and VWSC

Purpose

- Organize training course for pump attendants in one area, to:
 - a) supplement technical training already received during construction,
 - b) To give technical training for caretakers from village already served in case there are pump caretakers who have been replaced,
 - c) To give additional training in health education.

Participants

- Maji
- Afya

Preparation

- Planning of training schedule.
- Final identification of the location where the training will take place.
- Informing the villages concerned.

Task in the Village

- None.

Duration in the Village

- Not applicable.

Documentation

- Technical Training/Job Manual.
- Health Education Training/Job Manual.

Step 12 Implementation of Pump Attendants Course in an Area

Purpose

- Carry out training course for pump attendants from an area.

Participants

- Pump attendants from the area.
- VWSC from the area (for hygiene aspects).
- Maji
- (CDD, Afya)

Preparation

- Provide the training manuals and other training materials.

Task in the Village Area

- Train the pump attendants from the area in maintenance tasks.
- Train attendants from villages already served, in case there have been replacements.
- Train attendants and selected members from VWSCs.

Duration in the Area

- One week or more, whenever necessary, for VCT.
- (One day for VWSCs).

Documentation

- None.

After training VWSC selects final candidates in consultation with Maji and reaches agreement on form of compensation. VWC supervises regularly. Maji gives refresher training during annual scheduled visit.

Step 13 Establish Users By-Laws on Water Use and Sanitation

Purpose

- To make village able to administer its responsibilities with respect to operation and maintenance of the pumps and sanitation programme.

Participants

- VWSC
- Afya
- CDD

Preparation

- Draft of the by-laws.

Task in the Village

- Discuss the use of and the need for by-laws.
- Discuss the content of the by-laws.
- Agree on the by-laws.

Duration in the Village

- More than two days

Documentation

- A copy of agreed by-laws is left with the village.

Step 14

Hand Over the Pumps to the Village

Purpose

- To formally establish village ownership.

Participants

- Entire village government.
- VWSC members and village caretakers.
- Pump attendants.
- Maji (Divisional Maintenance Officer).
- CDD

Preparation

- Prepare village ownership document.

Task in the Village

- Outline the village responsibilities again.
- Outline the system of operation and maintenance again.
- Read out the contents of the ownership document.
- Discuss the document.
- Sign the ownership document.

Duration in the Village

- Half a day; can be organized directly after step 10.

Documentation

- Signed ownership agreement.

Practical Hints

If the village or Maji is not satisfied with the project, no signing should take place before all parties are satisfied. The CD workers should support the village in all reasonable complaints.

Step 15

Follow-Up for Health Education and Sanitation Action Plan

Purpose

- To check on the action plan in Health Education and Sanitation.
- To help VWSC where necessary.

Participants

- VWSC
- Afya
- CDD (RCU) where necessary (e.g. construction of latrines, wash houses etc.).

Preparation

- Review of action plan of village concerned.

Task in the Village

- Check and discuss the action plan drawn by VWSC on Health Education and Sanitation.
- Review developments.
- Offer help where necessary.

Duration in the Village

- Minimum two days.

Documentation

- Step reached in the action plan.

Step 16

Follow-Up for Uses of Water for Village Development

Purpose

- To check on the action plan drawn for village development and to help the VWSC where necessary.

Participants

- VWSC
- Pump attendants
- CDD/Rural Construction Unit where necessary.
- Kilimo.

Preparation

- Review of action plan drawn by village concerned.

Task in the Village

- Check and discuss action plan drawn by VWSC on village development.
- Review developments.
- Offer help where necessary.

Duration in the Village

- Half to one day minimum, preferably longer.

Documentation

- Step reached in the action plan.

Step 17

Annual Checks by Maji

Purpose

- To support the village responsibilities in operation and maintenance tasks.

Participants

- Maji (Divisional Maintenance Officer)
- VWSC
- Pump attendants

Preparation

- A schedule for annual trips in the district.

Task in the Village

- Check all the pumps in the village.
- Check wells and disinfect where necessary.
- Check on the functioning of the pump attendants.
- Give refresher training where necessary.

Duration in the Village

- According to work plan.

Documentation

- Well cards with information on well repairs, well use and hygiene conditions around the pump.

Step 18

Evaluation of the Project

Purpose

- To evaluate the water project in the village.

Participants

- VWSC
- Pump attendants
- Maji (Divisional Maintenance Officer)
- Afya
- CDD
- Kilimo / others who may be involved in the village development.

Preparation

- Collect baseline documents (water, sanitation, development conditions, see Steps 2 and 3).

Task in the Village

- Evaluate the work of the VWSC.
- Evaluate the work of the pump attendants.
- Evaluate the health education and sanitation programme.
- Evaluate the water related development in the village.
- Evaluate the acceptance of the water project by the villagers.

Duration in the Village

- One day.

Documentation

- Report of the evaluation.
Copies to be sent to DWE, DHO, DCDO, and DED, who will have a meeting. The minutes of this meeting (with comments and recommendations) will be sent to the RWF, RMO, and VWSC. To reduce the number of meetings if necessary, one meeting can be held for a number of villages.

ANNEX 2

UNDERSTANDING AND IMPROVEMENT OF VILLAGE HYGIENE

Training/Job Manual for Trainers, Pump Caretakers,
Village Water Committees and Village Health Staff
(Kangaroo Pump Version)

NOTE TO THE USERS OF THIS BOOKLET

For whom is this book?

This book is for:

- the village pump caretakers and their trainers
- those members of the village water committee that are responsible for educating the pump users
- village schoolteachers and health workers

What is the purpose of this book?

The purpose of the book is:

- to make the pump caretakers, committee members and village functionaries understand the importance of good and sufficient water and better hygiene
- to give guidelines and educational material (flipcharts) for educating the other villagers on water and hygiene

How to use the book yourself

- at each well, organize a meeting with the well users
- show each picture of this book and ask the questions given in the text
- do not give any answers yourself, but help the people to come up with their own answers and examples
- help your group to make decisions on how they will keep the well clean and improve their water use and hygiene

How can others use the book?

Health workers can use it for:

- home visits and neighbourhood meetings
- visits with the village water committee to traditional and improved water sources and public latrines in the village
- discussions at the clinic

Schoolteachers can use it for:

- health education lessons in class
- taking the students out for practical lessons, e.g. inspecting school latrines, improved water sources and traditional sources (including those infested by bilharzia)



Je, haya maji ni safi na yanafaa kunywa ?

Discussion topic 1

DIRTY WATER BRINGS ILLNESS

Question: Water that is open (a river, waterhole, unprotected well) can become infected with dirt and worms. Can you give some examples of how this can happen? (see picture)

Discussion:

- People bathe themselves and wash clothes in the river or the well. That water is later drunk by other people
- People defecate near the open water. The rain washes the stools into the water. Excreta of cattle are also washed in. The stools can have worm eggs and germs. When this water is drunk the germs and worm eggs come into your body

Question:

- Is open water in your village used for drinking and making food?
- Is that water always boiled, even at planting and harvesting time?
- What diseases can you get from drinking dirty water?

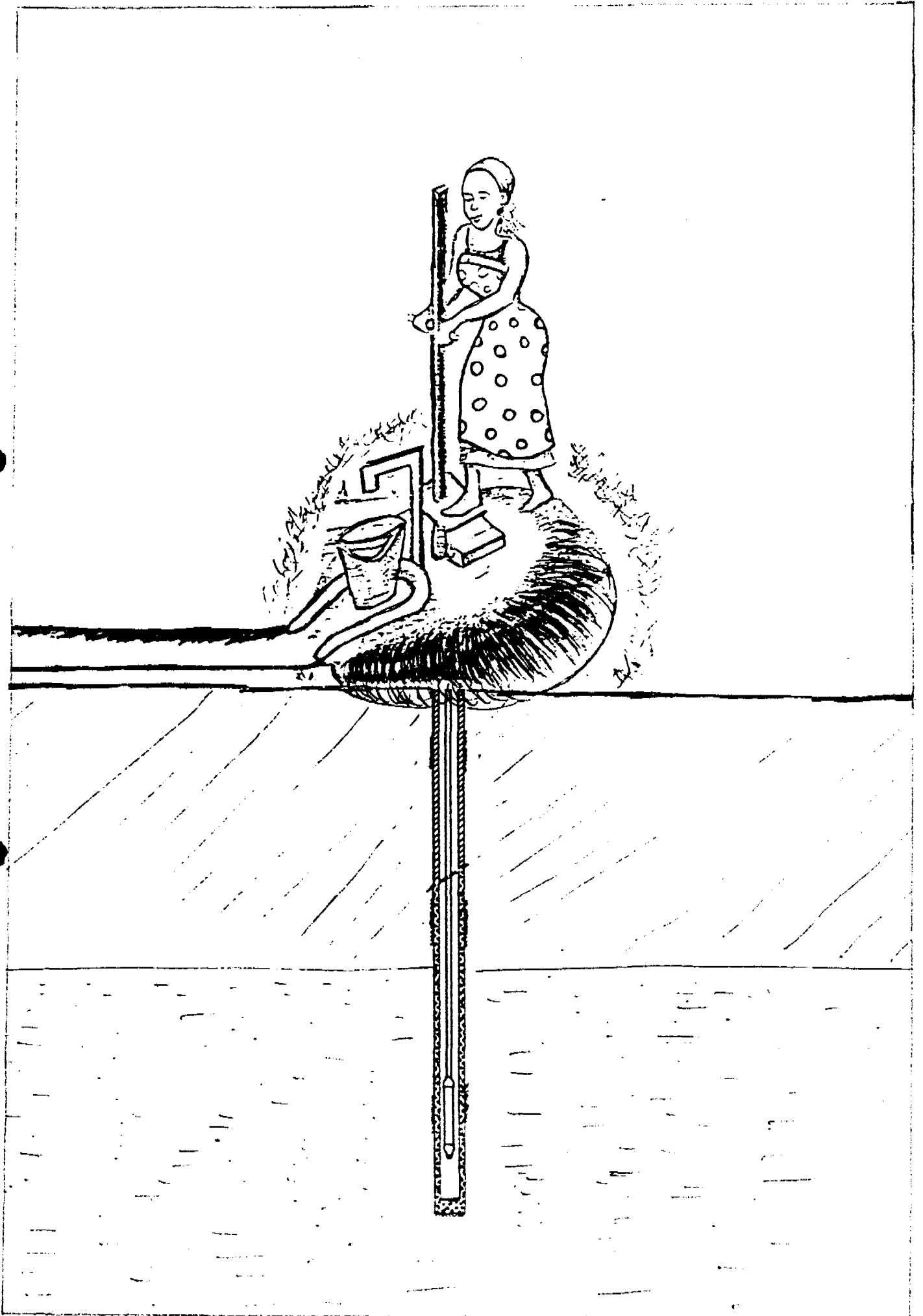
Answer: Cholera, typhoid, diarrhoea, dysentery, worms, jaundice

Question: How can drinking water bring these diseases to others?

Discussion:

- People who are ill with these diseases (even without knowing it) may defecate near water
- Their soiled clothes are washed in water
- This water is later used by other people for drinking and preparation of food

Conclusion: Which water in your village is unsafe? Will you still get your water from there?



Preliminary, untested illustration

A SAFE WATER SUPPLY IS GOOD FOR YOUR HEALTH

Question: Why is water from a pump safe to drink?

Discussion: Water from a pump comes from deep under the ground. There it cannot be contaminated by germs from stools, dirty clothes and people's bodies. (see picture)

Question: Will everyone in the village always use water from the pump to drink? Can you think of occasions when unsafe water will be used?

Discussion:

- The pump is farther than the nearest waterhole or the river
- There are queues at the pump
- The water tastes not as nice
- The pump is not working well
- Our children play in the river and drink from it

Question : How can we make sure that only safe water is drunk in our village?

Discussion:

- We can tell each other to stop using unsafe water
- We can make a village by-law on using only the pumps for safe water
- After some weeks we are used to a different water taste. We can also get our drinking water at another pump, if that tastes better

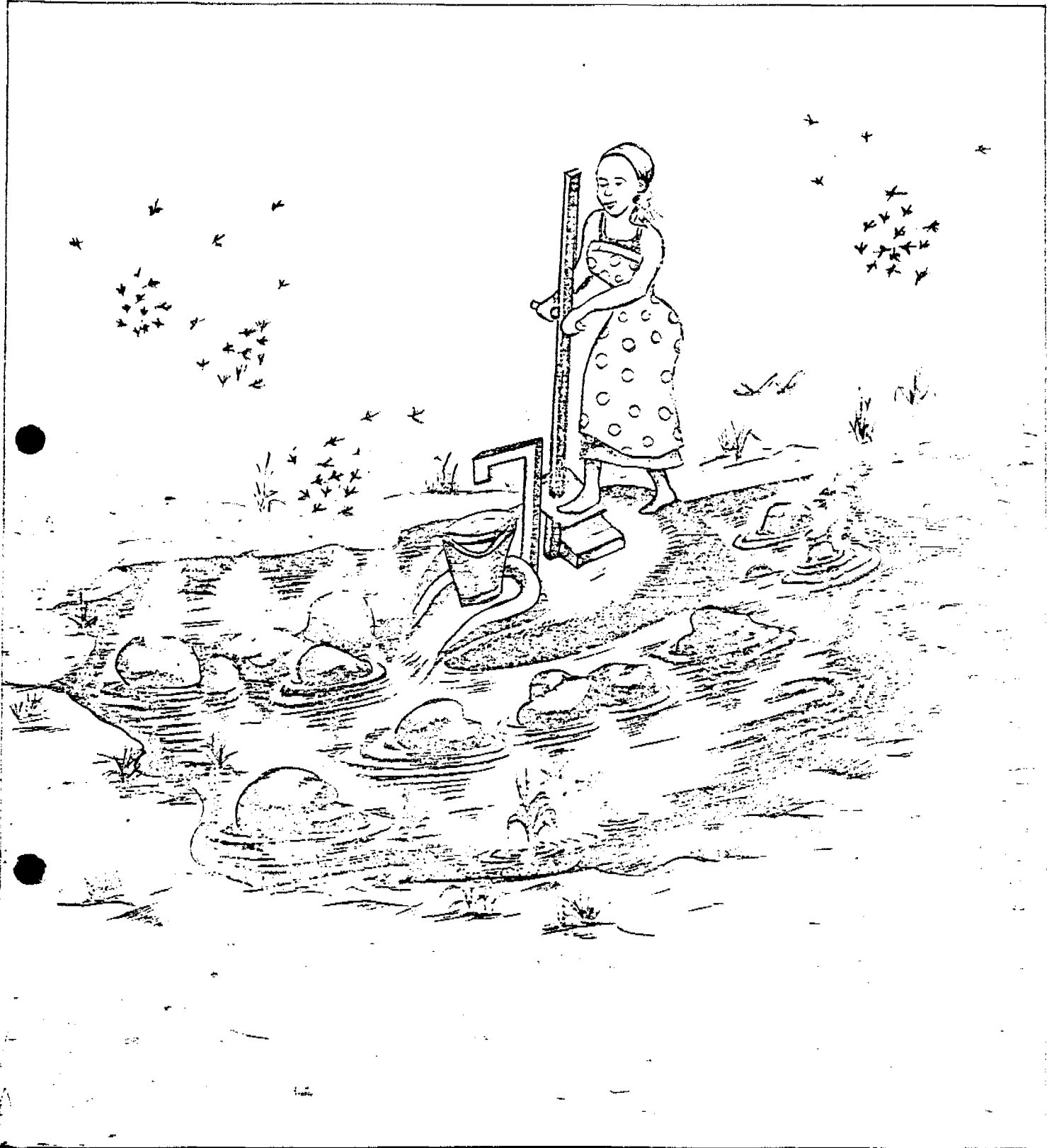
Conclusion: Water from a pump is safe because the well is closed and protected from dirt. The water has also been tested to make sure that it is safe to drink, even when it tastes a bit different. We should only use this water for all our drinking and cooking.



Je, haya maji ya kisima hiki bado ni safi na yanafaa
kunywa? Yanaweza kufanywa nini?

DOES THE SAFE WATER STAY SAFE?

- Question: The water in the ground is protected against contamination by people and animals. What can happen when a lot of dirty water stands around the well?
(see picture)
- Discussion: The dirty water seeps into the soil and contaminates the clean water that is pumped up.
- Question: What can happen when the well cover is cracked or opened?
- Discussion: Dirt and small animals (e.g. rats) can fall in and pollute the clean water
- Question: How can we prevent the clean water in our wells getting dirty ?
- Discussion:
- Every user sees that the drain is clean and that there are no puddles around the well
 - If there is water standing, a channel is dug to the field. The water can be used to grow vegetables
 - Cattle are not allowed inside the well area. A hedge or fence protects the well
 - Washing is only allowed when special provisions are made (drainage) at some distance from the well and no puddles and mud are formed
 - Broken or cracked well covers are repaired by the village water committee and pump caretaker
 - When a pump breaks down, the well is not opened but the broken pump parts replaced by good ones.
- Conclusion: To keep the well water safe, the users keep the pump surroundings clean. The caretaker and water committee see that the wells are well-kept. A hedge is made to keep cattle away.



MOSQUITOES BREED IN STANDING WATER

Question: Why is it also bad to have stagnant water around the wells? (see picture)

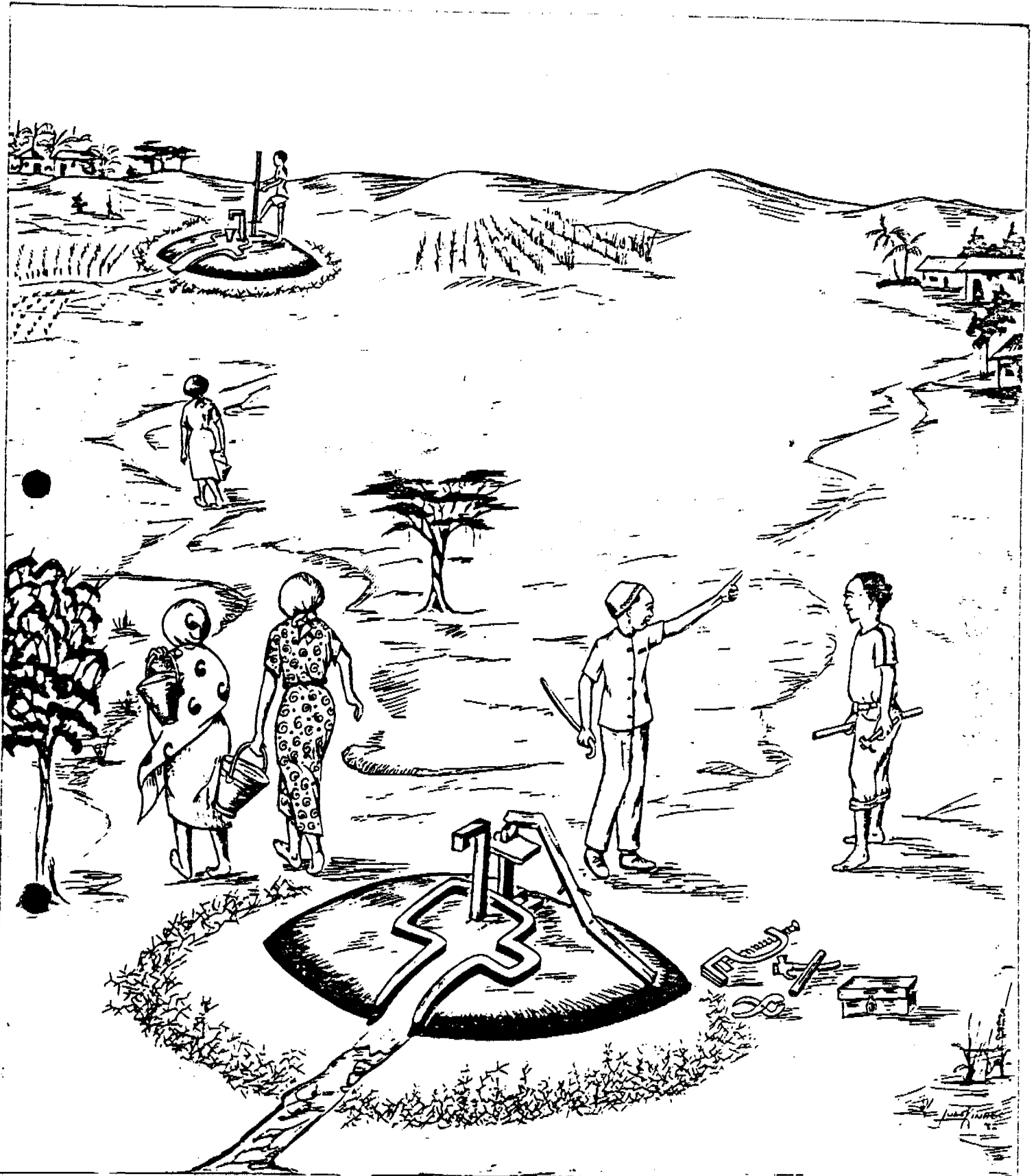
Discussion: Mosquitoes breed in standing water. They can transfer malaria, elephantiasis and other diseases from a sick person to a healthy person.

Question: Where can water collect in our village?

Discussion :

- Around the wells (puddles)
- Rainwater puddles in the compounds and village roads
- Old tins, calabashes, ditches, hollow trees and plants (vidimbwi) near the houses in which rainwater collects
- Rainwater storage drums or tanks that are not covered
- Puddles outside bathing places

Conclusion: To limit as much as possible the places where mosquitoes breed there must be no puddles around the well, no old tins, uncovered water containers and ditches around the houses. Where possible, standing water should be drained, and drainage channels made along the village roads



Tunaweza kufanya nini pampu ikivunjika ? Je, kuna mahali pengine tunaweza kupata maji mpaka pampu hii itakapotengenezwa ?

PUMP FAILURE AND VILLAGE HEALTH

Question: The village was for some time used to having good (drinking) water from the pumps. Now one of the pumps breaks down. The users do not go to another pump, but go back to dirty water. Their stomachs are used to clean water. What will happen?

Discussion: When your stomach is first used to safe water and then get dirty water you can easily become ill.

Question: What can we do to protect our health when a pump breaks down? (see picture)

Discussion:

- We go to the other pumps to get our drinking water
- We warn the pump caretaker as soon as we find that there is a problem with the pump
- We do not open the well but try to get it repaired quickly, with the help of the caretaker and the village water sub committee
- If the caretaker cannot repair it we seek help from outside the village

Question: How can users check their pumps?

Demonstration:

- Feel if the pump is firm on its base
- See if there are any loose parts (nuts, bolts, handles)
- Report to VCT if pump or parts are loose
- Wash hands, rinse bucket and empty in gutter before filling the vessel
- Clean gutter and well surrounds when necessary
- Do not allow children to play with the pump

Conclusion We must operate the pump in the right way to keep it functioning. When there are problems we warn the caretaker. When the pump breaks down we use another or boil our drinking water when it comes from an unsafe source. We ask the village water committee for a quick repair.



Je, maji safi yanaweza kuwa machafu unapoyagusa kwa vidole vyako ?

WATER COLLECTION AND STORAGE

Question: The water from the pump is clean and safe for people's health. But this water may not stay clean once it is taken from the well. How can it become dirty during collection and storage? (see picture)

Discussion:

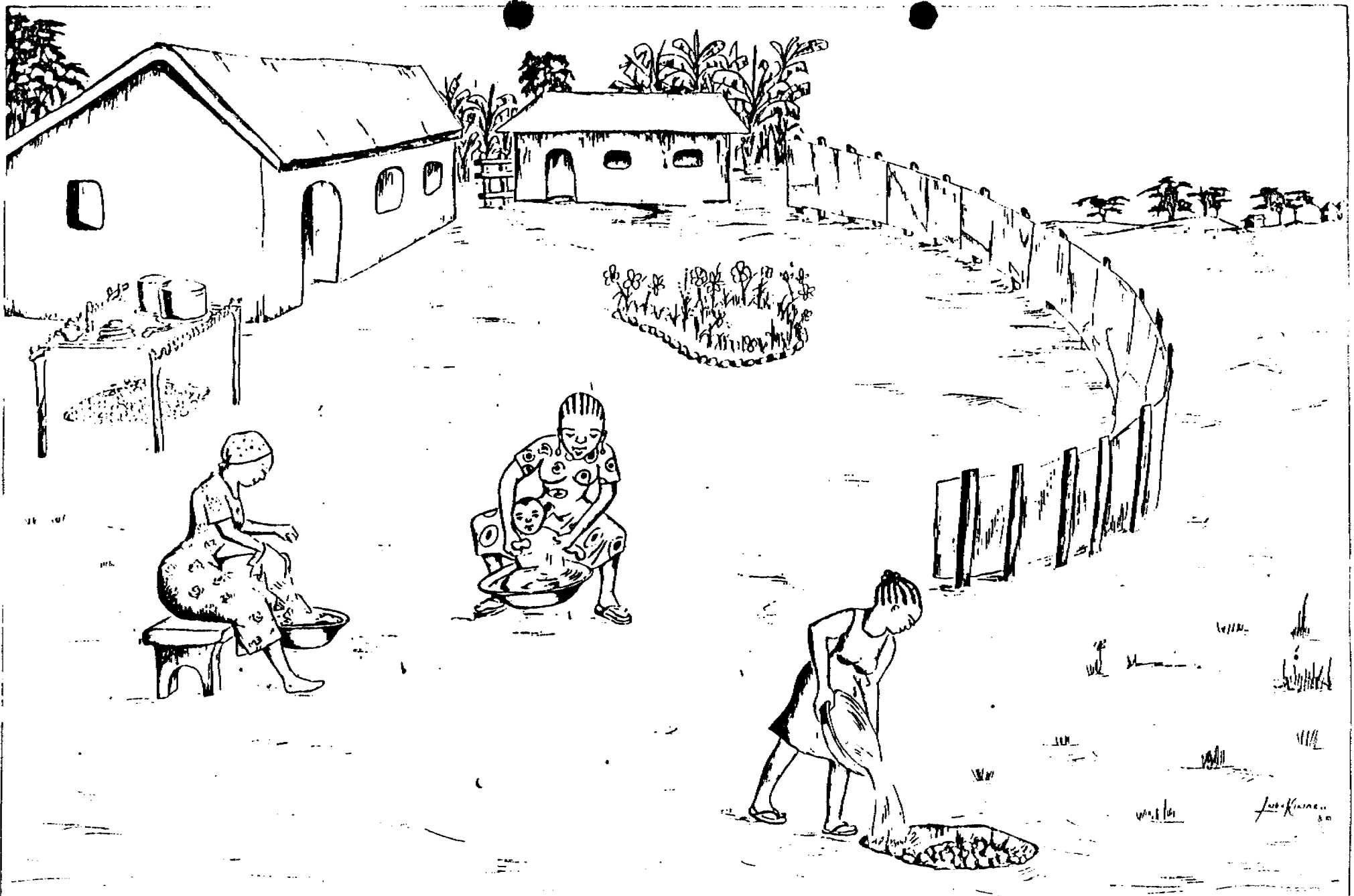
- People collect water in unwashed buckets
- They put leaves and twigs on top of the vessels to prevent spillage during their trip home. The leaves may be unclean
- Drinking water is stored in dirty or open pots
- The water in the collection vessel or storage pot is touched with dirty hands

Question: What can we do to make sure that the clean well water is not contaminated during collection and storage?

Discussion:

- Wash hands and rinse bucket before filling
- Put a clean cover on top of vessel against spilling
- Do not touch drinking water with hands or mouth
- Cover the storage pot with a firm cover
- Use a long-handled dipper (e.g. made from a calabash or old tin) to take water from the pot
- Clean storage pot often
- Teach everyone in the household how to take water from the storage pot in the right way. Explain to the children why they should not put their hands or drinking cups in the water.

Conclusion: To keep our clean water clean we wash our hands and buckets. We store our ^{drinking} water in a clean, covered pot. We use a long-handled dipper to take water from the pot. We teach our children how to collect and take water. We discuss this matter with our neighbours and other well users.



Kufua na kuoga mara kwa mara huwezesha na upatikanaji mzuri wa maji.

USE MORE WATER FOR WASHING AND BATHING

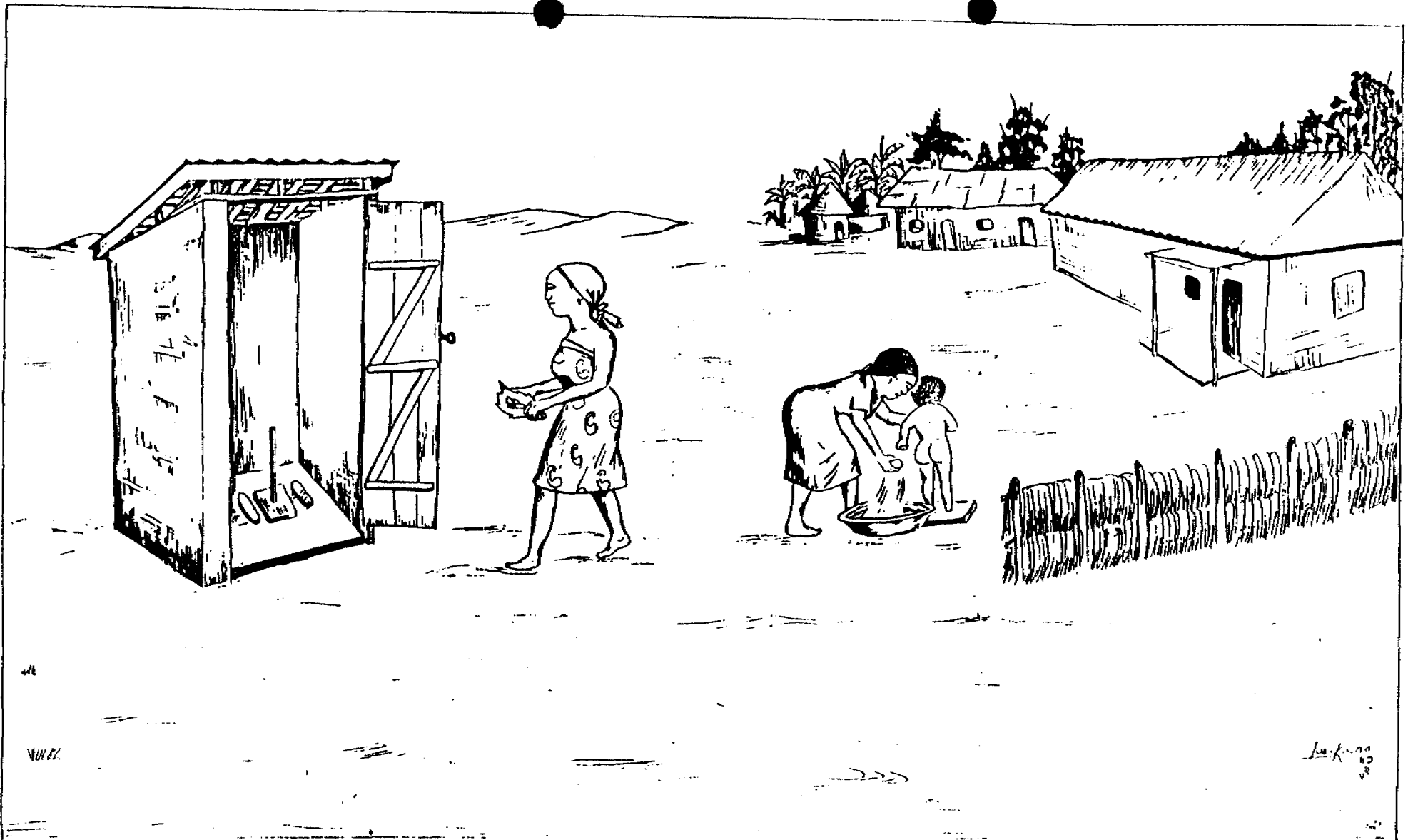
Question: What diseases can you get when you do not use water often to wash your hands, clothes and food utensils, to wash your children (especially their hands and eyes) and to wash your own face and body ?

Discussion: - Stomach diseases, when food is prepared or eaten with unwashed hands or dirty utensils
- Eye diseases, because in the dry season eyes that are not washed regularly get infected by dust and flies. When eyes are infected, bathe them frequently with salt water (as salt as tears)
- Skin diseases (scabies) and louse-borne fever, passed on by ^{tiny} ~~dudus~~ sitting on the skin and in clothes and bedclothes. In case of infection, scrub the skin with a brush and wash clothes and bedclothes frequently.

Question: What can we do to reduce the risk of these diseases ?(see picture)

Discussion: - Wash our hands more frequently, if possible with soap
- Wash the hands, face and body of our children often
- Wash our kitchen utensils every day and dry them on a frame in the sun (see picture)
- Wash our clothes and bedclothes more often and dry them in the sun
- Discuss with the village water committee and well project if we can make a washing slab and bathing facilities at the well

Conclusion: For a better health it is important that we use more water for regular washing of ourselves and our children (especially our hands and eyes), our clothes, bedclothes and kitchen utensils.



Kwa watoto wadogo wasioweza kutumia choo au shimo, tupa kinyesi chooni na isafishe mikono kwa sabuni.

A CLEAN LATRINE ALSO MEANS HEALTH

Question: When people drink water with tiny bits of excreta, they get stomach diseases (diarrhoea, cholera, typhoid, worms etc.) But there are other ways in which you can accidentally get a bit of excreta in your mouth. Can you think of an example?

Discussion:

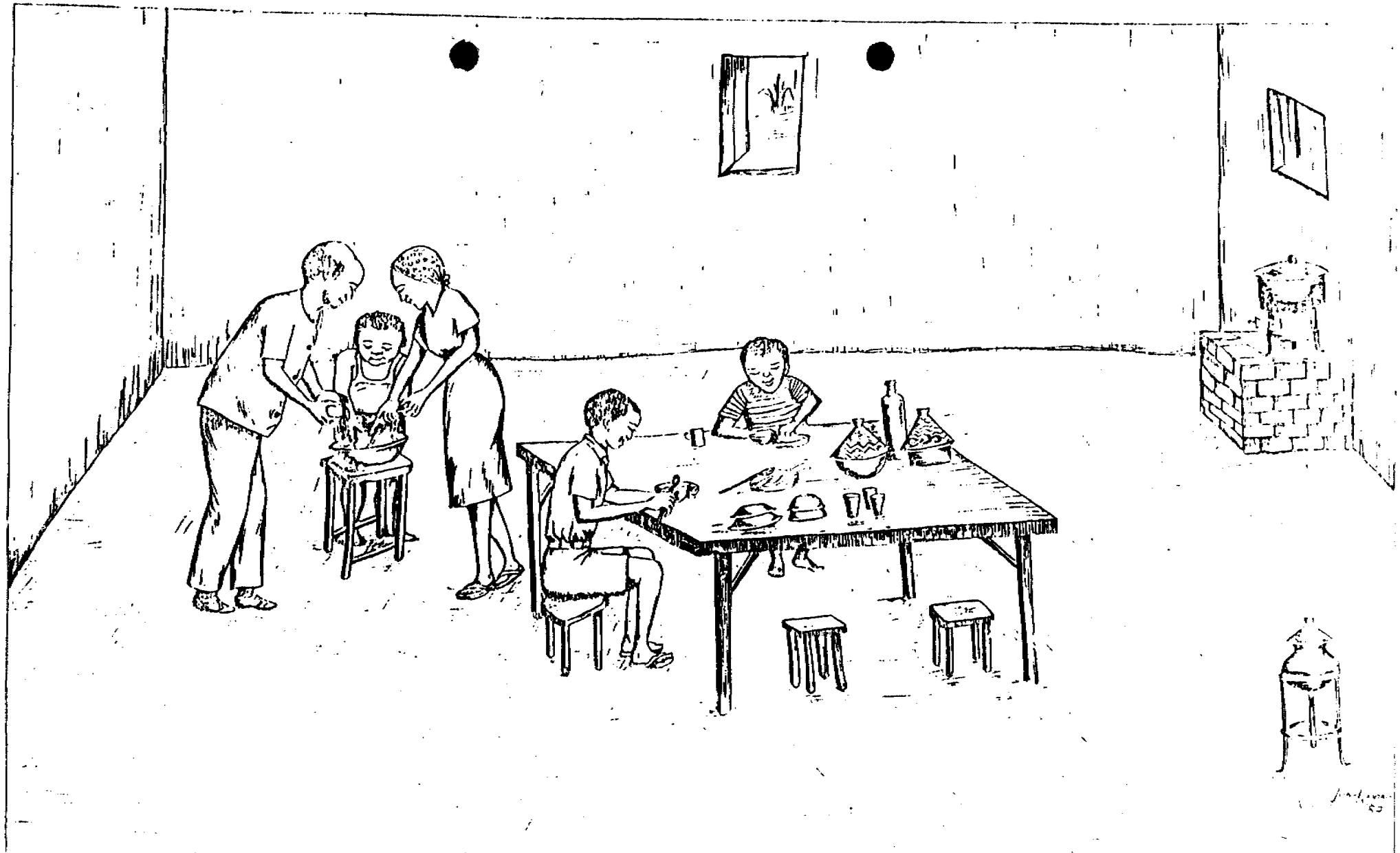
- The latrine at home or in school is dirty. Flies sit on the dirt and then sit on food
- Hands are not washed after toilet use. Food is prepared or eaten with soiled hands
- Young children crawl in a compound where stools are lying. They touch the stools and then suck their fingers
- Stools are lying uncovered in village. Flies sit on them and then on food
- People defecate under fruit trees. Fruit falls down and is picked up and eaten raw without washing.

Question: What can we do to avoid all risks of swallowing tiny bits of excreta ?

Discussion:

- Never leave stools in the open, not even children's stools
- Keep our latrines clean and use long-handled fly cover over the hole (see picture)
- Put a pot with water and if possible soap in or near our latrine for handwashing
- Teach our children to use a latrine and wash hands
- See that there are enough and clean latrines in school (with handwashing facility)
- Use a stick to make a hole and cover excreta in the field
- Make a by-law forbidding uncovered human excreta in the village, around wells, bus stop etc.

Conclusion: To keep healthy, we must not only drink safe water but also avoid swallowing tiny bits of excreta in other ways, such as through soiled hands, flies and soiled food.



Familia yetu yaweza kuingwa na kuungua, mikono michafu, maji machafu na mainzi kwenye chakula .

GOOD HANDWASHING IS IMPORTANT

Question: Why is it so important to wash hands, if possible with soap?

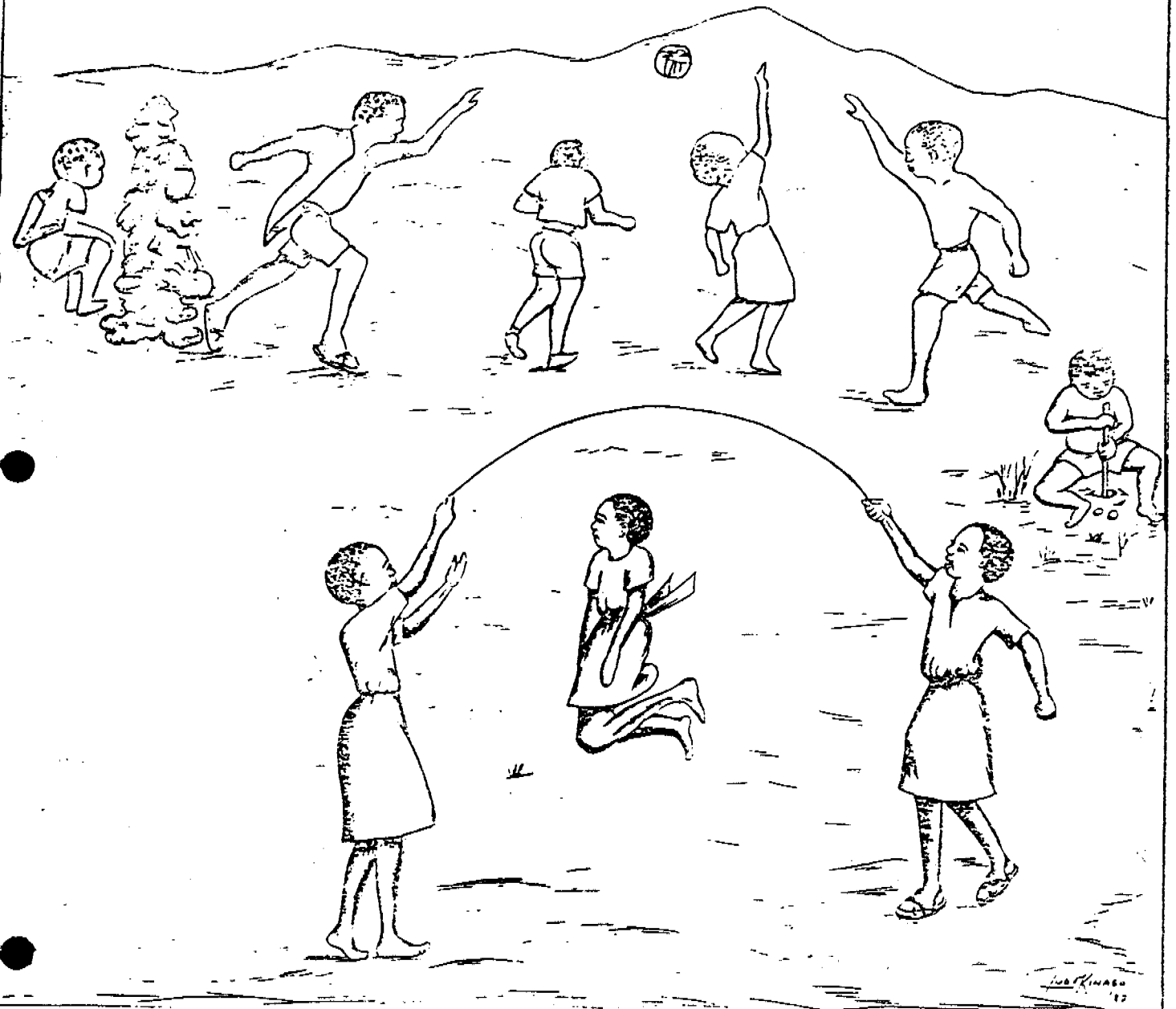
Discussion: Soiled hands can pollute water and food. When this is eaten or drunk you can get ill. Small children also often suck their fingers and thus swallow germs.

Question: When is handwashing important?

Discussion:

- When collecting drinking water
- After toilet use (children also) at home and elsewhere
- After cleansing the bottoms of babies and young children
- Before preparing food
- Before eating food

Conclusion: Frequent handwashing (with soap if possible) by adults and children is important to reduce the risk that germs and eggs of worms living in human excreta are accidentally digested.



Tusisahau kwamba watoto mara nyingi hawatamili choo. Kinyesi mara nyingine huweza kuwa na mayai ya minyoo. Mayai hayo huanguliwa ardhini na kutoa minyoo michanga.

Minyoo michanga huweza kuingia kwa watu wengine kupitia kwenye visigino vya miguu.

Minyoo haiwezi kuingia mwiini ikiwa kila mmoja anavaa kanda mbili. Pia tunaweza kuwafundisha watoto wetu kunya kwenye shimo ikiwa hakuna choo.

Discussion topic 11

HOOKWORM

Question: Do people in the village have hookworm?
How can you get this disease?

Discussion: Somebody with hookworm excretes in a shady place (e.g. behind a bush) The hookworm eggs in his stool come out and live for some time in or on the soil. Adults and children who pass that place on bare feet can get the worms in their feet, especially when the ground is wet. Once in the body, the worms start laying eggs that come out again in the stools.

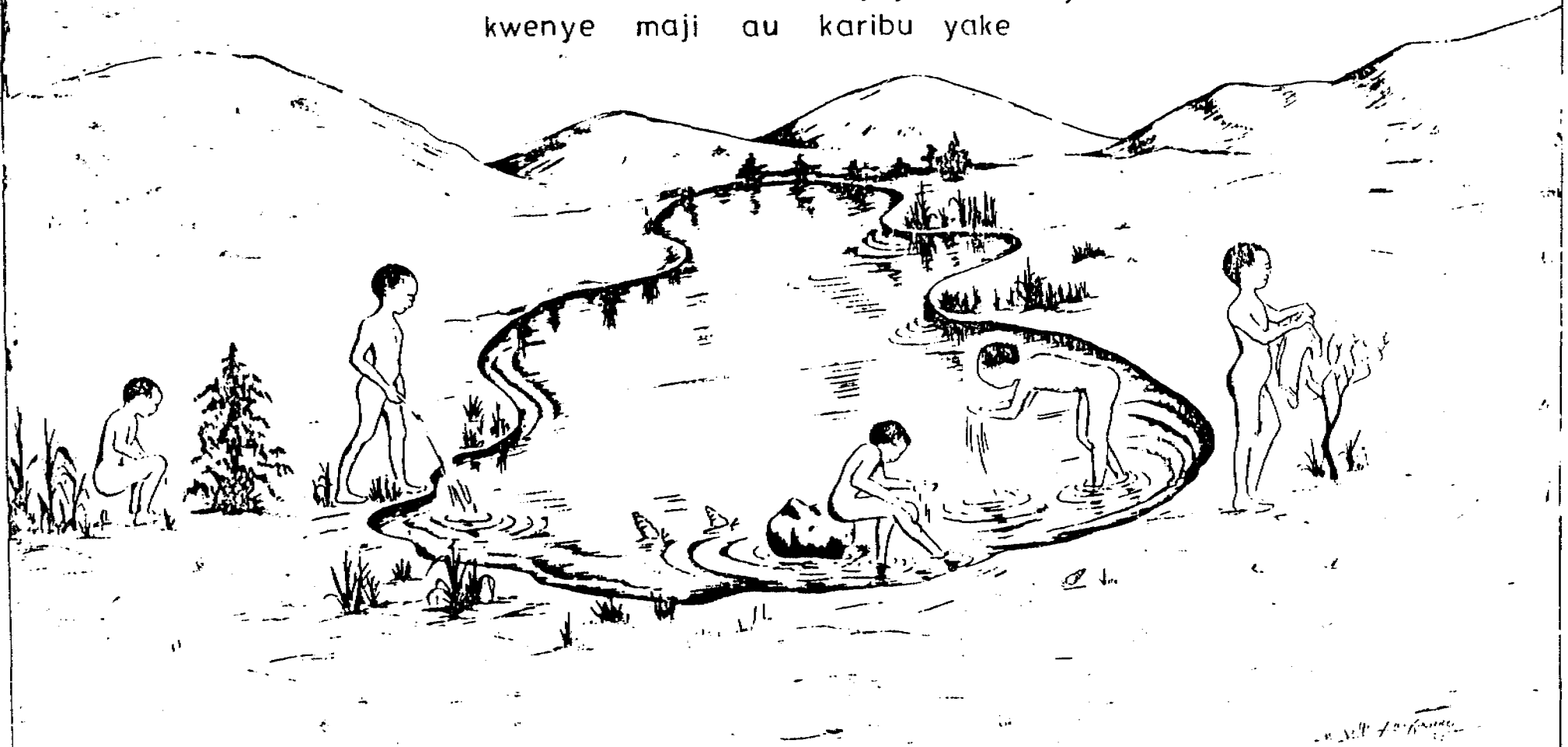
Question: What can you do to stop hookworm infections?(see picture)

Discussion:

- Have no uncovered stools lying around in the village , around the wells, at the bus stop etc.
- Use latrines when possible
- Otherwise (e.g. when working in the field) bury stools in a deep hole
- Wear sandals or shoes, esp. when ground is wet
- Get treatment when you have hookworms and be extra careful not to leave any uncovered stools

Conclusion: If everyone in the village (adults and children) uses latrines or buries their stool deeply when in the field there would be no more hookworm in the village.

Kwa uogaji usio wa hatari yeyote asikojoe au kunya
kwenye maji au karibu yake



Wakati mtu mwenye kichocho
anapokojoa au kunya kwenye
maji yaliyosimama au
karibu yake, mayai ya
minyoo wa kichocho
huingia kwenye maji.

Mayai hayo
huanguliwa
kwenye konokono.
Minyoo michanga
hutoka na
kuingia kwenye
maji.

Minyoo michanga huingia
kwa watu wengine
kupitia kwenye ngozi
wakati wanapooga au
kutembea
kwenye maji.

Discussion topic 11

BILHARZIA

Question: Does the village have a bilharzia problem?
How do people get this disease? (see picture)

Discussion: People who have bilharzia have worms in their urine or stool. When this urine or stool gets into water the eggs of the worms also get into the water. These eggs enter snails and grow into worms. The worms leave the snails and enter other people who bathe or stand in this water through their skin. These people then also get bilharzia.

Question: What can we do to stop the disease from spreading to other people?

Discussion:

- Nobody should defecate or urinate near or in open water
- If water in or near the village is known to be infested with bilharzia, people should know that it is dangerous to bathe, wash and swim in this water
- If possible, other safe places for bathing and washing should be arranged (e.g. a washing slab and bathing facility at a well, maintained by the women's group)
- People suspecting that they have bilharzia (blood in urine or stool) should go to a clinic

Conclusion: Nobody should urinate or defecate in or near water, as bilharzia is spread in that way.



Huyu mtoto amekunywa
maji machafu kutoka
mtoni au dimbwini.
Sasa anaharisha .
Mdomo wake
umekauka .
Ngozi yake
ikiinuliwa hubakia
imekunjamana .

Mama yake
anampa
dawa .

Amechemsha vikombe
sita vya maji kwa
dakika kumi,
akaweka huko
chumvi kidogo na
sukari kiganja kimoja .
Anafunika maji ya
kunywa .
Pia maji huchotwa tu
kwa kutumia kata .

HOW TO TREAT CHILD DIARRHOEA

Introduction: Even when you are careful, people can still get diarrhoea. This is especially dangerous for young children, because their body is small and can dry out quickly when they have diarrhoea and/or vomit a lot. When they dry out, their skin wrinkles like a fruit left in the sun. Their eyes become hollow. They become apathetic and may die before you can get treatment.

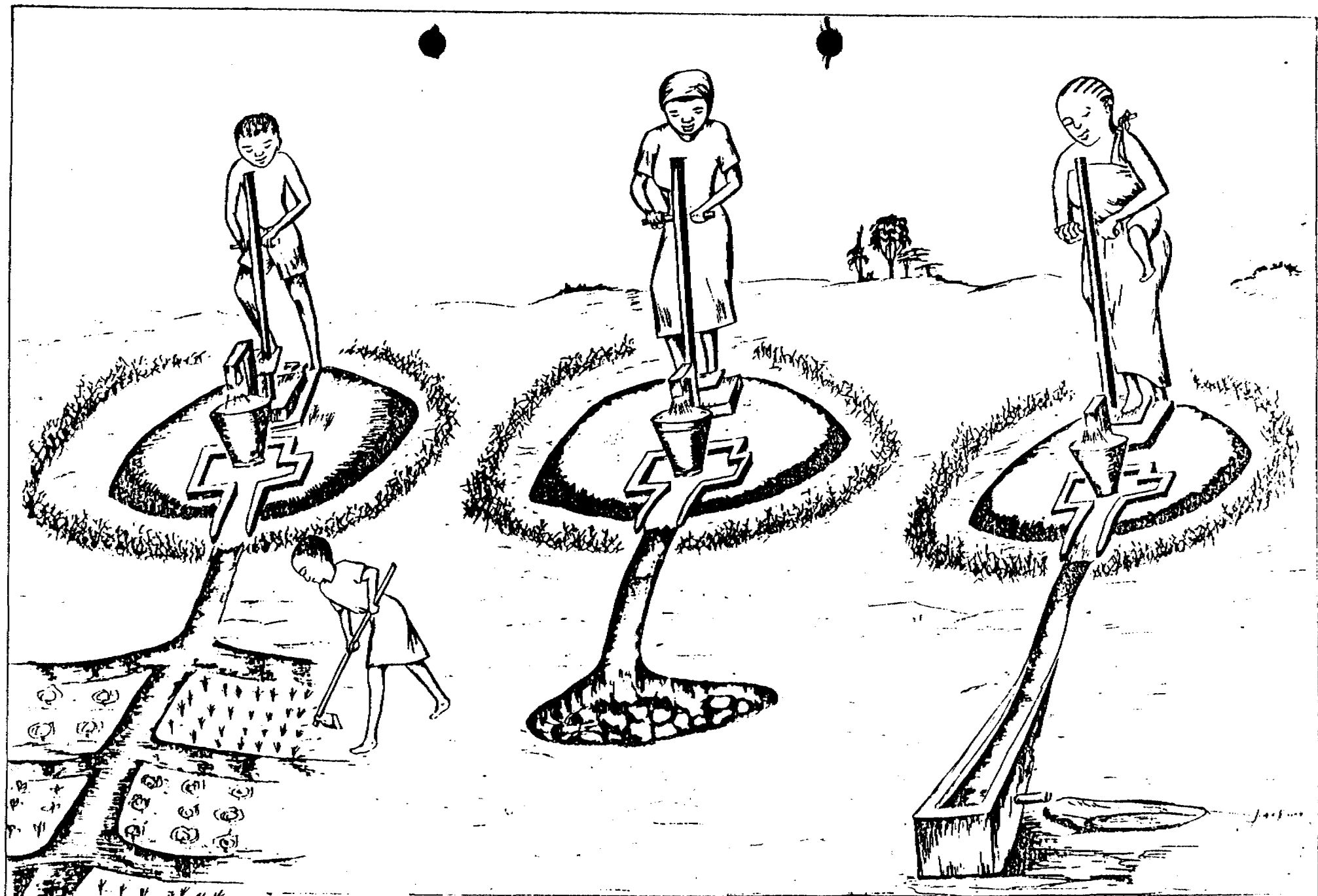
Question: What can you yourself do when the child has diarrhoea?

Answer: As soon as the diarrhoea starts,

1. put one handful of sugar (one tablespoon) and a pinch of salt (one teaspoon) in one litre¹⁾ of water
2. start giving the child the liquid
3. boil the rest of the liquid and let it cool down
4. Let the child drink as much as possible, as often as possible, but at least every hour
5. Take the child to the dispensary when its condition does not improve.

Conclusion: For a young child diarrhoea can be dangerous because the normal body water drains out quickly. The child therefore needs a lot of water, sugar and salt to replace the lost water and gain energy quickly.

1) One beerbottle can contain half a litre.



„Njia tatu za kuyatoa maji vizuri karibu na kisima

PRODUCTIVE USES OF WATER

Question: What other uses can the village make of their water supply? (see picture)

- Discussion:
- Households who have a well on their private land can use the drainage water to grow vegetables or fruits. In exchange the village government can demand that they keep the well site clean and look after the pump.
 - At wells sited on public land the school, a youthclub or women's group can organize a vegetable garden. The profits can be used to finance pump maintenance and group activities
 - Another possibility is a seedbed for fruit-, timber- and firewood trees at the end of the drain. When the young trees are mature enough, they can be planted in people's gardens or a village plantation.
 - The well water can be used to make bricks and clay tiles for a village building project

Conclusion: To benefit as much as possible from an improved water supply, the village can look into possibilities for small-scale productive uses of the water, such as dry season gardening and brick making.

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