The DANIDA Financed Rural Water Supply Programme in Iringa, Mbeya and Ruvuma Regions of Tanzania

Report prepared by a joint Evaluation Mission
from May 23th to June 20th 1987

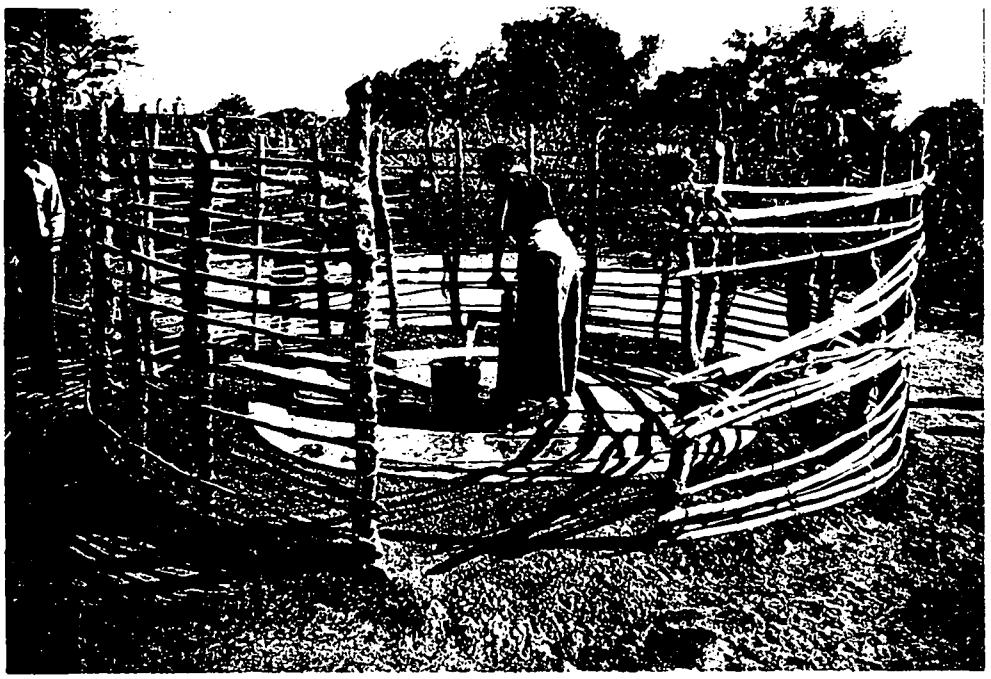

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TABLE OF CONTENTS

LIST OF TABLES

Preface

This report is the result of an Evaluation Mission carried out on request of DANIDA by a joint Evaluation Team under co-ordination of IRC (International Reference Centre for Community Water Supply and Sanitation, The Hague).
The draft evaluation report was written jointly by the team members and submitted to the DANIDA Mission at the end of the Mission in June 1987.
The draft evaluation report was distributed to the project and relevant authorities, who where asked to give their comments.
During a working meeting the draft report was discussed with DANIDA headquarters, who had invited persons involved in the project.
On the basis of these discussions and comments this final report was prepared emphasizing improved readibility and accessibility of the report.
Main conclusions and recommendations have not been changed and are supported by all members of the Evaluation Team.

Acknowledgement

This report could not have been written without the support from these involved in the project, who have provided the Mission with all necessary information, and who have contributed to the results of the Mission through their ideas and views.
The Mission would especially like to thank Mr. M. Liebst, Project Co-ordinator, Mr. F. Henriksen (Senior Technical Advisor), Mr. J. Kababi (RWE, Ruvuma), Mr. M.O. Ngalisoni (RWE, Mbeya), and Mr. S.J. Rwakatare (RWE, Iringa) who have given the Mission the opportunity to gain a full picture of the project, and who have provided all necessary logistic support.
The Mission would also like to thank Mrs. Esbjørn and Mr. Rasmussen of the DANIDA Mission for their assistance in making arrangements for discussions with various ministries in Dar es Salaam, and for interesting discussions in the beginning and at the end of the Mission.
Further, the support from Mr. J. Zilstorff (Financial Advisor), Mr. E. Olsen, Mr. M. Bright, Mr. K. Nielsen (Regional Implementation Engineers), Mr. H. Egerrup (CCKK-representative), Mr. B. Kapinga, Mrs. I. Benz, and Mr. K. Dahl (Village Participation Co-ordinators) has been much appreciated. Their active participation in discussions, particularly during field visits have much contributed to the evaluation process.
The Mission is also grateful for the support received from Mr. M. Mujwahuzi (IRA), Mr. E. Hansen, Mrs. J. Bukh (DANIDA Advisors) and Mr. G. Schultzberg (WHO). To exchange views with these resource persons has been very stimulating, and has given the Mission the opportunity to put its findings against the background of earlier experience in the project, earlier review missions and current events at the international level. Mr. Schultzberg also contributed by giving his comments on the contents of the draft report, and participated in team discussions during the final phase of the Mission.

Finally, the Mission would like to thank regional and district authorities, village authorities, water committees, and individual villagers for their hospitality and their contributions to this evaluation.

Abbreviations and Acronyms

AFYA	-	Ministry of Health
AJRM	-	Annual Joint Tanzanian/Danish Review Mission
AT	-	Appropriate Technology (for village self-improvement)
CCKK	-	A Consultancy Consortium of Carl Bro International A/S, Cowiconsult A/S and Kampsax-Kruger
CDA	-	Community Development Assistant
CCM	-	Revolutionary Party (Chama da Mapunduri)
CDO	-	Community Development Officer
CDR	-	Centre for Development Research, Copenhagen
CPW	-	Community Development Worker
DANIDA	-	Danish International Development Agency
DC	-	District Council
DHI	-	Danish Hydraulic Institute
DKK	-	Danish Kroner
DP	-	Domestic Point
DSU	-	DANIDA Steering Unit
GoD	-	Government of Denmark
GoT	-	Government of Tanzania
HP	-	Hand Pump
IE	-	Implementation Engineer
IO	-	Implementation Office
IRA	-	Institute of Resource Assessment, University of Dar-es-Salaam
MAENDELEO	-	Department of Community Development
MAJI	-	Ministry of Water
MMU	-	Mobile Maintenance Unit
O & M	-	Operation and Maintenance
PMO	-	Prime Minister's Office
PS	-	Piped Supplies
RDD	-	Regional Development Director
RSC(M)	-	Regional Steering Committee (Meeting)
RWE	-	Regional Water Engineer
RWMP	-	Regional Water Master Plan
SEC	-	Socio-Economic
SECA	-	Socio-Economic Assistant (now VPA)
SW	-	Shallow Well
TDR	-	Training for Rural Development
ToR	-	Terms of Reference
TZS	-	Tanzanian Shillings
VPA	-	Village Participation Assistant
VPC	-	Village Participation Co-ordinator
VWC	-	Village Water Committee
WMP	-	Water Master Plan

Executive Summary

This evaluation of the DANIDA-financed rural water supply programmes (further indicated as "the project") in Iringa, Mbeya and Ruvuma regions of Tanzania concerns the period 1980-1987, covering both the preparation of Water Master Plans and pilot implementation programmes during phase I (1980-1983) and the implementation of village water supply systems during phase II (1984-1988) up to date.

The evaluation was carried out by the International Reference Centre for Community Water Supply and Sanitation in collaboration with team members appointed by the Government of Tanzania.

The objectives of the evaluation mission are set out in the terms of reference. In essence the Mission was required to evaluate project objectives, implementation and achievements by reviewing all aspects of the project. The evaluation team had preparatory meetings with staff from DANIDA headquarters and involved institutions in Denmark. The project was visited from 23 May to 20 June 1987. Field visits were carried out to about 26 village water supply schemes, including both handpumps and gravity schemes.
The objectives of the two phases of the project are respectively "to provide the Government of Tanzania with firm recommendations for immediate and long-term development of water resources", and "to construct drinking water supply systems in 300 priority villages in the three regions". These priority villages had been identified during the WMP studies on the basis of criteria concerning needs and costs. Construction of water supplies already started under phase I, before priorities were established. These water supplies also serve villages which are not on the priority list.

The project also aims to develop a village-based maintenance system with maximum responsibility for the villagers as owners of the water supply systems and to apply an integrated project concept.
The evaluation team has given special attention to key issues related to this concept, including village participation, affordability and village based maintenance, health, and technology selection.

Up till June 1987, the project completed handpump and gravity supply schemes covering 118 villages. At the present rate of implementation, the total number of villages served by June 1989 will probably be 269, presenting 90% of the target number of villages.
This figure includes both high and low priority villages. Earlier review reports indicated a considerable increase in costs due to Tanzanian inflation. These reports appear to be too pessimistic. Although no final conclusion could be drawn, there are indications that not far from 300 villages could be covered within the originally estimated budget of DKK 200 million for construction.

The project was found to be efficiently managed by the DANIDA Steering Unit in Dar es Salaam. Project resources are being used judiciously, and financial control procedures have much improved. Monitoring of physical progress and costs is now getting due attention. However, at the regional level there is confusion about the lines of responsibility, in particular the relation between DSU, Implementation Offices, Village Participation Co-ordinators and Regional Water Engineers need to be better defined.

More attention could have been given to the functioning of Regional Steering Committees and collaboration at the regional level with AFYA (Health Department), MAENDELEO (Community Development Department) and district authorities. Institutional and financial constraints have hampered the integration of the project. These constraints need to be jointly considered by DANIDA and other donors.

The water supply facilities are generally of good quality and are being appreciated by the users. Design criteria are still appropriate, but monitoring of water use is needed. Certain gravity systems supply contaminated water and have a source capacity problem. Source protection through land use control and afforestation can probably solve these problems for small catchments, but in certain cases groundwater supplies would be more suitable.

The water supply systems generally function well, and villagers expressed their commitment to maintenance. Most villages as yet have no clear arrangements for the organization of maintenance, and do not pay the scheme attendants. Preliminary data on village income and maintenance costs indicate that the proportion of income which would have to be spent on operation and maintenance ranges from 2 to 6%. This preliminary finding indicates, that the constructed systems are in principle affordable to the villages.
Monitoring of operation and maintenance and functioning of systems should provide further information as a basis for technology selection, system design, and required support for village-based maintenance.

Village participation co-ordinators and their staff have adopted a practical approach to village participation. This approach should be further developed through exchange of experiences and increased collaboration between the regions. Village participation in planning and construction has contributed to efficient use of both project and village resources, and has created a sense of ownership within the villages.
Village participation in maintenance is still in an initial stage and no detailed inventory has as yet been made of options for local financing and administration. Training of villagers needs to be set up more systematically.
The project could look for practical ways to increase its efforts to involve women. Sofar, these efforts appear to be limited.

Little progress has been made in the field of health education and sanitation. It is felt that the project's efforts to develop this component have not been sufficient. Attempts to develop collaboration with AFYA need to be continued by determining mutual interests and compromises where necessary.

In spite of these set-backs, the evaluation team concludes, that the project is doing well. A third phase is recommended. During this phase emphasis should be placed on further developing and strengthening village based maintenance and cost recovery systems at the village level. Integration of village participation into the department of Community Development and development of a supplementary health and sanitation programme should receive much attention. Separate construction targets should be set for each region, and specific objectives formulated on issues like water resources management, environmental control, maintenance, utilization of improved water supplies, village hygiene, women's involvement and institutional development.

For the third phase, priority criteria need not to be changed, but priority allocation procedures should be reviewed.

Project organization needs to be more clearly defined with increased responsibilities at the regional level for technical control and programme development. DANIDA Steering Unit should concentrate on logistic support and general project management, and develop collaboration with the Water Ministry in supervising and monitoring the regional programmes.

Water resources data need to be kept up to date, and experience gained through implementation used. A more systematic methodology needs to be developed to make a proper choice between ground water and surface water, taking into account water quality. Technology selection should also be reviewed with districts and villagers in order to make them aware of costs and maintenance requirements. In view of problems with source capacity, close liaison with the Department of Forestry and the Project for Environmental Protection and Afforstation under preparation is recommended.

Village based operation and maintenance systems need to be further developed by providing follow-up training support to villages. It is recommended, that Mobile Maintenance Units focus on monitoring and training, and remain at the regional level under the regional steering committee. The role of the district should be further developed by providing limited support to district water engineers in Mbeya, Iringa and Songea Rural Districts.

Village Participation Co-ordinators should collaborate in using their experiences to revise the handbooks with particular attention to maintenance, financing and organization.
Sanitation and health education could be developed along the lines proposed by Ole Therkildsen in 1985. Generally the proposed support to the village health workers programme should adhere to national primary health care guidelines.

In view of present institutional capacities and constraints affecting the project it is recommended that DANIDA and other donors consider to reserve a small proportion of project funds for support to national institutions in order to follow-up the recommendations of the Arusha Seminar in 1986.

1. INTRODUCTION

1.1 Project History

In 1971, the Government of Tanzania decided "to provide piped water supply to the rural areas so that by 1991 all Tanzanians will have ease of access to a public domestic waterpoint". As part of this endeavour, bilateral donor agencies were asked to assist in preparing Regional Water Master Plans. DANIDA accepted to support the preparation of Water Master Plans for Mbeya, Iringa and Ruvuma regions.

A joint appraisal study was carried out by MAJI and DANIDA in October 1978 and an agreement was signed in December 1979. The technical part of the plans was compiled by CCKK, a Danish consortium of consulting engineers. The social part was done under separate contract by CDR, a Danish Research Institute. Partners for Tanzania were MAJI (Regional Water Engineer's Office) and BRALUP (now IRA), a research institute at the University of DSM.
These studies were carried out from January 1980 to May 1983 and resulted in recommendations for an implementation programme.

The co-ordination between the Engineering Consultants, the socio-economic studies and the Tanzanian authorities both at central and regional level was undertaken by the DANIDA Steering Unit established for that purpose in Dar es Salaam.

During this study phase, a pilot contruction programme was carried out. Between January 1981 and December 1983 the Regional Water Engineers, assisted by the CCKK Implementation Engineers for May 1982, constructed 11 new gravity schemes, which supplied water to 24 villages, and 113 shallow wells. The gravity schemes provided water to 49,000 persons and the shallow wells to 23,000 persons (present population).

In September 1983, a new agreement covering Phase II of the project was entered into between the Governments of Tanzania and Denmark, whereby DANIDA undertook to finance the implementation of water supply schemes in some 300 of the 633 "high priority villages" in the regions of Iringa, Mbeya and Ruvuma in accordance with the recommendations of the Water Master Plans. The agreement also covered pilot projects in health education and sanitation. Total budget was fixed at 249 million Danish Kroners (price level September 1982).

1.2 Purpose of the Evaluation

This evaluation of the DANIDA financed village water supply programme in Iringa, Mbeya and Ruvuma Regions of Tanzania concerns:

a) The Water Master Plan studies and pilot implementation programme (Phase I, 1980 - 1983)

b) Implementation programmes in the three regions (Phase II, 1984 - 1988).

The evaluation was carried out by the International Reference Centre for Community Water Supply and Sanitation (IRC) in collaboration with team members appointed by the Government of Tanzania.

The general objective of the Mission as stated in the terms of reference Annex 1) has been "to carry out an evaluation of project objectives, implementation and achievements, to related its findings to policy objectives, water sector development and general development prepectives in Tanzania, and to present its conclusions against the background of recent discussions between donors and national governments at the international level".

Considering the limited period which has passed after constructing and handing over of water supply systems to villages, the evaluation did not aim to make a full evaluation of project in terms of impact on the target group and maintenance performance, but to make a first attempt to assess project performance in terms of functioning and use of constructed water supply systems and user participation. The detailed objectives and specific subjects for evaluation are set out in the ToR (see Annex 1).

In essence these objectives and subjects were to evaluate project achievements in providing water to priority villages, project organization and institutional development, project, finance and logistics the final outcome and use of WMP studies, technology selection and system design, the project's achievements towards establishing a village based O & M system, the village participation approach, improvement of village hygiene and the place of water sector development in the Tanzanian economic policy.

1.3 Objectives of the Project

In 1987 the joint Tanzania/Danish Appraisal Mission indicated the following objective for the Water Master Plan Studies:
"The objective of the survey and the studies involved is to provide the Government of Tanzania with firm recommendations for immediate and long-term development of the water resources in the regions with particular reference to the supply of water to villages for human and stock use".

The Appraisal Mission also stated that "the most important objectives of rural water supply programmes are an improvement of health conditions, saving of time on water fetching thereby indirectly facilitating a general economic development and stimulation of the community spirit" (p. 27). It was also stated that supply of clean water does not fulfill these objectives, and that a more integrated approach is needed, including sanitary improvements, health education, strengthening of agricultural extension, etc.

The position of women and the effects of water supply improvements on their time spending was stressed as a point of concern. The mission indicated that a meaningful approach in rural water supply must be based on socio-economic and sociological research.

It can be seen from the above that integration of socio-economic and technical study components was aimed at from the beginning, and that village participation has been an important point of consideration.

It is important to note that this integrated concept for the project is only partially reflected in the Government to Government Agreement for Phase II of September 1983, and in earlier agreed minutes of August 1982. No specific objectives concerning health and sanitation, community participation or women's roles were formulated.

Thus, more emphasis was put on implementation of as high a number of village water supply schemes as possible in support of the Tanzanian policy to provide a source of clean, potable and dependable water within reasonable distance to every village.
In view of the above, the Mission has evaluated the project with reference to the main objectives of covering 300 villages in 5 years, bearing in mind the phylosophy of the project as outlined by the Appraisal Mission and recommendations of the Water Master Plan.

1.4 Methodology

The evaluation methodology aimed to involve as much as possible all involved parties in discussions including ministries, regional and district authorities, project staff, village authorities and users, in particular women. The purpose of these discussions has been to make full use of experiences gained in the project, and to stimulate project staff and others to develop their views and to give opinions about the future of the project. Therefore, the conclusions and recommendations are not merely based on the findings and analysis of the team members of the Mission about what is necessary and desirable, but also on an assessment of what seeems feasible considering the above experiences.

The evaluation was prepared from March to May 1987 through a review of project documentation covering the period 1978-1987. The information from the documentation was summarized in a briefing document covering all important aspects for evaluation. The contents of this briefing document was discussed during a two-day meeting with DANIDA staff and consultants at IRC.
These discussions provided additional information to complete the briefing document, which was then sent to the project for review.
Discussions with DANIDA indicated that additional emphasis needed to be put on evaluating the sustainability of the constructed water supply systems, health and sanitation and on environmental issues.
The evaluation itself took place in May/June 1987 with a duration of one month. During the first days discussions were held with the DANIDA Mission, national institutions, donor agencies, and the project. Team members appointed by the Tanzanian government were briefed on the results of the preparation work. These issues in the Tanzanian water sector were discussed with relevant authorities.

Next, the team visited the regions, spending about a week in each of the three regions. To cover all aspects of evaluation, the tasks were divided among the team members according three main subjects:

- System design, construction and maintenance
  (system design, functioning of systems, technology and source selection, operation and maintenance, water resources, physical progress)

- Project organization, finance and institutional development
  (project costs, project organization, training, co-ordination with regional and district authorities, project finance, transport, maintenance costs, village income, government finance, O & M organization, socio-economic subjects and village health)

- Socio-economic subjects and village health
  (socio-economic studies, integration of VPCs, role of MAENDELEO, the village participation concept as applied in the regions, participation in planning, construction and maintenance, involvement of women, water use and hygiene, health education and sanitation)

Each team member focussed on specific subjects, but much attention was given to exchanging information and views between team members. Further, for field visits the composition of sub-teams was regularly changed in order to diversify observations and strengthen the interdisciplinary character of the evaluation. Field visits were planned by the project according to an earlier request by the evaluation team to choose "good" and "bad" villages and to get a good cross section of different types of schemes. Some of the schemes were under construction. A total of about 26 schemes, both handpumps and gravity supplies.

For the engineering part, much attention was given to obtaining a full impression of intakes, reservoirs, domestic points and handpumps in different physical conditions.
For the socio-economic part meetings with villagers, both men and women, were held to obtain a systematic impression of how the village participation approach has worked out, how people benefit from the system, and how villagers organize themselves to maintain the systems. Summary case study reports were written on 13 of these villages (see Annex 9).

For the organizational, institutional and financial subjects, meetings were held with regional project staff and regional authorities in each region. Further, 7 district headquarters were visited to meet the District Commisioner, the District Development Director, the District Water Engineer and the District Co-operative Officer. During these visits information was obtained on village incomes, district budgets, O & M practices, local taxation, etc. In each region the full evaluation team held a one-day meeting to exchange information and draft tentative conclusions.
These conclusions were discussed with project staff and regional authorities. The results of the visits to the regions were discussed during a two-day evaluation team meeting. Two former team members of Annual Joint Review Missions and a resource person from WHO headquarters participated in this meeting, aimed to get additional information concerning the project's history and earlier review missions as a basis for final conclusions. Main tentative conclusions were discussed with the above resources persons, with the DANIDA Mission and with DSU. After these meetings, the draft report was prepared during the last days of the Mission and discussed with the Ministry of Water and the Ministry of Finance and Planning.

The draft report was submitted to the Danish Mission before departure. The present final evaluation report was prepared after a debriefing session at DANIDA headquarters. Comments from WHO, the DANIDA Mission in Dar es Salaam, the project and CCKK were reviewed and additions were made where necessary in order to improve the readability of the report. Main conclusions and recommendations were not changed.

2. PROJECT ACHIEVEMENTS

2.1 Present Physical Progress of the Project

In total, 118 villages have completed, and/or handed-over water supply schemes on 01.06.87.

Out of these, 78 (66%) are gravity, 39 (33%) handpump and 1 (1%) is a diesel pump water supply. 40% of the completed water supply systems were started during the first phase, but completed during the second phase. The following table shows the number of villages with completed schemes.

Table 1: Villages with completed Water Supply Systems

Started during phase	Iringa		Mbeya		Ruvuma		Total	
	1	2	1	2	1	2	1	6
Gravity	9	9	24	8	9	26	52	78
Handpump	0	16	8	5	4	21	18	39
Diesel Pump	-	-	1	-	-	-	1	1
Total per Region/Phase	9	25	33	13	13	47	71	118

Annex 3 gives more detailed tables, including the covered present population and population for 2006 as given in WMP.

Out of the 47 completed village supplies started in the first phase, only 39 (64%) were handed-over to the village. Particularly, the handing-over rate for Ruvuma was low, 31%. In one scheme in Ruvuma, major maintenance was already needed like replacement of pipes of the main line because pipes with different maximum pressure specifications had originally been lain. Some handpump schemes were completed in 1982 and 1984 and still not handed-over.

The Mission found that the project was hesitative to make the village owner of the water supply. This was probably due to a lack of established procedure for the transfer of ownership, involving several authorities like the Regional Water Engineer, the CCKK representative, and Engineers of the DSU, who had to inspect and approve the system.

During this time lag, all maintenance costs and the scheme attendants were paid by the project. Often extra DPs were connected or extra handpump supplies were drilled. It was therefore not in the interest of the village to see the handing over speeded-up.
It is also important to stress, that village ownership is not yet an official policy of the Government of Tanzania. The Arusha Seminar of March 1986 gave an opening in that direction, but its recommendations have no official status (see further Chapter 8).

In Iringa and Ruvuma the project makes serious efforts to increase the number of handpump sites in the villages included in the first phase, when the handpump schemes only partly covered the village due to poor groundwater surveys. In Mbeya, such a rehabilitation exercise was not planned and the village was accepted as being supplied if at least 25% of the population was covered.
The population (WMP figures for 1981) provided with water supplies (completed supplies) and with supplies under construction are presented in Table 4.

Table 2: Population served by the Project

Region	Completed*) Supplies	Supplies under*) Construction	All Supplies by year 2006
Iringa	61,385 (32%)	57,161 (37%)	223,764 (30%)
Mbeya	87,369 (45%)	66,212 (42%)	373,632 (50%)
Ruvuma	43,918 (23%)	32,614 (21%)	151,071 (20%)
Total	192,672 (100%)	155,987 (100%)	748,467 (100%)

*) Based on population figures for 1985.

Iringa has presently 38 villages with water supplies under construction, for Mbeya this is 35 and for Ruvuma 15.

2.2 Priority Setting

The WMP indicated the need for improvement of the village water supply by giving the village a high or low priority. The project did not always adhere to this WMP priority setting.

For all the supplies (handed-over, completed, under construction and in preparation), the priorities per region and type of supply are shown in the following table.

Table 3: High and Low Priority Villages served by the Project

Type of Supply	Iringa		Mbeya		Ruvuma		All 3 Regions	
	H	L	H	L	H	L	H	L
Gravity	31	22	73	13	23	16	127	51
Handpump	13	10	31	2	23	4	67	16
Diesel	-	-	2	-	-	-	2	-
Total	44	32	106	15	46	20	196	67
%	58%	42%	88%	12%	70%	30%	75%	25%

In the selection process in Iringa and to a lesser extent in Ruvuma, the priority setting as given in the WMP was not strictly followed. This was particularly the case for Iringa where almost half of the selected villages have a low priority according to the WMP. It was brought to the Mission's attention that a number of scheme was started during the first phase before priorities were established.

However, even during the second phase many low priority villages were served, especially in Iringa (see Table 4).

Table 4: Distribution of Village Water Supplies according to priority setting for the First and Second Phase

	Projects started in the First Phase Projects				Projects started in the Second Phase			
	Iringa	Mbeya	Ruvuma	Total	Iringa	Mbeya	Ruvuma	Total
High Priority	13 (65%)	23 (92%)	3 (23%)	39 (67%)	31 (55%)	83 (86%)	43 (81%)	157 (77%)
Low Priority	7 (35%)	2 (8%)	10 (77%)	19 (33%)	25 (45%)	13 (14%)	10 (19%)	48 (23%)
Total	20	25	13	58	56	96	53	205

(Remark: 6 supplies have no priority indication)

Arguments for deviating from the priority setting were:

- the breakdown of the supply still functioning during the WMP survey, in many cases a diesel pump, but sometimes also an old gravity scheme;
- in certain cases the main passes a village with a low priority but having a poor water supply source;
- there is often not a clear difference between a low priority and a high priority village in terms of needs;
- the information collected during the village survey in the WMP was in sufficient or not correct;
- water supply conditions and needs were found to have changed as a result of population growth, or hydrological circumstances;
- political pressure to include village(s) in the project.

The reasons were applicable for all regions but apparently Iringa and Ruvuma more weight was put on arguments in favour of deviating from the priority list.

From the above it can be seen, that established priorities were not fully respected. However, the Mission considers that villages with socalled low priority are often badly in need of an improved water supply. In this respect, it appears more appropriate to adher to priority criteria, than to a rigid priority list. Therefore, the Mission concludes, that the project's resources have generally been used in the spirit of the original priority criteria (see also Chapter 5.5).

2.3 Balance between Construction and New Systems and Rehabilitation

The majority of the supply systems (81%) are new systems, while in 19% rehabilitation of an existing system was undertaken.
The following table gives an overview of the new and rehabilitated system (including systems handed-over, completed, under construction and in preparation).

Table 5: Villages served by New and Rehabilitated Schemes

Type of Supply	Iringa		Mbeya		Ruvuma		Total	
	New	Rehab.	New	Rehab.	New	Rehab.	New	Rehab.
Gravity	33	20	73	16	28	12	134	48
Handpump	23	0	31	1	26	2	80	3
Diesel	-	-	2	-	-	-	2	-
Total	56	20	106	17	54	14	216	51
Proportion (%)	74%	26%	86%	14%	79%	21%	81%	19%

The implementation in Iringa and to a lesser extent in Ruvuma was more geared towards rehabilitation of broken down or insufficiently supplying schemes when compared with Mbeya. This fact is related to the previous deliberations on priority ranking. It was noted, that the scope of rehabilitation has often changed during implementation of schemes. New system design and extension caused considerable delay. The Mission considers, that this may have negatively affected overall physical progress.

2.4 Expected Total Physical Progress after Phase II

Total expected physical progress was established through detailed review of all villages and schemes, both at DSU and in the IOs. The overall result of this review is given in Table 6.

Table 6: Physical Progress

No. of Villages with Water Supplies as per 01.06.87		Cumulative
Handed-Over	60	60
Completed (not handedover)	58	118
Under Construction	87	205
In Preparation (and planned to be finalized before June 1989)	64	269

As shown in Annex 5, Iringa indicated to have only 4 water supply systems in preparation, as compared to Mbeya with 32.

By the end of 1988 probably most systems presently under construction will be completed, and by June 1989, about 269 villages may have been served, if approved programmes are carried out according to schedule. This would represent 90% of the target number of 300 villages, but not fully within the planned project period.

However, if only systems presently under construction were included, the total number of supplied villages would reach 205, including 141 high priority villages, 59 low priority villages and 5 villages with no WMP priority indication. As low priority villages have generally been selected on the basis of established needs, according to this figure 68% of the original target will probably be achieved within the planned period.

Table 7: Expected increased Coverage by End 1988

	All Supplies		
	New supplies	Rehab. supplies	Total number of villages served
High Priority	115 58%	26 13%	141
Low Priority	45 22%	14 7%	59
	160	40	200*)

*) 5 supplies have no priority indication

It should be noted, that it has been difficult for the Mission to distinguish between increased coverage and improved service. However, considering that many of the rehabilitated schemes were in fact not functioning, and considering that many of these existing schemes were in fact extended to serve a larger population and to meet design criteria, the Mission concludes that the project's achievements are impressive.

2.5 Construction Costs

Earlier Review Missions indicated, that an overview of costs per scheme was lacking. As it takes mostly several years for a scheme to be constructed, the new accounting system introduced in 1986 does not yet provide these costs.
Estimates made during the WMP studies have been updated as proposed by the 1986 Review Mission on economy, organization and finance, and are mainly based on assumptions concerning inflation in Tanzania.

The Mission has found that much importance is being attached to costs expressed in Tanzanian Shillings, whereas most expenditures are in Danish Krones. On the basis of information provided by the project the costs of a scheme can be divided into three elements:

Table 8: Main Construction Cost Elements

	1986 (actual) (approximate	1987 (budgetted) percentages)
- Direct Import Element*) (paid by DANIDA in Denmark) for pipes, etc.	57%	62%
- Local Element (paid by*) DANIDA) partly for fully domestic element and partly for import content of domestic element.	40%	35%
- Local Element (paid by**) Tanzanian Government)	3%	3%
	100%	100%

Overvaluation of the Tanzanian currency during the first years of the implementation phases has thus affected only the fully domestic element, or about 15 - 20% of the DANIDA financed component. This overvaluation has increased construction costs during several years.

However, the increase in costs during these first years is somehow counter-balanced by a sharp decrease of costs when expressed in Danish krones of the indirect import element after devaluation of the Tanzanian Shilling.

Cost-overrun may also be caused by change in scope of the works. It was noticed, that rehabilitation of existing village water supplies has required, in most cases, complete reconstruction of schemes. On the other hand, more handpump schemes have been constructed than originally planned.

Costs of handpump supplies are lower than those of gravity schemes. Therefore, it is difficult to know at present to what extent additional costs for rehabilitation will finally cause an overall increase of costs.

*) Source: DANIDA water project - Annual Financial Report 1986.

**) Source: Copy of letter from Project Co-ordinator DSU to the P.S. Ministry of Lands, Water, Housing and Urban Development Government of Tanzania dated 24.2.1987 in which Tanzania Government's contribution is given as TZS 5,297,647 in 1986-87 financial year. This constitutes only 3% of total Construction Cost of DANIDA projects. Tanzania Government's budget for 1987-88 is yet to be finalized by the Government and the figure of 3% contribution has been assumed on the basis of 1986 figures.

Considering that the Danish contribution to the project was originally fixed in constant value (reference date: September 1982) and considering the effects of both Tanzanian and Danish inflation over the past few years (see Annex 12), the Mission concludes, that assumed cost overrun*) can not be confirmed. There are signs that due to savings in costs, expressed in DKK, as a result of devaluation of the Tanzanian currency and increased emphasis on handpump technology, not far from 300 villages can be covered without exceeding the originally estimated amount of DKK 200 million.

*) See: "Report by A Review Mission on Economy, Organization and Administration, April 1986.

3. PROJECT ORGANIZATION AND INSTITUTIONAL DEVELOPMENT

3.1 Water Master Plans and Pilot Projects - Phase 1

The agreement between the Government of Denmark and Tanzania for the preparation of the Water Master Plans for Iringa, Mbeya and Ruvuma was signed in December 1979, and the preparation of the WMP started in 1980.

There were four major categories of activities under Phase 1 of the WMP:

- Water Resources Studies, 1980 - 1982;
- Water Supply Studies, 1980 - 1982;
- Socio-Economic Studies, 1980 - 1983;
- Construction of Pilot Projects, 1981 - 1983.

These activities were implemented concurrently by a Danish consortium of consulting engineers (CCKK) with inputs from the Danish Hydraulic Institute (DHI), Centre for Development Research (CDR), Institute of Resources Assessment (IRA) and the Regional Water Engineers. These activities were co-ordinated by the DANIDA Steering Unit, in collaboration with the Ministry of Water, Energy and Minerals*).

The CCKK Project Manager was stationed in Dar es Salaam. A regional manager was stationed in each of the three regions. They were responsible for day-to-day organization of the work, as well as administrative matters. The SEC study group had one SEC specialist in each region. Village surveys were carried out by CCKK/MAJI with inputs from SDR/IRA. The RWE was fully responsible for the implementation of the pilot schemes.

Regional Authorities were consulted on a regular basis through meetings of Regional Steering Committees under chairmanship of the Regional Planning Office on behalf of the Regional Development (RDD). Other members of this committee during the first phase were:

- The Regional Water Engineer;
- MAJI Headquarters;
- DANIDA Steering Unit;
- CCKK Project Manager;
- SEC Group Representative.

Annex 6 has been attached to demonstrate the management structure during Phase 1 as observed by the Evaluation Mission.

As four years have passed since the end of Phase 1, it is difficult to evaluate the adequacy of the organizational set-up in this phase. However, the collaboration between the socio-economic group and the RWE has been very valuable for establishing a participatory approach for implementation of village water supplies in the three regions.

*) After having been integrated in the Ministry of Lands, Water and Natural Resources, "MAJI" was established as a separate Ministry in April 1987.

3.2 Implementation Phase II

The Government to Government Agreement indicated that the executing agency for the project is the Ministry of Water through the Regional Water Engineer's offices located in the three regions of the project area. It also indicated that CCKK consultants would assist the RWE in the execution of the project works. The DSU created during the first phase would play an important managing and logistic role under the DANIDA Mission. During Phase II, AFYA and MAENDELEO were invited to attent the Regional Steering Committee meetings.

Considering the high target set for implementation, size of the project area and the involvement of various institutions, the organization needed to be flexible and evolved through the years. As a result, the Mission has found difficulty in getting a full picture of how roles and responsibilities are defined. Organization charts provided by the project were observed to cause confusion with regard to lines of responsibilities. Job descriptions for the personnel in the Implementation Office are lacking, or very general (job advertisements). However, the Mission has noticed that this apparent lack of clear organizational structure has not affected the implementation performance. There seems to be a spirit of joint responsibility for achieving the objectives of the project and the progress made is very impressive. To clarify the structure, the Mission has sought to identify responsibilities of different institutions participating in the programme (see Table 9).

3.2.1 The Ministry of Water

At the national level, the Ministry is responsible for the supervision of the works executed by the Regional Water Engineers and budgetting and reporting on the local contributions to the project. The Ministry is also required to be an active participant in the Regional Steering Committee meetings. The Mission has however found that the Ministry meets with difficulties in playing a significant role in supervising the project. Although represented in the Regional Steering Committee, of late, only lower level officials have been sent. Due to this situation, DSU is forced to take responsibilities which would normally be expected to be the Ministry's.
These responsibilities include the overall supervision of the project, and monitoring of achievements. At present, the ministry's contacts with the programme are very loose, and information on experiences in the regions and on achievements are often insufficient.

3.2.2 The DANIDA Mission

The DANIDA Mission is also involved in the project as can be seen from some of the charts provided by the project (Annex 6).

During the Water Master Plan preparation phase, DSU was reporting direct to DANIDA, Copenhagen office. This arrangement was changed in 1983, when responsibility for the monitoring of DSU was vested into the DANIDA Mission, Dar es Salaam.

In addition to this, the role of the DANIDA Mission is to participate in annual consultations and sign agreements on behalf of the Government of Denmark.

3.2.3 Joint Annual Review Missions

The main task of the review mission*) was to give an actual basis to the bilateral annual consultations. However, considering their ToR, they were also asked to supervise and to steer the project. As a result the review missions went into considerable detail into various subjects and recommendations were often given the status of management decisions.
Possibly also due to lack of clear project objectives, the JARMs have been mostly concerned with immediate necessities in the project and have paid less attention to broader policy, organization and implementation issues in an early stage, such as cost recovery, health and the issue of technology selection and service levels**). The evaluation mission therefore concludes, that review missions have played a different role from what was originally intended, but have usefully assisted the project in striking a balance between achieving quantitive targets, and developing village participation.

3.2.4 DANIDA Steering Unit (DSU)

DSU is an autonomous unit solely responsible for the management of the project. It is also responsible for financial and technical control of design and construction, technical supervision, financial management, procurement, logistics and liaison matters of the project. To ensure a smooth implementation of project works, DSU procures necessary equipment, pipes and fittings from abroad and makes local purchases for items available locally. Since DSU is the executing unit of the DANIDA Mission, it is empowered to approve and authorize all requests from the Implementation Offices from the three regions. The DANIDA Mission is represented in the RSCM by the DSU.

During the evaluation period, the Mission has observed the importance of the role of DSU in managing the project. Efficient management and logistic support by the DSU have been vital for the success of the implementation programme. However, it is the opinion of the Evaluation Mission that DSU could gradually start to delegate some of its responsibilities to the implementation offices located in the three regions. Based on observations, design and construction and general supervision of the implementation could be done by the Implementation Offices and the Ministry of Water respectively. The Evaluation Mission feels that DSU should be responsible for logistic support and general project management, but should exert less direct control on the technical issues of the regions. Monitoring of project progress and costs could in that case receive more attention, than in the past, and collaboration with the MAJI Ministry in supervising and monitoring the project could be gradually developed. In redefining responsibilities it would be preferable if responsibilities for approval of designs and construction could be more clearly distinguished from those for

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*) See Government to Government Agreement, 10 September 1983.

**) The evaluation mission found strong indications that there is a growing divergence in village development levels, with low financial capacities in some villages and higher development levels and needs (house connections) in others. These differences are at present not taken into account in choice of technology, participation procedures and service levels (see also section 5.1 and 6.6).

commissioning the schemes. At present all responsibilities are concentrated in DSU with some delegation of executive powers to the IEs. This kind of situation has created problems in many projects outside Tanzania because poorly designed or constructed schemes were commissioned to meet project targets. It could be envisaged to lay more emphasis on the RSC's responsibilities in commissioning the schemes, possibly with technical advice from DSU and the Ministry. In view of the reduction of DSU responsibilities and the recent posting of a MAJI engineer in DSU, the number of expatriate staff can be reduced.

3.2.5 Village Participation Sections

During its visit to the regions, the Mission had an opportunity to meet the three VPCs and their staff and see some of their performance. Through the use of Village Participation Attendants (VPAs), formerly called SEC Assistants, the VPCs' offices have done an impressive job in mobilizing and involving the communities. The Mission has also noted that the position of the VPCs is not clear. Different accounts were given of VPCs being directly under the DSU, being partly under DSU and partly attached to the IO, and being fully attached to the IO, and relating to the DSU only in administrative matters. This is also reflected in the repeated changes in the quarterly report procedures. This situation puts strain on the functioning of VPCs and co-ordination at the regional level. As the work of the VPC is an integral part of the regional implementation projects, and not a isolated programme on its own, the Mission recommends that the VPC's are formally attached to the Implementation Office, acting as advisors to the RWE, as well as to MAENDELEO and AFYA, when the collaboration with these departments gradually develops. Job descriptions of the VPCs should be formulated as part of the overall project document, and areas identified where the VPCs will have special responsibilities in the implementation process, e.g. number of taps/pumps, checking if villagers are served according to the agreement before schemes are handed over, etc. Close consultations with the technical staff can ensure that source capacity, investment cost and physical progress are taken into account, and project performance ensured.

The Mission has not found sufficient grounds to recommend the recruitment of a senior co-ordinator of the VPCs in DSU. It is felt that the function would unnecessarily increase the heaviness of the present organizational set-up. VPCs could develop collaboration with trained MAENDELEO staff and seconded CDOs in such a way that their own tasks change from direct implementation to guidance, monitoring, programme co-ordination and development and advice.

In this respect, there is a definite need for the VPCs to co-ordinate their activities and jointly determine the common elements and future activities in their programmes, while preserving sufficient flexibility for adaptation to local circumstances. In cases where more time and/or specific expertise is needed for a district activity, it would be envisaged to give VPCs the opportunity to request a short-term consultant. This actually complies with expressed needs within the project. In this context, the possibility could be considered to give the co-ordinating role to one of the VPCs. Specific areas for co-ordination and co-operation might include:

- Adaptation of the field manuals to actual field procedures;
- Including process observations into the manuals based on the field experiences;
- Defining the general functions of the VWCs in O & M vis-a-vis the Village Government and the users;
- Preparing regional training programmes for village based maintenance and maintenance financing;
- Setting up a monitoring system on socio-economic aspects for the mobile units.

It is further recommended that MAENDELEO and AFYA seconded staff activities are closely involved in decisions concerning major programme developments.

The Mission noticed with concern, that the number of expatriate staff tends to increase. Several Danish volunteers have been posted in the project. In the field of village participation it does not seem appropriate to overlook the possibility of exploring how their tasks could be usefully carried out by nationals, especially considering the fact, that nationals may have more relevant experience. Considering the nature of the tasks involved, the Mission recommends that the number of expatriate staff in the village participation sections be minimized and that use is made of local experience when feasible.

3.2.6 Implementation Office (IO)

The Implementation Offices are managed by CCKK expatriates. The staff in the unit consists of an average of three expatriate and a number of engineers seconded to the project by MAJI. Among others the office is responsible for:

- Planning and design of the water supply schemes;
- Material specification and quality control;
- Day-to-day Management;
- Hydrological and Hydrogeological investigations for source selection;
- Water Quality Control;
- Supervision of site engineers;
- Management of the project workshop.

The execution and manning of these tasks is done by RWEs staff seconded to the project.

The Mission has observed that good general relations exist between RWEs and Implementation Offices. However, working relations are rather loose and the role of the RWE seems to depend on personal relationships. The organization (see Annex 6) for the three regions, shows that there are considerable differences between the regions.

The role and place of the CCKK resident seems to be ill defined. There seems to be an overlap between his work and the senior technical advisor. In addition, lines of authority are not clear,

because the CCKK resident representative has the power to evaluate performance of the implementation engineers as a senior technical person in CCKK. Therefore, the I.E. may find himself forced to follow-up conflicting orders from both DSU and CCKK.

The CCKK resident representative's position in relation to the RWEs could be clearified. For instance, he could give support to economic optimalization of designs, to quality control during design and implementation phases and and to the O&M system development, as this appears to be the type of function he has taken up. More equal attention would be paid to all 3 regions as compared to the present situation that shows bias on Iringa Implementation Office.

3.2.7 The Regional Water Engineer's Office

The Government to Government Agreement states that the RWEs office is responsible for executing village water supply schemes with assistance from the CCKK consultants. In addition, the RWE is the secretary of the Regional Steering Committee (see 3.2.8). Location of the project offices in the RWEs yard facilitated easy execution of the project activities. The RWE in collaboration with the I.O. prepares the project budget and submits it to the Ministry of Water for submission to the Ministry of Finance. Equally, local funds for the project are channeled through the RWEs office. The RWEs engineers seconded to the project are carrying out impressive works at the different sites allocated to them. The project has enabled them to gain valuable practical experience in community based water supply projects. In one region, managerial skills have also been developed. Except for Ruvuma, technical manpower in the regional offices seem to be satisfactory.
Despite all these arrangements, the Evaluation Mission is of the opinion that the responsibilities of the RWEs office as envisaged in the agreement are not fully realized in the regions. The relationship between the consultant and the RWE vs DSU is confusing as mentioned earlier. This affects in particular the position of the RWE. The charts imply that the RWE's role is advisory rather than implementing (Annex 6). In the present set up the Implementation Office reports directly to DSU. In this way most of the RWEs feel they have no control on the project works, and do not have the roles as stated in the agreement.

The Mission is of the opinion that a growing delegation of managerial tasks from the DSU to the RWEs organization and clarification of the lines of responsibilities between all parties concerned might have a beneficial effect in this respect.

3.2.8 The Regional Steering Committee

The decision making body for the project is the Regional Steering Commitee. The Committee consists of the following:

- The Regional Planning Officer, Chairman;
- The Regional Water Engineer, Secretary;
- The Regional Community Development Officer;
- The Regional Health Officer;
- The MAJI Headquarters Representatives;
- CCKK Project Manager;
- DANIDA Steering Unit;
- Village Participation Co-ordinator.

The Committee meets once every three months. Its main tasks are to monitor the progress of the project, approve annual and three year rolling regional implementation plans and take decisions on project matters.

During its visits, the Evaluation Mission had an opportunity to discuss with the various members of the committee on their views with regard to the functioning of the committee. Most of the members were of the opinion that the RSC is no longer as active as it was two years back. Reasons for the situation include:

- No discussions on project policy issues;
- Lack of AFYA and MAENDELEO issues on the agenda;
- Weak representation from key institutions;
- DSU dominating discussions;
- Transport problems;
- Improper timing of meetings.

Minutes of the Regional Steering Committee meetings confirm the above.

Possibilities of reviving the spirit in the RSC suggested are:

- Inclusion of AFYA and MAENDELEO issues on the Agenda;

- In addition to the existing responsibilities, the RSC should discuss project policy issues;
- Advance information on data of the meeting by a separate letter several days before the meeting;

- MAJI should be represented by a senior person;

- Occasional general rotating meetings of the three committees to discuss and exchange ideas.

3.2.9 Conclusions on Project Organization

Concluding, it can be said that the Evaluation Mission has in no way established a case of inefficiency due to lack of a project organization structure. The project has performed remarkably well, the programme works are very impressive and the degree of competence of the project staff is high.

However, the evaluation mission is of the opinion that a formal organization chart of the project would improve the situation and clear misunderstandings and duplication of responsibilities.

The present strong position of DSU is justified in view of high construction targets, but does not allow RSCs to play a co-ordinating role. Gradual shift in emphasis from implementation targets to other project objectives, including the development of a village-based maintenance system, requires that management responsibilities are transferred to the regions. Further decrease in implementation rate would disturb the balance between the cost of personnel and other project cost, especially when the cost of DANIDA personnel would be included in the project's disbursements.
In view of this, it would not be appropriate to further develop DSU as a semi-permanent institution, even though there is a clear need at present for strong logistic and financial management support. The

Mission therefore concludes that the required number of expatriate and local staff needs to be determined on the basis of present responsibilities and tasks, with a view to future integration of the project, and gradual decrease of implementation rate to a sustainable level.

This Mission has made a first attempt to summarize the division of responsibilities (See Table 8). This first attempt may provide a basis for discussions within the project.

It is recommended that immediate efforts are made to make sure that a formal structure for the project is established soonest. A number of steps towards an improvement of the situation should include:

- interviews on organizational and personnel matters with officials participating in the project, to be done by a facilitator;
- call a meeting to discuss identified issues;
- solutions to organizational problems jointly worked out;
- preparation of a formal organization chart.

Table 9: Division of Responsibilities (present situation for intended project discussions)

Function	Institutions									
	MAJI	DANIDA MISSION	DSU	RWE	IO	VPC	AFYA	MAENDELEO	IRA	RSC
Planning:										
Regional Plans										X
Project Plans			X							
Annual Consultations	X	X								
Joint Reviews	X	X							X	
Decision Making			X					X		X
Training:										
VPAs						X				
Scheme Attendants					X					
Scheme Mechanics					X					
Budgetting:										
At the Regional level					X					X
Fund Disbursement	X		X							
Budget Spending			X	X	X					
Reporting	X		X	X	X					
Cost Monitoring			X		X					
Management:										
Overall Management	X		X							
Financial Management	X		X							
Personnel Management	X		X	X	X	X	X	X		
Day to day Management					X					
Logistics			X		X					
Technical Approvals			X							
Transport			X		X					
Stores					X					
Village Agreements				X		X				
Project Execution:										
Surveys				X	X					
Designs	X			X	X					
Construction				X	X					
Site Supervision					X					
Handing Over			X			X				
Support O & M					X					
Procurement:										
Fittings, Pipes etc			X	X						
Spareparts			X	X						
Stationery			X		X					

3.3 Training

3.3.1 Water Master Plan - Phase 1

Training was a very important planned programme during the WMP study. A number of counterpart staff were trained on the job and abroad. The positive impact of this arrangement is now felt in the regions. Most of the counterparts are performing their tasks efficiently. The training was mainly of engineers, hydrologists, hydrogeologists, survevors and SEC assistants. At the end of the Water Master Plan Phase, most of these were absorbed by the Implementation Office in Phase II.

3.3.2 Implementation Phase

The project has no programme for the training of the staff of the project. However, the Evaluation Mission has been informed of on the job training taking place.

The Mission observed that the Implementation Office in Mbeya region has put great effort in improving management skills of project engineers. This has greatly contributed to efficient organization in this region. The mechanical engineers are preparing the training of the mechanisms and scheme attendants. The VPCs, in collaboration with MAENDELEO, are doing the training of the 43 SEC assistants in their respective regions and one region has started a course for all Village Committee members in the region (see also Chapter 8).

A short term consultancy was carried out on training needs and possibilities in Tanzanian Institutions in 1986. Its recommendations have not been implemented as they were not considered practical by the project. Presently, each mechanical engineer plans to carry out his own training programme. The Mission feels that more use could be made of the recommendations of the consultancy report. Further, it would be preferable if the project itself could define training needs and objectives more clearly before embarking on new training programmes.

3.4 Co-ordination with Tanzanian Institutions

Three major institutions are participating in the project. Their functions are:

- MAJI designs, constructions and maintenance of water schemes;
- AFYA carries out a bit of health education and intends to promote pit latrines through the seconded officer;
- MAENDELEO does the training of the Village Participation Assistants.

MAJI is the only department which is in the project as such. The role of the other departments as defined in the WMP (Vol. 13) is to work in a service function on the projects by performing the specific responsibilities falling under their departments.

Non-existence of a strong co-ordinating mechanism both at the national and the project level has attributed to a lack of co-operation and co-ordination between the three sectors. In all three regions, one health officer has now been seconded to the project.
On request of the project, MAENDELEO has also seconded three Community Development Officers to the project, one in each region.

MAENDELEO also has field staff in a number of wards where the project is working. The VPCs involve this staff wherever possible. However, no general arrangement has as yet been worked out and formally MAENDELEO remains outside the project.

The Mission concludes that efforts to establish collaboration with other departments have lacked success but remain important for the future. Therefore, it is recommended, that more priority is given to the establishment of practical co-operation and joint preparation of activities.

3.5 Integration of VPA's into the Tanzanian Structure

It was observed, that the project tends to continue to develop its capacities in the field of village participation. Considering the present constraints within AFYA and MAENDELEO, there seems to be no alternative than to continue with the existing arrangements through which relevant people are seconded to the project and village participation assistants employed by the project. However, it was noticed that sofar little thought is given to a future division of roles between existing departments through an increase of their respective capacities.

The Mission is of the opinion that a gradual process of phasing out the VPAs should be worked out if all the existing institutions are to perform their respective roles effectively.

In this respect, special attention was also devoted to the integration of the VPCs and the 43 VPAs employed by the project. The need to employ VPAs was apparent during the WMP Phase I when the Community Development Department was not fully staffed. Since then the Tanzanian Government has made considerable efforts in improving the capacities. Such a move has resulted in the employment of CDAs and CDOs at the Ward and District levels respectively (Table 10).

Table 10: Number of Community Development Workers

	No. of CD Workers 1983	No. of CD Workers 1987
Iringa	51	102
Mbeay	63	87
Ruvuma	41	data not collected

Given the above situation the Mission is putting forward the following recommendations:

- VPAs to continue in project for close co-operation with villagers during planning and construction, as the work is very time and labour intensive;
- CDAs to be involved wherever present;
- Through good planning and co-ordination at district level ensure that CDAs do not have activities in several different sectors in their ward at the same time;
- VPAs to be gradually absorbed into MAENDELEO through training for the recognized MAENDELEO Certificates;
- Problem of transfer to other Regions after training to be overcome by bonded training (DANIDA supporting training costs);
- Problem of insufficient qualifications could be solved through so-called intermediary courses;
- The department of Community Development be involved in the recruitment of additional VPAs;
- CDAs to be involved not only in the construction phase but also in supporting village management and financing of maintenance, including the development of the training and backstopping programme;
- DANIDA to make specific training funds available, to familiarize the CDAs in the project with present experience of the project and prepare them for their tasks during the consolidation phase.

3.6 Institutional and Financial Constraints affecting the Project

3.6.1 Institutional Capacities at National Level

A co-ordinated approach to implementation of rural water supply programmes, operation and maintenance, and community participation was stressed to be important by the participants of the Arusha Seminar (1986). The role of the MAJI Ministry in establishing such an approach is essential. However, this Ministry is having major constraints in developing its role, because of:

- Lack of funds;
- Lack of transport (only one car is available for MAJI headquarters);
- Insufficience of manpower resources allocated to MAJI after it was created as a separate Ministry;
- Different degrees of control over rural water programmes financed by different donors.

It is difficult for the Ministry to overcome these constraints as the organization is still being established after the creation of the Ministry. However, feed-back mechanisms allowing project experience to be used to further develop sector policies, and to

define the responsibilities at the various levels are needed. Lack of clear policy guidelines, and definition of responsibilities hamper the development of institutional capacities allowing the integration of the project in the existing institutional structure. It is therefore recommended, that efforts by MAJI to improve co-ordination between regional programmes, and to establish more direct lines of communication with regional programmes are supported. Emphasis should be placed on using experiences in projects to develop policy guidelines, and monitoring and evaluation systems which allow the Ministry to stay informed about the programmes carried out, and to make realistic plans.

Better communication and monitoring of programmes would allow to identify common elements of the various donor supported water programmes in order to formulate and operationalize national policy guidelines concerning community participation, and village based maintenance.
In view of the above constraints, DANIDA and other donors could jointly consider to reserve a small percentage of their project budgets to support national level institutions so as to follow-up the 26 recommendations of the 1986 Arusha Seminar.

3.6.2 Community Participation

Although the Act of Local Government outlines responsibilities of different bodies, there are sofar considerable differences as in how these responsibilities are understood. A cabinet paper is being prepared to better define community participation. As roles and responsibilities appear to evolve in the regions (see also Chapter 8), these issues could be clearified and policy statements expressed in operational terms on the basis of experiences in regional programmes. Financial and technical assistance at the national level is recommended in this respect.

3.6.3 Sanitation in Relation with Water Supply Programmes

During the 1986 Arusha Seminar the issue of integrating sanitation in water supply programmes was discussed, and opinions were divided. No progress appears to have been made since. As no clear policy exists on this issue, successful collaboration between the project and AFYA may largely depend on motivated individuals. Therefore, a sanitation and health education component should be developed carefully (see further Chapter 9), on the basis of established mutual interests on both the side of the project and of the AFYA department.

3.6.4 Cost Recovery and long-term Sustainability

It was found that very limited and unsystematical information is available on maintenance costs and villager's incomes. Consequently, there is no firm basis for comparison between villager's incomes and total costs to be recovered, and affordability considerations have to be based on very approximate figures (see Chapter 7), or small samples.

Even if the results of the affordability analysis are positive, it needs to be realized that such analysis is necessarily in financial terms and of short term nature.
For the longer term, it is important to take into account the true cost to the economy. Like in all other developing economies there is distortions in market prices of goods and services.

The true economic costs of O & M of water supply installations which consist of those of both labour and material (imported and domestic) will be different from the financial costs based on market prices of inputs.
If such true economic cost is to be charged to the users in future the percentage of villager's income meant for water supply may rise, and it may be more difficult for both the villagers and the government to sustain the future O & M or to expand the system beyond 2006 (or earlier in some villagers if population growth exceeds the figures assumed in the Water Master Plan).

From the national budget and "Economic Recovery Programme", it appears that the shortage of foreign exchange will continue to be accute in future.
Import of spare parts will put a further strain on the foreign exchange situation. It may therefore be necessary to assist the Tanzanian Government until Tanzania is able to produce the spare parts domestically with least use of import, or until the balance of trade situation in Tanzania becomes favourable.

It is recommended, that this issue be discussed between the donors in order to collaborate in ensuring that the supply of spare parts to villages is not hampered by lack of foreign exchange. This is an important condition for a successful village based maintenance system.

4. PROJECT FINANCE AND LOGISTICS

4.1 Project Budgets and Disbursements

The budget for the first stage was officially fixed at TZS 74 million.

Total disbursements have been considerably higher (see Table 16), mainly because scheme construction continued during the so called interim phase (1983).

Table 11: Phase I Disbursements*) compared with original Budget

Budget Lines	Original Budget (DKK x 1000)	Disbursements (X 1000)
1. Construction Costs	37,000	56,610
2. Staff Housing		6,529
3. Consultancy, including Socio-Economic	32,000	38,655
4. DSU & Evaluation	1,000	1,972
5. Feasibility Study		94
6. Other Expenses	4,000	3,733
TOTAL	74,000	107,593

The budget indicated in the Government to Government Agreement for Phase II is DKK 249 million. Estimated 1987 budget and actual expenditures for preceeding years are presnt in Table 17

Table 12: Project Budget and Expenditures (Phase II)

	PHASE 2 (DKK X 1000)					
Grant Component	1984	1985	1986	Total 84-86	Project Grant	Budget 1987
Construction Costs	24,232	48,987	35,343	108,562	200,000	38,346
Operation & Maint.	-	-	625	625	10,000	660
CCKK Consultancy	5,534	7,364	8,970	21,868	15,000	6,760
Health & Sanitation	-	-	71	71	8,000	600
Rsearch	-	-	84	84	1,000	48
DSU Administration	887	801	724	2,411	7,000	586
EDP MAJI	-	31	1,337	1,367	2,000	1,000
Contingencies	0	0	0	0	6,000	2,000
Exchange	636	150	2,080	2,867	0	0
Total	31,289	57,334	49,234	137,856	249,000	50,000

*) Source - DSU

From this table it can be seen that during the first three years of Phase II about DKK 138 million have been spent out of the total project funds of DKK 249 million, leaving DKK 111 million for the remaining two years. At the present implementation rate the project funds will almost have been spent by the end of the project period. However, construction activities as planned in the present three years rolling plan will continue until June 1989.

As indicated in Chapter 2, it is not possible at present to draw final conclusions concerning cost overruns, but according to information obtained from implementation engineers in Mbeya and Iringa Regions the present implementation rate can be sustained. The total number of villages covered in the three regions would thus be about 269 by June 1989 within the budget of DKK 249 million. This, however, will depend largely on the number of villages which will finally be supplied with handpumps because construction costs for handpump schemes are relatively low.

4.2 Monitoring of Physical Progress and Costs

The Mission has found that much progress has been made in developing an accounting procedure, which allows costs to be monitored per scheme. The following detailed statements are being made by the project:

- Cost Information Sheets for each Scheme
  These sheets are prepared by the Implementation Office.

- Records of Expenditure per Scheme
  Four forms are being used concerning respectively transport, salary costs of VPA's, RWE expenditure and issues from regional stores.

  These forms are being completed by the DSU accounts office based on monthly records sent by the Implementation engineer.

- Monthly Financial Reports
  These include a summary of expenditures for all regions, and accumulated expenditures for each scheme. The monthly financial reports are prepared by the DSU account office and sent to the Implementation Engineer.

This financial reporting procedure has been found highly useful for budget control purposes by the Implementation office.

However, the Mission has found that it is so far difficult to correlate accumulated expenditures with physical progress in the implementation of schemes. A notable exception to this was found in Mbeya region, where physical progress and "financial progress" for individual schemes are visualized on special charts prepared by the project engineers.

Even in this case, cost control is still difficult for the following reasons:

. Basic estimates (from WMP) were all in TZS. As the exchange rate between DKK and TZS has been changed several times during the past 3 years, estimated costs in TZS change frequently. This makes the comparison of cost and physical progress very difficult.

- Expenditures before 1.1.1986 have not been recorded scheme-wise. Thus, indicated actual costs are only estimates and not real costs.

It was observed that the project has started to monitor costs in DKK. The Mission supports this development as expenses made for construction are mainly in DKK, or in local currency converted from DKK.

Considering the different steps taken by the project since the new accounting system was introduced, the Mission concludes that the financial management of the project has much improved.

The Mission recommends that cost estimates could be in DKK and used for cost control. Changes in exchange rate would effect actual expenditures much less, and monitoring of "physical progress" as compared with "financial progress" would be more effective.

4.3 Proportion of Costs of Different Elements

The proportion of cost elements was derived from the 1986 annual budget:

Table 13: Cost Elements of the 1986 Annual Budget

	Costs**) (Million DKK)	Proportion of Total Cost (%)
Total Scheme Costs	28.8	57.6
Total Overhead *)	8.0	16.0
Total Construction Expenses	36.8	73.6
Carried-Over from 1986	1.5	3.0
	38.3	76.6
Operation & Maintenance	0.7	1.4
Health & Sanitation	0.6	1.2
Research	0.1	0.2
Admin. DSU	0.6	1.2
CCKK Consultancy	6.7	13.4
EDP - MAJI	1.0	2.0
Contingencies	2.0	4.0
	50.0	100%

It is important to note that salary costs of expatriate staff under DANIDA contract are not included. Consequently, these figures do not give a full picture of the cost

*) Including Stores, Implementation & Administration which include VPCs office, workshop and its transport, Yard expenses, HP surveys, new buildings, Pilot schemes, etc.)

**) Rounded off figures.

The Mission has found that cost elements for village participation have already been included in construction costs.
Therefore these costs were established on the basis of indicative figures collected in the regions (VPCs' salary costs, allowances, etc. not included).

Table 14: Cost of the VPCS's Establishment

	Mbeya	Iringa	Ruvuma
VPA Staff	462,600	569,472	400,000
Transport	1,080,000	1,080,000	864,000
Seminars, Training, etc.	1,000,000	200,000	200,000
Total (TZS)-Approx.	2,542,000	1,849,472	1,464,000

These amounts indicate that the cost of village participation establishment is not adding much to the construction costs. For instance, for Iringa region, the construction budget for 1986 - 1987 is about TZS 58 million. The cost of the village participation component represents only 3.15% of the total.

The Mission concludes, that project funds are essentially used for implementation of village water supply schemes, and that cost for overhead and transport are being kept within reasonable limits.

4.4 Resource Allocated for O & M and for Health and Sanitation

Important human and financial resources have been committed to the project. These have been allocated to different components of the project (i.e. Construction, Operation and Maintenance, Consultancy, Health and Sanitation, Research, DSU Administration and Contingencies) and among the three regions (Ruvuma, Mbeya and Iringa). Although overall financial resources have been judiciously allocated, few have been used for O & M and for Health and Sanitation. In particular, in the field of health and sanitation there has been a salient shortage of human resources. This situation is reflected by the absence of clear implementation progress in this area in all three regions. Efforts to establish a sustainable operation and maintenance system are recent. Emphasis sofar been on construction and rehabilitation aspects of the project.

Recently, efforts have been started to redress this situation. Steps have been taken to get more collaboration from district councils and AFYA people through the VHW programme; more VPCs have been recruited to strengthen the capacity in Ruvuma and mobile operation and maintenance units have been created in all regions.

Although these are positive developments, the Mission still feels that there is a lot to be done in the areas of Operation and Maintenance and Health and Sanitation components of the project.

As for the allocation of manpower resources on a regio by regio basis, Ruvuma is least equipped in terms of human resources. Both Mbeya and Iringa have higher numbers of qualified engineers and SEC assistants than Ruvuma. This situation is reflected in the slower pace of implementation experienced in Ruvuma Region.

4.5 Tanzania's Contribution to Project Funds

It is important to note that Tanzania's contribution to the project has not been clearly indicated in the Government to Government Agreement. Thus by this agreement, Tanzania is not obliged to contribute any money for project funding. This not withstanding, the Government of Tanzania has been contributing some money annually to meet part of the local costs of the project (see Table 20). Although the amounts have been always small compared to DANIDA's annual contributions, this still shows that there is also serious commitment to the project by the host country; especially when one considers the turbulant economic climate Tanzania has been facing over the period of project implementation.

It is also important to note that no information was collected on the total cost of Tanzania's contribution in terms of manpower and facilities.

Table 15: Tanzania's and DANIDA's Annual Financial Contribution to the Project in TZS and DKK (1984 - 1987) - (X 1000)

1984/85		1985/86		1986/87	
L	F	L	F	L	F
D.A.	53,817	1,000	208,122	5,300	180,801
	DKK (31,289)		DKK (57,334)		DKK (49,234)

Source: DSU - Dar es Salaam

Note:
L = Tanzania's Contribution
F = DANIDA's Contribution
( ) = Contribution by DANIDA in terms of DKK

Exchange rate used is 1 : 1.72 for 1984/85 and 1 : 3.63 for 1985/86 and 1986/87.

In spite of this, disbursement of funds from the Treasury have sometimes been slow, causing some problems in project work. In some instances, DANIDA has been forced to release funds to bridge the gap created by late disbursement of funds from the Treasury. In view of this situation, the Mission feels that it would be important for the Government of Tanzania to consider how the process of releasing funds can be improved.

4.6 Transport Planning

Efficient transport arrangements have contributed much to the smooth running of implementation programmes.

The Mission has made a special effort in evaluating this aspect by detailed discussions with project staff responsible for transport planning. The Mission has observed that in the regions vehicles are generally efficiently used. The allocation of vehicles is done in different ways:

- In Mbeya region a monthly transport plan is drawn on the basis of planned activities. Allocation of vehicles is plotted on a chart. Vehicles are allocated according to requirements established during a monthly staff meeting where project activities are discussed;

- In Iringa region vehicles are allocated to sections and schemes under construction. This arrangement was chosen because vehicles would be easier to control.
  Allocation of vehicles in Iringa is done on a weekly basis.

- In Ruvuma, vehicles are allocated to schemes and to sections;

- The DSU has no specific transport planning, but vehicles are allocated to specific activities. For instance, trucks are used to transport materials to the regions. Small vehicles are used flexibly. DSU has some extra transport capacity to allow for sudden transport needs, for instance after loss of vehicles through accidents or major breakdowns.

It was noticed, that vehicles in Ruvuma region run for about half the mileage, compared with other regions. The Mission has not been able to find a good explanation for this, but it was indicated by project staff, that mileage is not always a good indicator, as the time spent on bad roads in Ruvuma is quite high, while distances covered may be sometimes less.

Good records are being kept on mileage of vehicles, and kilometre costs of each vehicle. This allowed the Mission to appreciate the considerably higher running costs of Landrovers, when compared with Nissan Patrols.

The Mission noticed, that records on vehicle use are not kept, and that is therefore difficult to conclude on the actual required number of vehicles.

The Mission found that control on vehicles is satisfactory. In the regions a limit is set on the number of kilometres driver per car. In case of excessive use of cars (over 3000 km per month), the reasons is for increased use is discussed with the staff concerned.

The Mission concludes that transport arrangement are adequate. It is recommended to give more attention to recording vehicle use on a daily and weekly basis in order to have explicit information on transport requirements and on down time of vehicles as a basis for future planning of transport.

4.7 Procurement

The present procurement procedures were found adequate. However, it was observed that procurement could be quicker and less cumbersome if more direct lines could be established with suppliers. Further, it was noticed that approval is required for relatively small purchase orders.

The Mission is of the opinion, that DANIDA should consider how administrative procedures could be simplified, for instance by establishing a direct communication between the project and DANIDA purchase department.

5. WATER MASTER PLAN STUDIES

5.1 Water Resources Studies in the Water Master Plans

The Water Master Plans contain good water resoures assessment studies based upon processing of available hydrological and hydrogeological data, supplemented to a limited extent by field work. The studies provide:

a) a clear regional picture of the water resources conditions;
b) practical tools that give guidance towards proper source selection for water schemes; these tools concentrate on:
   - 10-years minimum flow estimates (for gravity intakes from streams);
   - a "groundwater potential" classification (to predict conditions for shallow and deep wells).

The 10-year minimum flow is presented as a specific discharge ($1/s/km^2$) and was obtained by regionalization of the statistics of the existing stream flow records, supplemented by estimates derived from "spot measurements" of low flows.

Three major sources of uncertainty affect the pattern obtained:

a) unknown, but possibly limited quality of the historic flow records, in particular in the statistically extreme parts;

b) sensitivity of procedure to determine recession curve constants for measuring errors and small stream flow variations: two spot measurements only per season is a bare minimum;

c) procedure to "scale down" the observed annual minimum flow to a 10-year minimum flow is questionable as long as hydrological similarity between compared catchment is not proven.

These sources of error represent a design risk for gravity systems in cases where the design demand equals approximately the estimated 10-year minimum flow. In such cases extended gauging and a more detailed analysis are required to reduce this risk.

The use of low flow gaugings, however, is a good approach to facilitate regionalization.

A parametric hydrological model (NAM-model) was used in three so-called index areas to analyse its potential for application in the regions considered. Possible objectives for application are:

a) obtain better understanding of the catchment's hydrologic behaviour;
b) generating flow records for ungauged catchments;
c) gap-filling and record extension for gauged catchments.

It should be realized that the scope of the Water Master Plans was broader than that of the subsequent implementation phase. In the context of the latter phase - restricted to village water supply - the first objective can be reached more easily by low flow

gauging analysis; the second one would require much additional research on the parameter-values to be used; the third one is worthwhile only if the record generated is related to a potential intake site. Given the approach chosen for the implementation phase, the NAM model will not generate much practical benefit.

Extensive recommendations are given to the Water Master Plans for improvement and extension of the hydrological observation networks. However, the argumentation presented is not in terms of expected benefits but rather on the basis of WHO guidelines, thus not convincing. The recommendations seem furthermore incompatible with the available means within MAJI.

It would have been better if recommendations had been made for a selected, small number of stations of primary importance, both to support low flow investigations and to provide reliable information useful for other implementation that were within the Master Planning's scope.

Water balance studies carried out focus the attention on possible water allocation problems during extremely dry periods. Such problems are the result of steadily increasing competitive demands for surface water (domestic supplies, irrigation, etc.) and are likely to present themselves in zones of Southern Mbeya and Iringa regions and around Iringa town. Critical review of existing water rights is recommended by the Water Master Plans.

A clear, practical approach has been developed for prediction of the potential for groundwater abstraction. The approach is based on a geomorphological differentiation and the classification obtained and supported by data from wells. The methodology and resulting maps are an important help to the regional hydrogeologists to recognize patterns and to use this information for siting and construction of wells.

5.2 Water Resources Investigations during the Implementation Phase

In line with focussing after the Water Master Planning on a narrower field, village water supply, also the investigations regarding water narrowed in scope. They comprise mainly:

- low flow estimation activities (in relation to gravity schemes on schedule);
- a drilling campaign of deep wells;
- resistivity survey for well siting purposes.

The low flow gaugings, geared with the 3-year rolling plans for implementation, are extremely useful. On a short-term and at relatively low cost they seem the best way to obtain a picture of low flow conditions to be expected. Continuation of the low gauging programmes is strongly recommended, including the continued monitoring of sites where schemes have already been completed - in order to receive feed-back.

Some critical remarks on the methodology used to scale down the spot measurements to a 10-year minimum flow have been given above. The regional hydrologists are eager to improve the methodology and are strongly encouraged to do so. Correlating spot measurements with records of a station with similar recession constant (instead of correlating with just a nearby station) was suggested by these hydrologists and seems a good step forward in this respect.

The drilling campaign, carried out in 1985/86 by a contractor, had a dual purpose:

- to confirm the validity of the hydrogeological classification during the Water Master Plan Phase (which is a sound procedure);

- to supply groundwater at locations where hand-drilled wells can not be constructed.

The outcome of this programme of approx. 20 wells are said to confirm largely to the hydrogeological concepts developed, but results are not yet accessible because the data are in Copenhagen for processing and interpretation. Unfortunately, the opportunity to involve MAJI professionals in the analysis does not materialize in this way.

Resistivity surveys are carried out for well siting purposes by the regional hydrogeological sections. Most of the wells (75%?) however are sited by trial and error, within the general framework presented in the Water Master Plans. Practical benefits (in terms of important saving on siting work) are likely to be obtained only in special cases. Such cases may be present at sites where unconsolidated deposits are found) e.g. Usengo Flats and Karroo Formation) or where groundwater salinity might occur.

5.3 Utilization of the available Water Resources Information

The village water enquiry forms included in the Water Master Plans contain for each village a suggested source of water, and some characteristics of this source. This information represents the "best estimates" at that time, based upon the outcomes of the water resources studies. The forms, in turn are used as an input to the 3-year rolling plans. In this way, the water resources information obtained during the Master Planning Phase is mobilized quite efficiently for implementation purposes.

This information can be amended by the regional hydrologist and hydrogeologists, on the basis of low flow gaugings, resistivity surveys, outcomes of the test drilling programme and feed-back from implemented schemes. They only can do so, if they dispose of a good knowledge of the prevailing hydrological and hydrogeological conditions. Participation in the WMP was for several of them a very good help to obtain this knowledge; newly assigned professional are helped in this respect by the presence of the WMP reports and maps. Systematic procedures (e.g. by mapping) to keep the total water resources picture up-to-date, however, have not been observed. Given the importance of the feed-back of new information, it is strongly recommended to develop and utilize such procedures.

The role of the hydrological sections during the implementation phase is reduced to supplying information obtained from low flow gaugings. These sections have become somewhat isolated from the "mainstream" of the project. Nevertheless, they could very well make a more valuable contribution if they were involved more directly in the selection and analysis of potential gravity intakes sites (using more information than low flow gaugings only). Extending the responsibilities of the hydrologists in this direction is recommended.

No response yet has been observed to the WMP recommendation to critically review present water rights, as a first step towards rational water resources management (allocation of water in dry periods).

The DANIDA supported project should consider which role to play in this respect in collaboration with Tanzanian authorities. Suggested activities are:

- study of the functioning of the existing water rights system;
- identification of conflicts to be anticipated;
- recommendations for allocation criteria;
- recommendations for effective control systems.

5.4 Socio-Economic Studies and Utilization of Data

As part of the overall water master plan study, a socio-economic study has been carried out in the three regions. Design and implementation were done by the Centre of Development Research, a social research institute financed by DANIDA, and the Institute of Resources Assessment, (formerly Bureau of Resources Assessment and Land Use Planning) of the University of Dar es Salaam. Activities of the socio-economic group consisted of:

. inputs into the questionnaire for basic village data collection to a total of 300 questions and used by CCKK in their half-way village assessment visits;

. a more detailed study on water use, sanitation and health in 66 villages representing various agro-economical conditions in the 3 regions, as well as different levels of water supply (traditional, improved and under construction);

. development of a programme for village participation as part of the RWE's pilot implementation programme.

In addition, several sub-studies were done on water contamination during collection and home storage, health education, involvement of women, training and integration of community participation into the existing Tanzanian structures (MAJI, AFYA and MAENDELEO).

Experiences with community participation were incorporated into recommendations for a Tanzanian policy on village participation in rural water projects and handbooks prepared for village participation and health education on water and sanitation.

Data collection results were used in particular for defining basic elements for the implementation: design criteria (25 l/c instead of the national Tanzanian criterion of 30 l/c/d), peak factor (2½ hours peak of 3.0) and village selection area. For the number of water

points the Tanzanian design criterion were retained of a maximal distance of 400 m and 250 users/water point at the end of the design period.

Studies on participation policy, institutional aspects, involvement of women, hygiene education and water quality in the home were not taken up in the summary Water Master Plans. This was probably because they were completed almost one year later than the technical studies (May 1983). Wider knowledge and use of the findings may also have been limited by the absence of an executive summary on the socio-economic studies in the 2 volumes concerned.

Recommendations for the organizational set-up for community participation were reviewed in a meeting with the departments concerned (MAJI, AFYA, MAENDELEO, PMO, SEC Group, DSU), on 1st September 1983. It was concluded that at that time, Tanzania did not have the necessary manpower capacity to implement the community participation component, as the Department for Community Development has been re-established very recently and was not yet fully staffed at the two lowest levels (district and field level). Therefore, it was agreed that the project could employ form IV school leavers as an interim measure. Since then, no overall reassessment of the situation has been made.
Results of the hygiene education and sanitation studies were not used in the implementation programme. The reason was that increased easy access to a better and reliable water supply was considered the main step to improved health and well being. Secondly, the participatory hygiene education tried out in a few villages could not be expanded to the other project villages within the water programme without placing great demands on additional manpower, training and co-ordination. Thirdly, a national village health worker programme was under re-establishment, in which health education to prevent diseases would be a major element.

The village participation handbook for piped systems was revised in 1985, mainly because its procedures were too cumbersome and not realistic in the village situation. Only the English version was adapted as the Kiswahili version was in too acedamic language for village use. Also a separate handbook for handpump wells was made. The handbooks are kept only as a general guideline for the VPCs. Work has developed in the field resulting in changes in or variations on almost every step. Some steps have been dropped completely because they were too cumbersome and the resulting data were not really used. Others have been combined because of logistic reasons (some villages are at a distance of a six hours' drive) or adapted to the local culture. As a consequence there is at present no written form in which these experiences are reflected and can be used in training, field work and further system development.

5.5 Priority Setting and Programming

The WMP villages have been categorized according to the priority for an improved water supply. The highest priority has been given to villages with low accessibility or source capacity and/or high health risks ("worst first"). The total number of high priority villages identified in WMP is 644. From these 300 villages were to be chosen for Phase II (implementation project). Listing of

high-problem villages has been a valuable means for defining a clear project policy and coping with political pressures for taking up villages with lower or no immediate water supply problems.

However, as implementation proceeds it has become clear that in many of the villages originally classified under lower priority conditions have deteriorated (e.g. pumped schemes broken down since) or that the orginal classification was done on insufficiently accurate data.

In a meeting at Mikumi on 5th and 6th May 1987, the joint project staff (MAJI, IO, VPC; DSU Technical Advisor) therefore proposed a review of the WMPs on, among other things, priority criteria.

It is the opinion of the Mission that the priority criteria as such are very good and should be adhered to. However, this does not imply that the priority lists should remain fixed. Conditions change, so adaptations will always be necessary. It is therefore suggested that on this issue a meeting is held with all parties concerned, including districts, to adapt the present procedures for modifying the priority lists, without changing the criteria themselves. It is also suggested that any changes approved will require documented evidence from the IO and VPC with regard to village conditions in terms of sources reliability, accessibility, water quality, etc., as defined in the WMP.

5.6 Source Selection and Protection

The physical presence of water is sufficient in each region to meet easily the requirements of domestic water until the year 2006. Economic and social constraints are limiting strongly the choices to be made, but even so it is possible at many locations to exploit both surface water and groundwater.

In some areas there is only one type of water (either surface water or groundwater) available within reasonable distance. E.g. surface water resources are relatively scarce in the Northern part of Mbeya region, the NW part of Iringa region and the Eastern part of Ruvuma region; there, groundwater seems the only practical solution for many of the villages. On the other hand, groundwater is in some zones too saline for domestic use (e.g. near Lake Rukwa, N.E. Tunduru, locally North of Iringa) or can not be exploited within the limits of accepted technology (too deep water levels, e.g. locally on Usungo Flats). In such cases one has to rely on surface water sources.

For the cases where surface water and groundwater sources can be selected alternatively, some more analysis is needed. Pre-assumption in the Water Master Plans is that gravity schemes are preferred over groundwater schemes. The supposed availability of surface water and uncertainties regarding groundwater (aquifers, technology) certainly have motivated this preference.

During the implementation phase, a certain shift in preference can be observed in favour of groundwater schemes. Good experiences with experimental hand-drilling (e.g. in Ruvuma) and disappointing rates

of some low flows have fed these adjustments. Nevertheless, less systematic methodology to make a proper choice between groundwater and surface water has not been worked out, even though a first general approach is outlined in th WMP (Vol. 3). It is highly recommended to develop and use such a methodology, based upon criteria such as:

- costs;
- water availability (quantity, undercertainty and reliability);
- water quality (observed and vulnerability for pollution);
- acceptable or preferred technology (both from the point of view of the project and the users);
- maintenance requirements and affordability.

In general, groundwater supplies will have a more reliable and acceptable bacteriological quality; nevertheless there is scope to increase the protection of the source from pollution. For gravity schemes, sources protection against pollution is to some extent possible in small catchment areas upstreams of intakes (control of land use, afforestation). Larger catchments are not manageable in this respect and frequently represent a health risk.

Source protection from the point of view of water quantity means in many cases that during the source selection ample attention has to be paid to the reliability of the supply, which stresses again the importance of the low flow gaugings and requires monitoring of groundwater levels, at least in areas where seasonally declining water levels have caused problems already (e.g. in some wells in the Songea district).

Furthermore, establishing water rights (provided there is control) and controlling land use in areas upstream of intakes are additional steps to protect the quantity of the sources.

6. TECHNOLOGY SELECTION AND SYSTEM DESIGN

6.1 Design Criteria

The design criteria indicated in the WMP and arrived upon after field studies carried out under the socio-economic component of the WMP are:

- water consumption : 25 litres per capita per day
- peak factor : 3.0 (2½ hours peak factor)
- distance between water point and home : 400 metres
- number of users per tap or pump : 200 people
- design period : ± 20 years, upto 2006.

Water Comsumption

As for the water consumption the design criterion deviates from the Tanzanian design criterion which is 30 lcd. The pre-evaluation study on "Water Use and Village Participation in Operation and Maintenance" (DANIDA, May 1987), includes a sub-study on water consumption over an period of 9 - 11 days in 4 villages with a gravity piped supply using water meters at the tap and master water meters at the village entry point of the distribution system.

Consumption per capita ranges between 11.6 and 20.8 lcd. For the maximum day during the study period, the range was between 15.3 and 24.1 lcd. It may be concluded that on the average, the design consumption of 20 lcd gives still room for some increase in consumption (± 17%) considering a system and waste loss of 5 lcd.

The study results are only partially reliable due to the fact that the study was done during a period when many people were working in the field and the fact that it was during the rainy season, having probably lower consumption figures.

Because agricultural activities dominate the subsistence, the settlements are scattered and in the near future new water points are to be built to cater for increased population and settlement expansion.

Design Period

The implication of using design period of 20-25 years are the higher investments, and thus in principle higher annual costs. This point is not further elaborated upon as high priority has been given to the system reliability and meeting increasing demand.
The Mission supports this choice and is of the opinion that shorter design period could cause problems in functioning of systems. This would hamper the development of village based O&M systems.

It should be noted that the time horizon change as years pass if the project is to comply with the present design criteria.

Storage Tanks

For the design of the storage tanks in the gravity schemes, 50% of the daily village water consumption using the population figures for the year 2006 is applied as storage capacity.

Four storage capacities, for which standard drawings have been made, are use: 25,45, 75 and 100 m^3.

The pre-evaluation study on water use includes data on peak flows for the 4 gravity schemes. Using these graphs it can be calculated that a storage tank with a capacity of 25% of the daily village consumption would suffice. Considering the fact that the population figure for 2006 is used, it means that presently the storage tank has approximately a volume of the actual total daily consumption. This fact may contribute to the improvement of the water quality of the stored surface water but the applied rule in the design of both transmission mains and storage tanks should be looked into in view of project economics.

Because of reasons of village awareness of ownership of water supply, it was decided to build for each village connected to the group gravity scheme, a storage tank, without applying economic considerations.

Peak Factor

The technical part of the study done separately reveals that the peak factor suggested in the WMP is still valid.

The Evaluation Mission recommends that monitoring of the water consumption and peak factor should be done regularly so that these design criteria could be adjusted when necessary and feasible. In this respect it is important to note that the subject of house connections was raised twice in the regions by district authorities. This may well become an important issue to deal with in the near future.
Housing connections may have implications for the management of systems and the design concept. If allowed, it would be important to ensure that connected consumers bear the costs of required additional investments to increase the capacity of the system, including the intake, and the transmission main. This would also be required to pay the connection.

Distance

In the determination of the number of water supply systems in a village either the distance criterion or the population criterion is applied. The criterion resulting in the highest number is conclusive. Since most villages are characterized by a scattered settlement pattern the distance criterium gives the number of village systems.

This method is correctly applied. In some villages the walking distance for several households is more than 400 m and sometimes even more than 800 m. This can not be avoided because of the scattered settlement pattern. In the case of a remote cluster of houses, at least 20 houses should be together to justify an expensive capital investment.

Number of Users per Water Point

In more densely populated rural villages the population criterium determines the number of water supply points. A water supply point can serve for 250 people, using actual population figures. For

gravity water supplies, the DP is designed to facilitate for an extra bibcock connection in future, in order to supply 400 people per DP. Handpump wells can also be used by a maximum of 400 people.

In designing group schemes more considerations should be geared towards the economy of the design without reduction of the service levels (design criteria).

Design Considerations for Gravity Schemes

The size of the gravity schemes in the 3 regions differs considerably. The following table gives the number (and %) of villages connected to a scheme of at least 5 villages:

. Iringa	32 out of 47	(68%)
. Mbeya	69 out of 88	(78%)
. Ruvuma	7 out of 40	(18%)

Local prevailing conditions like topography, available water resources, settlement patterns, etc. have contributed to the above mentioned feature.

The Mission was informed on problems related to community participation encountered during the implementation and in the Operation & Maintenance responsibilities following handing over.

In designing group schemes, the number of villages to be connected should wherever technically possible be minimized.

6.2 Technology Options

The technology to be applied is very much dependant on the water resources available. In the previous chapter on WMP studies, the potential resources are discussed.

In the implementation phases up to date, the technologies applied are:

. Gravity water supplies	78%
. Handpump Supplies	21%
. Diesel Pump Supplies	1%

In all regions the priority was given to gravity supplies and only if there appeared to be no potential, groundwater resources were surveyed. Very correctly, the diesel pump or electricity pump option was hardly applied because of difficult and costly operation and maintenance.

In general the WMP source recommendations were followed. The available information revealed that in 45 villages the technology as recommended in the WMP was changed in favour of handpump supply.

WMP recommended technology which changed to handpump technology:

. Gravity	14 villages
. Borehole	11 villages
. Conventional Pumping	9 villages
. Hydram	6 villages
. Water wheel	3 villages
. Solar pump	2 villages

In Mbeya and Iringa the present priority is still gravity water supplies while in Ruvuma the priority in the technology selection is in the process of changing from gravity water supplies toward handpumps supplies.

The Mission has the opinion that if groundwater sources are exploitable, higher priority should be given to handpump schemes as compared to gravity schemes, in particular in discussions with villagers and with district authorities.

Motivations for this change in priority setting of source and technology selection are:

- the higher potential for groundwater resources than identified during the WMP phase;
- the availability of lifting devices in Tanzania for the prevailing depths of groundwater;
- the lower initial capital investment for handpump supplies compared to gravity supplies;
- the community participation required is concentrated on one site involving a relatively small group of future users;
- operation and maintenance is the responsibility of a small group of users; financial management of the operation and maintenance is envisaged to be easier;
- the quality of the water is much better as compared to surface water sources;
- construction of handpump supplies, i.e. survey, drilling of boreholes and pump installation, is a feasible technique to be implemented by the DWEs.

Groundwater Lifting Technology

In the present approach the technology for groundwater lifting is limited to handpumps. Two types are used:

- SWN 80 - a lever type handpump manufactured in Morogoro. The maximum water level is 20-25 metres. At greater depth the pump is not very reliable, and more difficult to repair as the riser pipe has to be taken out in case the cylinder needs repair*);
- NIRA Direct Action Pump - which can lift water from a maximum depth of 9 - 10 metres. This type is on a pilot basis introduced by the project in Ruvuma Region. The Mission was informed that by next year a manufacturing unit for this type of pump will possibly be established in Dar es Salaam.

The project should not expand the range of types of handpumps since that will definitely cause constraints for the villagers in the maintenance aspects. This implies that groundwater beyond the depth of 25 metres can not be exploited.

The two NIRA Direct Action Pumps installed by the project showed a very good performance in operation and needed a minimum of maintenance. The operation may become somehow difficult for small children and older people with increasing water-lifting heights. Therefore, the pump is not suitable at greater depth.

*) See results of the UNDP/World Bank Test Programme.

The SWN 80 has higher maintenance requirements and will therefore be more expensive for the community. The project should monitor the performance of the pump and give feed-back to the manufacturer in order to improve the quality standard.

The availability of parts for the SWN against local currency in the future may be secured if donor countries agree to give import support to the privatised production unit in Morogoro (see also Chapter 3.6).
The status for the NIRA Direct Action Pump regarding this issue was not clarified.

The Mission learnt that often improper operation was the cause of breakdown. The users and the handpump attendant should be highlighted upon the correct operation procedures before and after handing over.

Since the policy of ownership of the water supply has been clarified, the implications of the responsibility of operation and maintenance will be entirely borne by the community. Therefore, during the introduction of the project in the village, the villagers must be fully informed on the Operation & Maintenance Costs to be expected for the future. Many villagers may be expected to encounter financial problems in the O & M phase.

In view of considerable differences in village incomes (see Chapter 6), the project should seriously consider the introduction of cheaper technologies like dug wells. Attention should be paid to the water drawings methods to avoid contamination of the source. The village should be given the opportunity to decide upon the technology to be used in consideration of the financial implications and other prevailing local conditions.

Areas or even part of the village where hand drilling equipment fails and which are difficult acessible may be considered for hand dug wells.

Ground water drilling Techniques

For groundwater systems, several technology options exist to construct wells:

- hand-drilled wells;
- mechanically-drilled wells;
- hand-drilled wells, mechanically deepened;
- wide diameter wells.

In the context of the ongoing programme, hand-drilled wells are preferred because they require and give good opportunity for village participation in construction. They can be drilled in many locations, but are reported to fail under certain conditions:

- deep (15-20 m) groundwater struck levels (e.g. part of Usungo Flats, N.W. part of Iringa Region, Karroo Formation in parts of Ruvuma);
- hand-augers can not penetrate stiff clays (Usungo Flats), laterite soils (Tunduru district) or hard basement (Pawaga area).

Improved hand-drilled equipment ("Vonder rig" from Zimbabwe) has been ordered already and might widen the range of application for hand-drilling. In cases where hand-drilling continues to fail because of the above mentioned reasons, a power-driven rig may yield technical solutions, however, without involving the villagers in the construction. Only where too shallow hand-drilled wells are deepened by drilling, the element of village participation could be preserved, be it in a rather artificial way. Technically, this approach could constitute of a 10" cased/screened hand-drilled hole, deepened by smaller diameter bit of rig to accomodate 8" screen.

It should be stressed that in all cases villages can participate well before construction in planning the facilities. Source and technology selection can then be discussed and physical constraints explained. For instance, dug or hand drilled wells may not be feasible under all circumstances. Thus more costly alternatives would need to be presented.

6.3 Reliability of Systems

Nearly all of the water supply systems function well throughout the year except a few handpump supplies in Ruvuma Region which run dry by the end of the dry season.

The gravity schemes do not face water quantity related problems as far as the team could investigate. The evaluation took place shortly after the end of the rainy season.

In cases where gravity supplies appear to supply insufficient water throughout the year, corrective actions are taken to increase the intake capacity before the scheme is handed over to the community.

6.4 Quality of Constructed Systems

The constructed systems, the Mission visited, like intakes, storage tanks, raisers, DPs, etc. were seen to be of good quality.

Problems encountered like not proper functioning screens at intake and erosion downstreams of intake had been followed up already for action by the project engineers.

6.5 Water Quality

The water laboratories under the RWE in the 3 regions have sampled many intakes and some handpump supplies. The Mission appreciated the efforts of the Mbeya Zonal Laboratory to do this sampling on a routine basis every month for 14 major intakes (see Annex 7 for bacteriological results for Mbeya Region). In Iringa sampling was done on an adhoc basis due to transport constraints (see Annex 7 for bacteriological results for Iringa Region).

Gravity Water Supplies

The high numbers of faecal coliforms for almost all the intakes indicates a faecal pollution upstream of the intake (see Annex 7). During the rainy season the contamination increases according to the data.

Information revealed that in most cases of high pollutional levels, human activities took place upstream of the intake, like (minor and major) human settlements, agricultural activities and herding cattle. Certainly surface water contamination levels will increase in the future unless strong measures are taken.

During the rainy season most intakes received water with a high to very high sediment load resulting in silting of the intake and necessitating very frequent cleaning and flushing of the intake and washing out of the main pipes.

The Mission was informed that some catchment areas reacted very fast on the failures of rains or burning grass, resulting in a significant reduction of discharge of the catchment area.

The project has not undertaken major efforts to minimize both the microbiological contamination and the erosion upstream of the intake.

The project should consider liaison with the responsible authorities like the department of Forestry and Environmental Protection in the Ministry of Lands and Natural Resources to find solutions to protect catchments, and to improve water quality.

Enforcement of the Tanzanian Government Acts on these issues may be difficult for large catchment areas.
Collaboration with the National Protection Council and the DANIDA supported Environmental Protection and Afforestation Project under preparation in Iringa, could be very useful.

Effects of Storage

The long retention time of the water in the gravity system, particularly because of the over-dimensioning of the storage tanks, has a significant positive effect on the bacteriological water quality of the gravity supplies (see Annex 7).

The improvement was not consistent but considerable reduction of contamination levels has been recorded.

The expected number of faecal coliforms per 100 ml samples ranges still between 280 and Nil with a median of 20. This contamination level is far above the international water quality standards of Nil.

Experience elsewhere shows that it is difficult and costly to build and operate water treatment installations. Therefore, such installations are not recommended. Moreover, the policy of the Ministry of Water, Sewerage and Sanitation rules out the application of any water treatment for rural water supplies.

It is recommended that the project disseminates information regarding the health risk due to the high contamination levels and include health education combined with the introduction of home based water treatment methods could be developed on a pilot basis. The Village Participation Assistants and Village Health Workers are capable cadres for the exercise which should include practical components that should be materially supported by the project.

The laboratories in the region should be facilitated with reliable and appropriate equipment for the water testing for faecal coliforms requiring a very accurate incubator.

The organization of the laboratories and the minimum sampling frequency as recommended by the consultant on water quality in 1986 deserve to be followed up.

Handpump Supplies

The Mission learnt from the villagers met, that they have generally a high awareness of the water quality and groundwater was preferred above tap water. Although this information does not provide a sufficient basis for conclusions, it indicates that preference to water sources may be influenced by quality considerations.

Data collected from the laboratories in Iringa and Mbeya (Annex 7) reveal that water from handpump wells is usually of excellent bacteriological quality also the chemical and physical quality are satisfactory.

7. VILLAGE BASED OPERATION AND MAINTENANCE

7.1 Operation and Maintenance Organization

The project started handing over completed schemes by the end of 1985. Some of these schemes had already been functioning since several years, and had been maintained by the project.
The villages had originally agreed to become the owners of the schemes and to contribute for maintenance, but it had not been made clear to them how maintenance would be organized, and how much the villages would have to contribute. It would therefore be unrealistic to expect villages to have already fully developed their solution for maintaining the water supply system.

Field visits and discussions with villagers confirmed, that the villages have not made specific arrangements. Financial as organizational solutions to set-up maintenance have still to be worked out. For instance, villages are supposed to pay a salary to scheme attendants and to pay for spare parts, but do not yet have a maintenance fund or special bank account.

It was found that, although the services of scheme attendants are highly appreciated by the villagers, most of them are not paid. As the project guarantees the proper functioning over a period of 12 months, it takes care of repairs occurring during this period when due to technical errors made during the construction period.
Villages are supplied with a set of tools and a stock of current spares as part of the handing over procedures. Thus, there had been no need for most villages to buy spare parts. Meanwhile, it was observed that these stocks are not always well kept. The Mission feels that stockkeeping is an aspect which deserves attention.

From the above, it can be seen that the village based maintenance system is in a very early stage of development. Therefore, it is too early to draw firm conclusions concerning its viability.

The Mission has observed that some villages have a well established general village organization with clearly known tasks for the members of the different committees under the village govenment.

Others lack good organization, management skills and trust, which does not form a good basis for future establishment of a financial management system. The project should identify the villages where such problems occur in order to provide organizational support, and to train members of these communities.

The authorities drew the Mission's attention to the fact, that there are considerable differences in village incomes. The yearly turnover of some villages, particularly the ones involved in agricultural business, is in the order of many millions of shillings.
Others are involved in production of food crops, and have more difficulty in generating financial resources, especially where access is poor.

Early discussions with villages on construction costs and maintenance requirements may indicate how much the villages can and

are willing to contribute, and may create a greater degree of responsibility of their property. Informing the villagers on the total investment costs could make them proud of their asset.

For schemes, which have already been handed over, villages could be informed on the state of the similar supplies in other economically comparable neighbouring villages. This comparison could create a kind of competition in maintenance performance.

In order to avoid any confusion concerning the ownership of the water supplies, extensions like new domestic points, handpumps, or improvements, like washing slabs, should be paid for by the village.

The Mission supports the idea that eventually district water engineers should be playing a role in future technical maintenance support to the villages. However, the existing low capacities of MAJI at the district level make a rapid transfer of these responsibilities from the project to the districts impossible.

As a first step the DWEs of Mbeya, Iringa, and Songea could be involved in construction and technical support to villages, since the numbers of handed over village supplies are relatively high, and the technical, organizational backstopping by the regional water department feasible.

7.2 Maintenance of Group Schemes

The Mission noticed with concern, that responsibilities of maintenance of group schemes are not well defined. Scheme committees composed of the chair persons of village water committees are functioning during construction, but they become less active or disappear after construction.
Discussions with project staff indicated, that maintenance of transmission mains and intakes of group schemes are supported to be carried out by village scheme attendants from the connected villages. In the long run this does not seem realistic considering the size of some schemes and lack of institutional arrangements.

It was noticed, that certain pump schemes go across the boundaries of districts. District authorities stated, that responsibilities for these schemes had not been discussed as yet.

The Mission concludes, that this issue deserves more attention. It is recommended, that district and village authorities are fully involved in developing a solution for this problem.

7.3 Mobile Maintenance Units

Sofar, five Mobile Maintenance Units have been established in support of village based maintenance. The units assist and stimulate scheme attendants to carry out maintenance and repair work. It was stressed by project staff, that these units do not aim to carry out such work themselves. Emphasis will be put on giving follow-up training and on monitoring of the systems. Monitoring forms are already being used in Mbeya and can be further developed on the basis of gained experience. VPAs are being attached to the units.

The Mission supports this development and recommends that DANIDA considers the possibility of long-term support to these units, which seem an indispensable instrument to develop village level institutions for maintenance. The Mission feels that it may not be appropriate to attach the units, which could be called Mobile Monitoring and Training Units, to the district water engineers, as the DWEs themselves presently carry direct responsibility for maintenance and would primary use their scarce resources to repair their schemes. It is therefore recommended, that this monitoring and training support role remains under the Regional Steering Committee. This role should be clearly distinguished from technical support for major repairs, spare parts supply, etc. This type of support could be given by DWEs if feasible (see section 7.1).

7.4 Training of Villagers for Maintenance

The project is preparing and executing various training activities aimed to strengthen villager's capacities for maintenance. These activities are partly planned to be caried out within the villages, and partly in regional institutions or the RWE offices.
On the technical side short practical training courses for scheme attendants are being prepared by the mechanical engineers in each region. Follow-up support and on-the-job training is already taking place through the mobile maintenance units.
Training activities in the field of village participation in maintenance, organization and finance are described in section 8.2.3.

The Mission has noted that preference for village-based training versus training courses at the regional level varies per region, and depend strongly on the personal opinion of project staff on the regions. Considering the various pilot training activities already carried out, it would be useful for the project to determine strenghts and weaknesses of the different approaches, and to define how training can be most effectively organized with emphasis on costs, required manpower resources, and impact.
It was further noted that each regional project team developes its own training programmes, and does not systematically use experience obtained by others in the project. Resources would be used more effectively if these efforts would be better co-ordinated, and exchange of information and experiences improved.

The Mission generally supports the project's preference for village-based training and support, which is likely to be more effective than short courses in regional institutions.

7.5 Operation and Maintenance Costs

The DANIDA schemes in the regions are new, and therefore, hardly any records of operation and maintenance costs are so far available. Discussions with District Water Engineers in Songea and Mbinga districts in Ruvuma region; Mbeya-rural, Kyela and Ileje districts in Mbeya region; Iringa rural district in Iringa region and with Regional Water Engineers in the three regions made clear, that no data are available on the actual O & M costs incurred per capita in gravity schemes and Diesel Pumped Schemes, as hardly any records are kept. Information could be obtained on government allocations, but

these are far below the actual requirements. The present budget allocation would to be approximately TZS 100,000/- for every diesel pumped scheme (irrespective of the population served), and TZS 40,000/- for a gravity scheme (again irrespective of size). As regards actual expenditure on O & M, the figures provided show that the acual expenditure is much higher than the budget allocation. In one district the expenditure in 1986 - 1987 was shown in the "book" as 1,085,191 TZS whereas the budget allocation is shown in the same book as a mere 2,500 TZS. Most District Water Engineers indicated that for minimum required maintenance an extra amount of about 50 - 100% of the budgetted allocation would be necessary.

In collaboration with project staff, the Mission has made an attempt to estimate average O & M costs both gravity and handpump schemes as constructed by the project. The results are as follows:

a) Gravity Schemes (1986 Value)

Per village (average 2,000 inhabitants)

1) Annual Cost of 2 scheme attandants
   2 x 1000 x 12 = TZS 24,000.- *)
2) Annual cost of single breakage of mains covering an average of 6 villages (based on recent expenditures on DANIDA completed Image scheme including transport)
   6000 : 6 = TZS 1,000.-
3) Average cost of Maintaining a DP being TZS 300 - 500 (with approx. breakage of such a DP every 2 years) = TZS 2,000.-

Total direct O & M costs per village per year TZS 27,000.-

Per capita per year $\frac{27,000}{2,000}$ = TZS 13.5

To this should be added costs of support for village based O & M, including major repairs, for instance emergency repair of damaged intakes. The minutes of a workshop held in Mikumi on 4th - 6th March 1985 indicate that the per capita costs of Mobile Maintenance Units would be TZS 4/- per capita per year on the basis of 2 visits per year. This per capita cost corrected for inflation in the year 1985 - 1986 in Tanzania (33% as shown in the government record) amounts to TZS 5.3/- in 1986 value.

Thus total per capita O & M costs for gravity schemes are roughly estimated at TZS 20/- (1986 value).

b) Handpump Schemes

According to information from project staff maintenance of a handpump could be as follows (tentative estimate):

*) Salary level close to what is being paid by the project.

. Annual costs of 2 scheme attendants 2 x 12 x 100/10	= Tzs 2,400.-
. Handle (requiring welding or replacement	= TZS 200.-
. Cylinder rod (2 times per year)	= TZS 1,200.-
. Tape Compri strips (approx.)	= TZS 400.-
. Concrete Platform parts	= TZS 600.-
. Bearings (average)	= TZS 600.-
. Total per handpump per year	= TZS 5,400.-
. Per Capita per year (5700)	= TZS 26.00
. Per Capita for Mobile Unit	= TZS 5.30
. Total	TZS 31.30

These estimated costs of about TZS 20 and 31 respectively seem more realistic than costs incurred by the district water engineers, and will be used for affordability considerations.

It should be noted, that depreciation and extension of schemes are not included in the above estimates.

On the basis of the completed schemes (June 1987) financed by DANIDA the yearly estimated financial requirements for O & M per region are calculated using the O & M costs of TZS 20 and 31 per head per year for respectively gravity and handpump schemes.

Table 16: Total estimated Annual Financial O & M Requirements for Completed Schemes

Region	Gravity Schemes		Handpump Schemes		Total	
	Population	Costs (TZS)	Population	Costs (TZS)	Population	Costs (TZS)
Iringa	50,691	1,013,820	10,694	331,514	61,385	1,345,384
Mbeya	59,665	1,193,300	26,196	812,076	85,861	2,005,371
Ruvuma	31,471	629,420	12,447	385,857	43,918	1,015,277

Note: Population figures according to WMP (1981)

Assuming full coverage with gravity and handpump schemes (in the same ratio as present) the estimated financial requirements would be, or would have been as shown in the following table:

Table 17: Estimated Financial Requirements for O & M with Full Coverage

Region	Total Population (in 1986*)	O & M per Capita	Total Estimated Cost (TZS mill)
Iringa	1,034,214	21.91	22.67
Mbeya	1,240,072	23.35	28.96
Ruvuma	605,998	23.12	14.01

*) Derived from WMP, Vol. 12 and 13

Considering the present budgets allocated to the regions (for Mbeya 1986/1987 TZS 8.6 million, for Ruvuma 1986/87 approximately TZS 2.5 mill.), the estimated financial requirements for O & M could not be met. A major share of the above costs will therefore have to be paid by the villages (see also section 7.7). It should be noted that cost of district support to O & M are not included in these estimated.

7.6 Cost Recovery

The meetings with villages have indicated that they are accepting the ownership of the village water supplies including the financial consequences and O & M responsibilities.

The cost for O & M as calculated in sector 6.5 are Tsh 20 and 31 respectively for gravity schemes and handpump schemes (per capita).

A high proportion of these annual per capita costs is for the scheme attendants, respectively 89% and 46% for gravity supplies and handpump supplies.
Discussions with villagers revealed that only 1 out of 5 scheme attendants was given some allowance in the range of 300-400 Tsh. per month. The emuneration of the scheme attendants may thus cause a problem in view of scarcity of funds.
The project should investigate the option of combining paid jobs at village level, for instance VHW and scheme attendants. Other options may be the payment of scheme attendants per job, in kind, and exempting him from communal activities.

The VPCs should further investigate how villages can be helped to develop and apply realistic solutions for their own organization structure (see Chapter 8).

7.7 Affordability

A basic condition to future maintenance is a balance between financial resources and maintenance requirements. Technology selection and determination of service level should broadly take into account what can be afforded to be maintained.

The project has constructed gravity schemes and handpump supplies, assuming that these would be maintained by villages with limited support from districts.

The Mission has made an attempt to evaluate the value of that assumption by estimating maintenance costs (see 6.5 above) and by collecting information on financial capacities at village and district level.

District Level Resources

The estimated budgets for DWEs are mostly in the order of 1 to 1.5 million Tanzanian Shillings. For instance, in Mbeya rural district the total 1986 - 1987 recurrent budget is TZS 1,408,827/- of which TZS 784,000/- for operation and maintenance for 11 villages with a diesel pumped supply and 16 served villages with gravity supplies. Required budget for 1987 - 1988 as estimated by the district shows a rise of about 15% compared with the 1986 - 1987 recurrent budget.

Information of actual expenditures for O & M has not been obtained, buth these are probably lower than the estimated budget. This is partly due to difficulties in the transfer of funds from the central government to the districts, but as the requirements are about 50 - 100% higher, than the amount finally allocated by government, districts have to fill the gap from their own revenues from levies and taxes they are authorized to perceive according to the local governments act. The most important source of revenue is the development levy of TZS 300/- per year for each able person above 18 years. So far, districts appear to recover between 40 and 70 percent of these levies, but can not meet the financial requirements.

Even though some districts were confident, that they could improve this situation, there seems to be no basis for high expectations concerning an increase of resources for operation and maintenance of village water supplies, and maintenance requirements as indicated in section 6.5 can not be expected to be met by the districts.

Village Level Resources

To evaluate village financial resources for operation and maintenance only official data on incomes have been used. No reliable information is available on informal (free market) income to individual villagers.

To estimate the official incomes the Mission has made an effort to obtain data from the District Co-operative Offices. A good sample was obtained form the Songea District, which is used for analysis. The sample concerns 10 villages where water supply has been provided through the DANIDA programme.

The following income elements were considered:

a) Community Net Income
This income composed of earning from community shops, community enterprised, community mills, community transport and community tractors. The net community income was obtained by deducting all operating costs from the community gross income.

b) Sales of Agricultural Products to Co-operatives
This gross income was derived from co-operative procurement records and in tonnage and the prices paid for Maize, Tabacco, Simsim, Sunflower, Beans, etc.

From these gross figures the unit cost of production were deducted on the basis of information from the district office (Kilimo). All taxes and levies were deducted.

The above two income elements combined for each village. In order to obtain the estimated minimum average per capita income the total net village income was divided by the estimated population in 1986. The population estimate was based on the WMP figures for 1981 and 2006 in the respective villages:

Table 18: Per Capita Communal Income for 10 Villages

Village	Per Capita Income 1986 (TZS)	Population in 1986
Mwongozo	816	1,119
Mkongo	460	3,012
Lilambo	401	1,766
Minazini	314	4,416
Lwinga	292	2,877
Njalamatata	501	2,140
Namatuhi	1,194	1,592
Magagura	363	3,026
Nakawale	723	2,594
Nakahegwa	557	1,644
		24,266

The weighted averaged recorded income for the 10 villages with a total of 24,266 people works out to TZS 501/-.

Discussions with co-operative officers revealed, that income from sales of vegetables, fruits and other products are not recorded. Therefore, an additional 20% should be added to the above amount. This bringing the per capita income at TZS 600/- per capita per year. This estimate is on the conservation side, as individual incomes from private activities are often considerable, and not recorded.

Assuming real income growth rate of 3.5 - 4.0% (aimed at by the Economic Recovery Programme of Tanzania) the weighted average net per capita income would be TZS 1,317/- in 2006 in constant 1986/1987 currency value.

The above income levels provide the basis for the affordability analysis.

It should be noted that the indicated amound does not include:

- Depreciation of installed system;
- Extension of the main system (intake, transmission main, new reservoirs);
- Major repairs due to excessive use or system deficiencies.

Included are:

- Direct Operation and Maintenance including scheme attendant's salaries;
- Purchase of spareparts of minor repairs;
- Replacement of taps and repair of DPs;
- Replacement of broken pipes;
- Replacement of handpumps (12 years);
- New domestic points or handpumps to meet new demand after 10 years.

The affordability analysis is presented in two steps. First only O&M costs are considered, next also extensions and replacements are considered as specified above.
For the first step (only O & M costs) two different assumptions can be made:

a) Cost of Mobile Maintenance Units being TZS 5.3/- per capita per year are paid by villages;
b) Cost of Mobile Maintenance Units are not borne by villages.

For the first case the required constant annual per capita contribution would be approximately TZS 20/- for gravity supply and TZS 31/- for handpump supplies.
When the costs of the maintenance unit are excluded, these amounts are TZS 15/- and TZS 26/- respectively.
This gives the following result when compared with per capita incomes.

Table 19: Proportion of Income to be spent on O & M (Ruvuma)

	(All Amounts in TZS (1986 Values)	
	Including Mobile Units	Excluding Mobile Units
	1986	1986
Gravity Schemes		
Amount to be recovered (per capita)	20	15
Per Capita Income	600	600
Proportion of per capita income to be spent on water	3.3%	2.5%
Handpumped Schemes		
Amount to be recovered (per capita)	31	26
Per Capita Income	600	600
Proportion of per capita income to be spent on water	5.17%	4.3%

From discussions in the regions, it appears that the village income in Ruvuma region is probably lower than in most districts of Mbeya and Iringa regions. Incomes are expected to be 20 - 30% higher there. Therefore, the proportion of the per capita income to be spent to operate and maintain the village water supply schemes will be lower. With time, in these two regions the percentage of contribution would thus be as follows:

Table 20: Proportion of Income to be spent on O & M (Iringa, Mbeya)

	(All Amounts in TZS (1986 Values)	
	Including Mobile Units	Excluding Mobile Units
	1986	1986
Gravity Schemes		
Amount to be recovered (per capita)	20	15
Per Capita Income	750	750
Proportion of per capita income to be spent on water	2.67%	2.0%
Hanpumped Schemes		
Amount to be recovered (per capita)	31	26
Per Capita Income	750	750
Assumed proportion of per capita income to be spent on water	4.13%	3.47%

For step 2 of the affordability analysis the following two items are needed to be considered:

1) Extending the distribution system and DPs (in case of gravity schemes) and the handpumps (in case of HP schemes) to meet the demands of population growth beyond 10 years from now and upto the designed period 2006;
2) Replacing the HPs installed now after a period of 12 years (the economic life of a HP).

In case of gravity schemes, the distribution system has been designed for likely growth of population in 10 years time and accordingly the piping as well as the number of DPs have been installed. With the growth of population in future, there will be need to extend the distribution system.
It is assumed, that no extension of intakes, mains and reservoirs will be required up till 2006. Costs associated with an extension are assumed to be TZS 20,000/= for each DP, including all pipes, materials and labour costs.

In case of HP schemes the cost of installing a new HP with boring, installing pump and constructing concrete platform in 1986 value of Tanzanian Shilling is approximately TZS 70,000 (according to figures obtained from the project, local material, cement, salaries and transport, respectively 4000, 2500, 700 and 25000 shillings).

The "replacement costs" of HPs in 12 years time will not, however, be the same as for installing a new HP. The items to be replaced are as follows:

		Costs in*) (1986 value of money)
Pump-head block and stand	=	14,650
Pump-cylinders (approx.)	=	7,250
Concrete blocks, etc. (if any) and tape compri strips	=	1,000
	TZS	22,900

Assuming a village with average population of 2000 in 1986 growing at the rate of 2.55%**) and a financial discount rate of about 15% in Tanzania, the annual equivalent cost were determined as Tsh 18,962 and Tsh 9,842/= for gravity schemes and a handpump scheme respectively.

These figures are based upon the cash flow enumerated by calculating the period in which the population will go up by about 200 after the initial design period of 10 years, in order to determine the years during which extensions are needed for this "typical" case. The cash flow includes expenditures for replacement of handpump components after 12 years.

This results in an annual amount to be recovered, and percentages of income to be spent on O & M and extension of the distribution system. These figures are presented in Table 21.

Table 21: Proportion of income to be spent on O & M Plus Extension of the Distribution System

	(All Amounts in TZS (1986 Values)	
	Including Mobile Units	Excluding Mobile Units
	1986	1986
Amount to be recovered:		
Gravity Schemes	21	16
Hanpumped Schemes	36	31
Per capita income:		
Ruvuma	600	600
Mbeya and Iringa	750	750
Proportion of per capita to be spent on water 859:		
Ruvuma		
Gravity schemes	3.5%	2.7%
Handpump schemes	6 %	5.2%
Mbeya and Iringa		
Gravity schemes	2.8%	2.1%
Hanpump schemes	4.8%	4.1%

*) These are estimated figires based on estimates of DANIDA Construction Engineer (Iringa Region) collected on 8.6.87.

**) Source: WMP vol. 12 Paper 3.1-3.14 (weighted average).

From the above it can be concluded, that the type of water supplies constructed by the project are in principle affordable even when the costs of future expansions are included in cost recovery.

It should be stressed, that this conclusion is based on very approximate figures, which need to be completed and corrected on the basis of monitoring results and data obtained from villages and the authorities.

It would be important in future to ascertain village by village what is actually affordable and to aim at technical and organizational solutions which allow the annual per capita amount to be recovered from villages to remain within 2 to 4% of the per capita income of the villagers. Consequently, maintenance cost considerations should be included in the village participation process.

8. VILLAGE PARTICIPATION AND INTEGRATION OF WOMEN

8.1 The Concept

The socio-economic group stated in Vol. 13 of the WMP (Chapter 2, p. 2.1) that in the rural water sector the main objective of village participation is to enable each village to plan, build, operate and maintain a water supply improvement with a minimum of assistance. Ideally the village is building and managing its own scheme assisted by the government, not the other way around.

Specific objectives for the village participation programme defined by the group are:

- The water scheme and its service level is in accordance with the expressed needs of the community;
- The community is willing to contribute significantly from its own resources to construction, operation and maintenance of the scheme;
- The resources are used in the most efficient way to satisfy the needs (p. 2.2).

Village participation in rural water supply is not new in Tanzania, but it has been interpreted as free village labour during construction only. This means that the community was fully dependent on the Government for operation and maintenance and financing of recurrent costs. The users had no say in such important local issues as location of village taps and operation of the scheme.

In practice, this meant that village governments had to accept poorly or non-functioning water supplies and continue the use of contaminated natural sources also in cases where they could have improved the situation by their own action (WMP, Vol, 12, p. 6.2-6.4).

In the DANIDA supported project, villages have become the owners of the water supplies and participate in local planning and construction. After handover, they are to carry out maintenance, financing and management, with the Water Department as a back-up in training, monitoring and repairs beyond village capacity.

Discussions with Tanzanian authorities, and users (Annex 9) showed that the DANIDA-supported water project has greatly contributed to the acceptance of full village participation at national, regional and village level. District authorities have become involved more recently and to a lower degree, and often do not yet fully understand the difference between mobilization of free labour on the one hand and village participation in all phases on the other.

The change in interpretation of content and goals of participation is undoubtedly a great step forward. Despite this change, it was noted that for all other water projects carried out in the three regions, the authorities adhere to earlier policy statements of the Tanzanian Government and do not use full village participation. Neither is it clear if present participation will be sustained once DANIDA steps back. No change in this confusing situation can be expected until the Government makes an official statement on the issue. Recommendations on how DANIDA and other donors could

contribute on this point have been made under general sector development in section 3.6. However. to cope with population growth and change in settlement patterns, a project policy on village participation in extending of schemes is needed (see also section 6.7).

8.2 Implementation of Village Participation in the DANIDA-Supported Project

The socio-economic team of the Mission discussed implementation practices and experiences with the project staff concerned. They also had group discussions in 13 villages. The result of the discussions are summarized in Table 21. More detailed reports on each village can be found in Annex 9.

8.2.1 Participation in Local Planning

During the WMP, the villages received general information about the project and their position on the priority list. After being included in the implementation plan, the VPC or assistant VPC contacted the village authorities to inform them about the implementation project and request them to call a general village assembly. In the assembly the project is discussed and an agreement signed with the Village Government stating type of water supply, number of water points and responsibilities of the village and MAJI respectively in construction and maintenance. House connections are not allowed (Annex 8).

The WMP recommendation to demand a village deposit of one year O & M costs as taken of real need and commitment was not implemented for practical reasons (how much, who collects, where to keep the money, etc.).

In the meeting, a Village Water Committee is chosen. It consists of 6 members, of whom at least 3 should be women. In practice this procedure is not always followed and the VWC is appointed by the Village Government.

Do these procedures contribute to the fulfillment of the general and specific objectives of village participation? Regarding objective 1, the "expressed needs" for a project, there is little real choice. Allocation has been decided in the WMP. Observed water shortage and long distances were key selection criteria. This makes it likely that in most high priority villages there is a real felt need for an improved water supply.

The Mission also did not find indications that the abolition of the maintenance deposits affected negatively the villagers' commitment to the project as far as the planning and construction phase is concerned. In O & M, the problem is not a low commitment to water, but village planning and organization for maintenance, as discussed in 8.2.3.

Because the choice of technology and the general service level are pre-determined by the project, the number and siting of domestic points (DPs) or handpump wells (HPs) becomes the most important decision which the VWC makes on behalf of the villagers and use of better water. The pre-evaluation study and the case studies show that in most cases, waterpoints are well-distributed and generally used (see case studies summary table 22 and section 9.1). This

indicates that siting of DPs and HPWs by the VWCs have helped to serve the present needs of all or almost all villagers.

8.2.2 Village Participation in Construction

An essential activity in this phase is the planning of the implementation works. For this purpose, regular meetings are held with the VWC. The task of the VPAs is to assist the village in the proper planning of their participation and in solving problems that may crop up. Special arrangements have, for example, been made to combine voluntary labour with harvesting and to divide the tasks according to the traditional labour division between men and women. In general, the Mission got a very positive impression of the commitment of the users towards construction (objective 2) and the efficient way in which the project and VWC uses local resources without endangering local food production and other important local activities (objective 3).

Some statistics supporting this view have been obtained from the performance monitoring system used in Iringa (Annex 10). These show that on the average 75% of the scheduled labour is present. These data contradict an earlier report - which is not based on actual data collection - that village participation in construction is too low to be of any benefit.
Since both value of labour and cost of inputs (VPAs, VPC) can be established, it would become possible to assess the cost-savings effect of the village participation approach developed in the DANIDA assisted project, if so desired.

8.2.3 Participation in Maintenance

The organization of maintenance and repairs has been described in Chapter 6. In this system, the VWC is meant to be one of the key elements. Tasks of the VWC as defined by the project*) are:

- represent the village government in all discussions and negotiations concerning the water supply;
- manage O & M of the scheme, including financing;
- form a communication channel from users to village government and vice-versa on needs, problems, information, etc.;
- supervise and support sanitary improvements and hygiene education.

During the Mission's field visits as well as in discussions with the VPCs it transpired that VWCs are often perceived by the village government as an organization imposed from outside. As a result they do not always function as intended. Discussions with members of the VWCs and with the users showed that, in particular, their role in O & M is not clear. In almost all cases perceived tasks of the VWC in O & M were limited to supervision of the cleanliness of DPs and make contacts with the Village Government in case problems were reported to them (Table ..). This is confirmed by the studies of Engelsen**) and CDR/IRA***). It is concluded that there is no need for the three VPCs and the MAENDELEO.

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*) DSU (undated), Revised Handbook on Village Paticipation.

**) Engelsen, Birte (1987). A report on the work and attitudes of the village water committees. Unpublished report.

***) CDR/IRA (1987). Water use and village participation in operation and maintenance. A pre-evaluation study of DANIDA-funded rural water supplies in Tanzania. Copenhagen, Denmark, DANIDA.

Table 22: Summary of Information from Discussions with Villagers

REGION	RUVUMA					
VILLAGE	Lipaya	Lumecha	Namabengo	Suluti	Lilambo	Kasumulu
POPULATION***	1,600	1,630 +)	3,144 +)	4,644	2,500	1,916
NO. DPS/HPS	12	19	25	15 (5 to be added)	10	14 (+ 1 under construction)
PERCEIVED OWNERSHIP	village	village/ DANIDA	village	village	village	government
PROJECT INFORMATION	in village assembley	in village assembly	n.d. *	in village assembly, men only	in village assembly	no assembly organized
FORMATION VWC	appointed	elected but not generally known	n.d.	elected	elected	appointed by Village Government; same chairman
COMPOSITION VWC	3 men 3 women	3 men 3 women	3 men 3 women	5 men; 3 women added on request project	3 man 3 woman	3 men 3 women
LOCATION WATERPOINTS	by VWC	by villagers	by VG	by VWC	by VWC	by VG; 6 more needed; reject own financing;
ORGANIZATION VILLAGE LABOUR	thru 10-cell leaders	thru 10-cell leaders	n.d.	thru 10-cell leaders	thru 10-cell leaders	n.d.
PARTICIPATION VILLAGE LABOUR	men and women	men and women	n.d.	men; (women engaged in farms)	men and women	men and women incl. from unserved sections;
STATUS WATER SUPPLY	completed 83 handed over 86	under construction	completed 85 awaiting handing over	under construction	completed and handed over 1985	completed 85; awaiting handing over
FUNCTIONING WATER SUPPLY	HPWs working slow discharge	completed HPWs working well	scheme works but intake not kept clean	n.a.**	all HPWs work well	DPs function
USE OF TRADITIONAL SOURCES	one section (immigrants) uses river	rivers for large amounts of washing; bilharzia risk	small no. of households uses river for all purposes	n.a.	some households wash in river; bilharzia risk;	large part still use rivers for all purposes
REPORTED BENEFITS	time gains; more safety for women & girls	time gains; safety; increased brickmaking; reduced infant diarrhoea;	time gains; reduced infant diarrhoea;	n.a	time gains; safety women & girls; brickmaking/ improved housing brewing, vegetables;	none
USE OF TIMEGAINS	work in agriculture	work in agriculture	work in agriculture	n.a	work in agriculture	n.d.
PATTERN OF WATER COLLECTION	children collect more	children collect more	children collect more	n.a	n.d.	n.d.
MAINTENANCE	2 male PAs trained	2 male PAs trained	2 male SAs under training	2 male SAs under training	2 male PAs trained	1(?) male SA trained
MAINTENANCE FINANCING	flat rate for adults agreed half a year ago; collection not started	from general village funds; no detailed planning & budgetting	tap users fund collection and general village fund; no detailed planning & budgetting	from general village fund; no detailed planning & budgetting	donation TZS 2,000 at handover put in separate fund; no detailed planning or budgetting	separate water fund intended
PAYMENT PAS/SAS	not since handing over	by DANIDA TZS 450	by DANIDA TZS 450	by DANIDA TZS 450	not since handing over	by DANIDA TZS 810
PERCEIVED ROLE VWC IN O&M	control hygiene; reporting all problems to VG	n.d.	n.d.	control hygiene and children	control of hygiene and children	none after construction
FINANCING EXPERIENCE	n.d.	case of fund misuse	n.d.	TZS 25,000 repair + flourmill from general fund	case of other fund misuse	n.d.
SANITATION	increased coverage traditional latrines	n.d.	n.d.	n.d.	promotion full latrine coverage by VPA	n.d
DRAINAGE AND UPKEEP WATERPOINTS	good	good	cleaning of intake poor	n.a.	good	good

* not discusses
** not applicable
*** population figures from village secretary's office
+) population figures from MHP for 1981 Present population figure not available

VG - Village Government
PA - Pump Attendant
VWC - Village Water Committee
SA - Scheme Attendant

MBEYA			IRINGA			
Utengule	Ihombe	Azimio	Lyasa	Ukembele	Mbalamaziwa	Kitumbuka
1,884	1,674	817 +)	1,744 +)	1,201 +)	1,100 +)	2,185 +)
19	16	9	9	14	8 + 3 under construction	9 + 1 cattle through
village	village	village	village	village	village	village
assembly held later	in village assembly	n.d.	thru 10-cell leaders	n.d.	in village assembly	in village assembly
elected	elected	appointed after construction	task force formed for construction;	elected; known to those met	said to be appointed by VG	elected
3 men 1 woman	3 men 3 women	3 men 3 women	task force: 6 men, 10 women VWC: 5 men, 1 woman	3 men 3 women	3 men, 2 women (latter not clear)	3 men 3 women
by VWC; 5 more needed; extra DP for	by VWC; considering paying 1 DP for increased population;	by VG	by task force	by VWC	by VWC	by VWC and discussed in village meeting
thru 10-cell leaders	n.d.	n.d.	thru 10-cell leaders	by VWC thru 10-cell	by VWC thru 10-cell	by VWC thru 10-cell
men only	men, as women already worked in fields	n.d.	men and women	men and women	n.d.	men and women
completed	completed and handed over 86	completed 86 handed over 87	completed 82 handed over 86	completed and handing over scheduled for 87	handing over scheduled for 87	completed and handed over 87
DPs function	DPs function	all HPs working well (?)	3 DPs out of order; money for repairs not yet collected	all DPs function	n.d.	all DPs function
not for drinking	a few still use riverbed wells for all purposes	river used for washing	one section (migrants) uses river	one section (migrants) no DP	one section (migrants) no DP	one section uses river for washing; bilharzia risk;
seasonal diarrhoea and chemical poisoning stopped;	time gains; easier domestic management; brickmaking/ housing, seasonal diarrhoea stopped; family care;	n.d.	reduced illness (not general); time gains;	facilitation brewing for add. income	time gains; safety women & girls	no more bilharzia for those using taps for all purposes
work in agriculture	work in agriculture	n.d.	work in agriculture	n.a.	work in agriculture	n.d.
children collect more	collect water when needed	n.d.	n.d.	collection when needed;	n.d.	n.d.
2 male SAs trained	2 male SAs trained	2 male PAs awaiting add. course	2 male SAs trained	2 male SAs trained	2 male SAs trained	2 male SAs trained
village meeting to be called	from village fund; rate set but not yet collected;	n.d.	fund collection at time of breakdown (average period report/ collection 2-4 weeks)	flat rate agreed; sep. water fund & training for financial control desired	extra payment for business use and more safety measures for financing & spare parts desired	donation at handing over put in sep. water fund; no long-term planning & budgetting yet
by DANIDA TZS 600	RZS 300 per month; now raised to 400	intended after training	not paid since handing over	By DANIDA: TZS 1000. TZS 600 planned after handing over	By DANIDA: TZS 1000. TZS 600 planned after handing over	TZS 40 per job
none mentioned	control of hygiene and work SAs	no role seen	no role defined	role in financial control desired	upkeep of hygiene; role in financial control desired	no role defined
several projects; profits in bank after cost deduction	several projects; control by special finance ctee;	n.d.	history of fund misuse	earlier case of fund misuse	no communal projects	n.d.
full coverage impeded by high water table	VG wants TA to construct VIP latrines at user cost and village subsidy for destitutes	n.d.	almost complete coverage traditional latrines; ashes against smell/ flies	low % latrine seen as health risk; promotion by VPA requested	problems with caving-in; felt need for latrine slabs at TZS 500 max.	traditional knwoledge and techniques used to solve latrine problems
good	good	drainage fair; no fence	drainage and fencing is poor	poorly draining soil; village initiative not effective; expert advice needed	n.d.	DP fenced but poorly drainage soil requires expert advice

officer seconded to the project to further define the tasks and possible task division in management of the water supply between the VWC and the village government. This should take place before discussing the various options for financing and management of the water supply with the users and the village governments and before carrying out further training programmes.

Table 23: Village Labour Contribution in Construction

Period	July-Sept.'86		Oct.-Dec.'86			Jan.-Mar.'87				
Scheme No.	206	251	009	137	049	206	215	251	Ismani III	049
% Attendance of Scheduled Labour	109	63	90	79	84	56	60	62	83	67
Total No. of Manhours Contributed	-[1]	27[2]	87[2]	13,000	7,000	2,000	-[1]	6[2]	8,000	2,200

[1] Still to be computed from raw data

[2] Workdays

Source: VPC Reports, Iringa Regiona

Training for VWCs has recently started in Ruvuma and Mbeya regions. In Ruvuma, two-day village seminars are held on maintenance and financing. Villagers are advised to open a separate water account and set a flat rate of TZS 50/- per tax-payer per year. In lower-income areas, payment in kind is proposed.

In Mbeya, VWC members get an one-week institutional course in Mbeya Training for Rural Development Institution. On the last day they are joined by members of the village government. Subjects covered include:

- a 2-hour presentation and discussion on why a maintenance fund is needed, how large it should be, from where to get the money, where to keep it and who to administer it;
- a 3-hour presentation and practice on account keeping.

It was also mentioned that VPAs get a one-week refresher course in which two hours are devoted to a discussion on financing and management of the village water supply. The Mission considers, that while this may create a good awareness on management issues of the village water supply, the size of the groups and the time for practical issues and skills are insufficient for establishing an effective village-based financing and financial management system for O & M.

In Iringa, a village-based training system for maintenance, organization and financing is still under development. The VPC has defined the roles of each village group concerned and proposed the following training activities:

- DP/Handpump user meeting on how they will manage their waterpoint;
- A seminar on the work and supervision of Scheme Attendants/Pump Attendants;
- A preparatory meeting with the VWC on their role in maintenance with users and Village Government;
- A joint meeting with VWC and Village Government to make definite arrangements.

This approach is not only more comprehensive, but also works from the basis up and should allow all groups involved in O & M to make their own reasoned choice. On the other hand, it is more labour and time consuming than the training in Ruvuma and Mbeya and may therefore have practical limitations. This should be part of the joint review of and discussions on the division of tasks for maintenance recommended above.

As final completion and handing over has been rather slow, few villages have started local management of O & M sofar (see also Chapter 6). Results are therefore limited and the Mission had few data to work with.

According to the project staff, many villages in which handing over has taken place, started to buy spare parts from the project or from the local market. Mostly these are bibcocks and fittings. Figures were not available as no record is yet kept of sales of spares and tools to villages.

Results with regard to O & M financing are summarized in Table 4, and show that a lot of work remains to be done.

Table 24: Village Financing of Local Maintenance and Repair

	CDR/IRA (1987)	Mission's Field Visits
No. of Villages visited with handed over water supplies	1	5
Regular payment of SA/PA	-	1
User contribution decided	-	2
Collection/Reservation started	1*)	-
Water Account opened	-	2

Concluding it can be said that organization of participation in maintenance is still at an initial stage and that no detailed inventory has yet been made of all issues and options for local financing and administration. Items as emerging from discussions with and materials from project staff and villagers are covered in Table 24. Systematic analysis of these and other issues in village

*) But misappropriation reported.

Table 25: Main Questions for Village Decision Making on Maintenance Financing

Questions for Discussions	Village Options
What Costs to Budget For?	Remuneration Scheme Attendants; Tools and Spare Parts for Repairs; Replacement of DPs or HPs. Extension of the distribution System (OPs, HPs, washing slabs)
What Funds to Use?	Village Funds; Voluntary Contributions; Regular User Payments, etc.
What Rates to Set?	Flat, i.e. all pay the same; Weighted, i.e. according to benefit.
How to Collect the Money?	Funds Raising Upon Breakdown; Taking Money from Village Fund; Reserving part of Village Funds; For Establishing a Separate Water Fund; Regular Collection of Household Contributions, etc.
When to Collect?	Monthly; At the Beginning of Financial Year; After Harvest, etc.
Who Collects?	VWC; VG; DP/HP User Group; Ten Cell Leaders, etc.
How to Keep the Money?	Village Account; Water Account; Who Signs for them, etc.
How to Administer the Funds?	Receipts for Bookkeeping; Financial Control; User Feedback, etc.
Who to Administer the Funds?	VWC; VG; Village Accountant, etc.
How to Pay the Scheme Attendants?	Per Job; Per Month; Per Year after Harvest; In Cash/Kind, etc.

maintenance (spare parts, supervision SAs/PAs, replacement functionaries, annual meetings, etc.) is required in order to allow villages to choose a feasible system.

The Mission is of the opinion that the development, monitoring and evaluation of these maintenance management systems should form one of the main objectives of the proposed second phase of the project.

8.3 Involvement of women

In the Water Master Plan, special attention was paid to enhance the involvement of women in water and sanitation projects. Women are the direct users of the water supply, and an increase of their influence makes it more likely that user needs are met and that the system stays operative.

Because the project staff sees water as a community project, the Mission observed, that specific efforts to involve women in the implementation project appear to be limited, apart from their prescribed membership in the VWC. In Ruvuma Region, the women VPAs contact women or women groups only when they have time. In Mbeya, no special efforts were mentioned. The VPC fears that mpre emphasis on women's involvement will add to women's already long and heavy working days. In Iringa, women VPAs stay longer in the villages during the preparatory stage so that they have more time for contacting the women as well as the men.
As far as theory is concerned, the training course of VPAs in the three regions includes a session on women and development.

From the case studies (Annex 9) it is clear that women often take a full share in the physical work during construction, unless they are busy in the field, when the men do the trench digging alone. The project should therefore look for practical ways and means to facilitate and strengthen the active involvement of women in especially local decision making, management and health aspects.

Examples of such practical measures are:

- discussions with local authorities why women's involvement is important;
- holding meeting and training courses at time and places convenient to women;
- informing women about meetings and encourage them to attend through village authorities, women leaders, etc.;
- helping women to speak out;
- holding separate meetings with women;
- assisting women in choosing capable representatives with enough time and support, etc.

The presence of women VPAs in each scheme should facilitate such inputs, provided that apractical approach is developed, and VPAs are given adequate instructions. In the handpump projects this may be less easy. Here male VPAs are employed because the construction team moves from village to village. For these, VPAs additional training and clear guidelines are required.

The Mission further recommends that experiences with women's involvement are discussed regularly at the co-ordinating meetings of the VPCs and lessons learnt are fed back into the village participation handbook.

9. IMPROVEMENT OF VILLAGE HYGIENE

9.1 Water Use and Hygiene

To evaluate the improvement of village hygiene through the use of improved water supply systems, the Mission has greatly relied on a pre-evaluation study carried out by the Centre for Development Research (CDR) in collaboration with the Institute of Resources Assessment (IRA). This in-depth study covered six villages in Iringa and Mbeya regions.
These villages do not constitute a representative sample of villages covered by the project, but the information obtained provides good indications concerning the use of the systems.
This information was mainly obtained from interviews with adult women in 25 households, 3 day observations at 3 DPs/pumps and metering water flows in 4 villages with gravity schemes.
To complete the Mission's information, team members had meetings in 12 villages, sofare relevant subjects were discussed (see Annex 9).

9.1.1 Use of the Improved Water Supply

An improved water supply can contribute to better health in two ways: Use of safer water and use of more water. The pre-evaluation study report indicates that 73% of the population uses taps or pumps exclusively for all purposes. Another 15% said they used both improved and traditional water sources as their main source. Twelve percent continued to use traditional sources. Main reason for use of traditional sources was the lesser distance. Unfortunately no distinction has been made for what purposes these traditional sources are still used. It may be that all drinking water is collected from taps or pumps, while clothes are still washed at the traditional sources as was reported in some of the villages visited by this Mission. Relatively safe rainwater may be a good alternative source of drinking water.

Adding data on rainwater collection to those on use of tap and pump water, the total percentage of reported use of - in principle- -safe water comes to 86%. Reported use of tap and pump water in the dry season was also 86%. There may be some bias in both answers, as the women may have wanted to please the interviewers. But even if this is the case, the reported use is very satisfactory for a water supply without private connections. Mean water use in the WMP reported for other villages than those investigated during the pre-evaluation was only 67%. This possibly indicates that the improved distribution of water points has led to a more universal use of tap and pump water in the project villages.

9.1.2 Use of More Water

Results of the interviews on amounts of water collected in the WMP and in the pre-evaluation study are reported in the Table 5 below. The figures in the second row were revised to make it possible to compare them with those of the socio-economic study of the WMP. The table shows that with a more accessible water supply, reported water use has increased since the WMP by almost 3 l/c/d. Observed water use is less high. This is attributed to problems of identification

of household members*). The measured water quantity gives the most reliable and also highest figure (15 l/c/d). However, this figure should be corrected for the fact that not all households included in the calculation of the consumption figure are served by DPs.

Table 26: Mean Daily Water Consumption in l/c/d

	Brought Home	Used at Source	Total
Reported Water Quantity (WMP)	10.2	2.9	13.1
Reported Water Quantity (CDR/IRA, revised for WMP)	13.1	2.9**)	16
Reported Water Quantity (CDR/IRA unrevised)	10.9	2.9**)	13.8
Observed Water Quantity	7.5	2.9	10.4
Measured Water Quantity	-	-	15.1

A house-to-house survey in 3 of the villages with water meters (Kiponzelo, Mbalamaziwa, Kasumulu) showed a reported use of only tap water of 92%, 92% and 60% respectively (Egerrup, pers.com.). Divising the total metered consumption by the number of actual users, a mean water use was obtained of 17.1 l/c/d. Extra water is used especially for washing and bathing. In the WMP socio-economic study 20% of the water collected was used for this purpose. In the pre-evaluation study this figure is 34%. Although some caution is needed with regard to the comparativeness of the two samples, this is a valuable effect of the project, since the transmission of diarrhoeal diseases is associated closely with insufficient water for personal hygiene.

Use of more water for washing and bathing can be further stimulated by having washing and/or bathing facilities near taps or pumps. At present there appears to be no clear policy on washing facilities of the project. From some of the case studies it appears that villages or users are ready to make their own provisions as a further village or neightbourhood development project. As this would leave more funds to spend on the water supply as such in unserved areas, the project could consider to encourage and facilitate such self-initiatives where possible.

*) Using household identification cards can prevent this. See: Cairncross, S. et al. (1980): Evaluation for Village Water Supply Planning (Technical Paper 15). The Hague, The Netherlands, IRC, p. 51.

**) As reported in Observations

The pre-evaluation study notes with concern that increase of water collection by children has increased greatly. A further study into the amount of water carried per trip by children of varying size and strength (height for weight indicator?) is therefore recommended.

9.2 Health Education and Sanitation

The Mission has made an effort to re-establish which strategies the project has followed sofar to develop this component. In an early stage the need for health education and sanitation was indicated, first in the WMP and later by JARMs. The JARM of November 1984 indicated the need to better define the health education problem and to define the objectives of a viable health education programme. A short-term consultancy was commissioned in August 1985 to tackle this problem*). At that time, the project had not developed this field of activity. Only in Ruvuma some health education and sanitation activities had been undertaken on an experimental basis in Magarura village. A draft plan of operation for a pilot rural sanitation project in Mbeya had been rejected as irrealistic due to high costs and as unsuitable for large scale implementation.

The 1985 short-term consultant on health education and sanitation recommended to promote technical measures to improve cleanliness around DPs and washing slabs and together with the promotion of a 100 percent latrine coverage and institutional sanitation to provide support to the training of Village Health Workers. The Mission would qualify his report as excellent and generally supports its recommendations. However, not all his recommendations appear to have been followed up and no clear project policy has been developed.

9.2.1 Health Education

In the absence of a clear project policy, and in view of problems met in establishing collaboration with AFYA, the project has mainly emphasized technical measures to improve cleanliness around DPs and handpumps, in combination with some educational activities. This is in line with recommendations formulated by the JARM in October 1985.

The results of these measures and education activities could be observed in Ruvuma, where users construct and maintain simple splitted bamboo fences around the taps or pumps. In other regions, few of these fences appear to exist and the Mission observed that these are often not well maintained. In these regions apparently too little attention was given to the physical protection of the improved water site. For instance, the project promoted to construct soak pits as part of efforts to improve the cleanliness around DPs. Some of these soak pits were observed to be containing stagenant water and therefore to present a health risk.

The VPCs and their staff reported to have carried out other health education activities on an experimental basis. Unfortunately, these activities were not well structured and not well reported upon. It is therefore not possible to draw conclusions concerning their impact. For instance, it was reported that the Health Officer seconded to the project in Ruvuma and VPAs in Iringa Region have

*) Ole Therkildsen (1985): Report on Short-Term Consultancy on Health Education and Improvement of Sanitation.

already trained several village health promoters. In Ruvuma, village leaders participated in seminars on health issues. The impact of these activities could not be assessed by the Mission, but keeping in mind experiences elsewhere, this type of health information transfer without a practical follow-up is not likely to have significant effects for health and behaviour of the target groups.

The Mission concludes, that the project has not systematically developed health education, even within the limited scope recommended by the JARM of 1985. It is recommended, that experiences within the project and in the three regions are discussed, and that health education activities are explicitely formulated and carried out in a well structured programme. Main areas could be the cleanliness around DPs and HPs, improvement of drainage, and water-hygiene issues like collection, transport, storage and household treatment. It is further recommended, that a more participatory approach is adopted, involving women, groups within villages, school teachers, and the village water committee.

9.2.2 Sanitation

The first consultancy on sanitation in 1984*) recommended to introduce VIP latrines. These recommendations were not given follow-up, because of high financial and manpower requirements. The Mission fully supports the project's decision not to embark upon a costly VIP programme, even though some regional and district authorities would prefer this type of latrine.

The second consultancy by Therkildsen in 1985 focussed on increasing coverage, improvement of traditional latrines and institutional sanitation.
This proposal was embarked upon in Ruvuma, where latrine coverage was reported to have increased considerably in some villages. Institutional sanitation was not given much attention. In Iringa and Mbeya no activities were undertaken by the project, specifically geared to sanitation.

The Mission concludes, that efforts to develop this component of the project's activities have been insufficient and could have been better co-ordinated. The Mission recommends that the recommendations formulated by Therkilson in 1985 are seriously considered by the project. It is further recommended not to embark upon a VIP programme, but to make use of experiences in the regions to design a realistic programme, focussing on upgrading of traditional latrines. Priority could be given to villages with a clear sanitation problem. The project could provide technical support and supply some materials. Considering the long-term character of sanitation activities, the Mission recommends, that collaboration with VHWs is considered. For instance, this person could play a role in the production and sale of cemented latrine slabs within the village.

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*) A. Wright (undated). Draft Plan of Operations, Mbeya Pilot Rural Sanitation Project.

9.2.3 Collaboration with AFYA

Collaboration between AFYA and the project is not considered satisfactory by project staff and some officials of the health department. Lack of interest in AFYA's side is illustrated by irregular attendance of RSC meetings, and insufficient back-up support of junior health officers seconded to the project.

It was reported, that attempts to collaborate in a pilot training programme for Village Health Workers stranded on administartive procedures and lack of funds on the part of districts and the AFYA departments. This is disappointing, considering that good progress had already been made and training teams had been formed. Even though the project's objectives are oriented to rural water supply implementation, there are sufficient grounds to give more priority to developing collaboration with AFYA. The Mission feels that the difficulties faced in developing such collaboration could be lessened by informing a broad group of AFYA staff on the objectives, targets and methodology of the DANIDA supported water project and to develop a common view on how health education and sanitation could be developed most effectively.

As the Ministry of Health is committed to carry out its own programmes within the limits of its capacity, it is realistic to seriously consider the national guidelines for the implementation of the primary health care programme, to determine common interests, and to compromise when necessary. For instance, a health educatiaonal role for VHWs could usefully be combined with the provision of basic drugs like aspirin and chloroquine as well as materials to treat minor injuries.

Considering the financial constraints of the villages, combination of remunerated functions like VHW and scheme attendants could also be looked into.

10. THE WATER SECTOR IN TANZANIAN ECONOMIC POLICIES

10.1 Introduction

Attempt was made to ascertain the position of the water sector in Tanzania's general economic policies. In this endeavour, use was made for four key policy documents. These are the "Development Budget (1986/87)", "The Review: Twenty Year Rural Water Supply Programme by MAJI", "Budget Speech (1986/87)" and the more specific "Economic Recovery Programme" which runs from 1986/87 - 1988/89.

In his budget speech on June 19th, 1986, the Minister for Finance, Economic Affairs and Planning made the following remarks in emphasis of the social services sector including WATER:

"Despite the emphasis on the productive sectors, the Government will continue with efforts aimed at strengthening vital social services such as Health, Education and Water. This sector is vital for its positive linkage effects to production and efficiency".

The Minister also stated one of the principal objectives basis of the 3-years recovery programme as to be:
"To reduce unnecessary Government expenditures and maintain existing basic social services such as education Water".

These statements provide an indication of the importance attached to the water sector, because there is assumed to be a positive economic effect as a result of improved water supply.
The Mission has made an attempt to find information to support these preliminary findings.

10.2 Budget Allocation

For the financial year 1986/87 the Government allocated a total amount of TZS 785.253 million for the implementation of both rural and urban water projects. This represents about 5% of the total development budget of the country for that year (TZS 15.860 billion). As for financial year 1987/88, the Government intends to spend TZS 751 million on water supply projects. These amounts, though not very high in comparison with donor contributions, are considerable against the background of Tanzania's economical situation. The percentage allocated to the water sector is high compared to other countries.

Another indicator on the high priority given to the water sector is the recent creation of a separate Ministry of Water.
The Mission concludes, that water has a relatively high priority and that continued DANIDA support would be in line with government economic policies.

10.3 Development Effects

Field visits and discussions with villagers revealed that in all the villages served with water, women spent considerable less time to fetch water. According to the women, this time gain is being used mainly for agriculture. This implies that there is now increased farm acreage and output than before. But without production figures,

it is not possible at this stage to tell whether the project has had such developmental effects to the beneficiaries. A study to establish this fact is thus needed.

10.4 Regional Priorities

Discussions with both regional and district authorities in all three regions showed that water sector development ranks among higher priority sectors. After Agriculture; Education, Water and Health were indicated to be of equal and thus second priority.

Efforts to relate these discussions from regional and district authorities to annual budget allocations in the three regions deemed less important since a larger part of their development budgets come from the Central Government. As such, regions have little influence on budgets that annually go into the water sector.

11. CONCLUSIONS

11.1 Project Objectives

Project objectives for the second phase have not been explicitely formulated, and the main emphasis was put on achieving implementation targets. Nevertheless, the project has continued to a large extent to work in the spirit of the recommendations of the water master plans by developing a practical approach to village participation. Generally the Mission concludes, that the project is doing very well.

11.2 Project Achievements

State of progress

Considering the present state of progress, the over-all good quality of the constructed systems, and high usage of the facilities, it is concluded that project achievements are quite satisfactory. If the present implementation rate is sustained, the project will have covered by the end of 1988 at least 68% of the originally targeted number of villages. This figure includes schemes started under Phase I. The present three year rolling implementation plan covers villages where preparation of implementation has not yet started. The final number of villages could thus become higher than the indicated figure.

It was found that out of these 68%, 39% of the villages did not appear in the list of priority villages established during Phase I. Out of these, the socalled Phase I villages were selected before priorities were established.

Considering the fact that water supply needs in many of the socalled low priority villages were reported to be as high as in the high priority villages, the Mission concludes that project resources have been utilized in the spirit of the originally established priority criteria concerning needs and costs.

Cost Overrun

From available information on physical progress and costs, the Mission concludes that cost overrun is largely due to higher cost of rehabilitation of existing gravity schemes, including schemes constructed during Phase I. This may indicate that planners have underestimated the implications of rehabilitating existing schemes up to a standard which allows villages to maintain and operate the system.

However, contrary to the terms of reference for this Mission, which state that 150-200 villages will be covered within the present budget, it was found that cost savings are already obtained through the construction of more handpump schemes than originally planned. The resulting lower increase of average costs per village allows to expect, that more than 250 villages can be covered within the project budget.

11.3 Organization and Management

a. Phase I

From documentation on phase I, and discussions with former project staff, it is concluded that the collaboration between the socio-economic study team, and the regional water engineers has been quite valuable in establishing a participatory approach for implementation of village water supplies.

b. Phase II

Management Structure
Considering the present confusion about the actual set-up and lines of responsibility, the project has performed remarkably well. This is apparently the result of the efforts of highly motivated individuals, and feeling of joint responsibility.
Efficient management and logistic support from DSU have been vital for the success of the implementation programme. However, the Mission feels that DSU has sometimes exerted too strict control on regional project matters, and has not fully appreciated the importance of further developing the role of RSC's , for instance in the procedure for handing over the systems.

Management Information
Considering the lack of complete information on the relation between physical progress and costs, the Mission concludes that monitoring of implementation and costs has initially received insufficient attention during Phase II.

Regional Steering Committee
There has been lack of discussion on project policy issues related to the implementation of the regional programmes. Health and Community Development Department representatives have not fully participated in the meetings. Because of this, and other factors, regional steering committees have not effectively played their role as outlined in their terms of reference.

Integration of the Implementation Offices
In view of the existing good general relations between the RWE and IO, high degree of involvement of MAJI project engineers, and positive views of Regional Authorities on the project, it is concluded that the organization of the project on the regional level has worked out well. However, the Mission feels, that the integration of Implementation Offices in the Regional Water Engineer's structure could be improved, and lines of responsibility more clearly defined.

Position of the VPCs
The position of the village participation co-ordinators vis a vis the implementation engineer and the regional water engineer is not well defined. This has been found to be a constraint for further development of an integrated approach.

Co-ordination of VPCs
Considering remarkable differences in approach and methods between the regions, it is concluded that there is a definite need for VPCs to co-ordinate their activities and jointly determine the common elements and future activities in their programme.

Institutional Constraints
The MAJI Ministry does not have at present the resources to effectively take a leading role in developing a co-ordinated approach to implementation of rural water supply programmes, operation and maintenance and participation. This hampers the integration of the project in the local institutional setting.

11.4 Use of Water Master Plan Studies

Linkage between water resource assessment studies and implementation
There is a clear linkage between the three year rolling plans and water resources assessment studies, especially in the beginning of the implementation. It can be concluded, that these studies have provided a very useful and indispensable basis for implementation of village water supply schemes.

NAM-model
Considering lack of reliable hydrological data and sufficiently dense meteorological network, modelling studies have been of limited relevance for the implementation phase.

Source Selection
Considering the different prevailing hydrological and geohydrological conditions in the regions, it is concluded that no absolute preference can be given to either surface or groundwater supply schemes, but that optimalization of source selection procedures is necessary.

Socio-Economic Studies
Socio-economic data collected during Phase I have been used to establish design criteria and priorities, as well as a reference for the recent pre-evaluation study.

A particularly valuable element of the study has been the incorporation of a field-experiment on village participation as part of the pilot implementation programme of the RWE.
Studies on participation policy, institutional aspects, and water quality in the home have been insufficient and merit follow-up during Phase III.

Design Criteria
Considering recent studies on water consumption in 6 selected villages, it is concluded, that design criteria as indicated in the WMP are still valid.

11.5 Technology Selection

Handpumps technology
Considering present state of development of handpumps (SWN 80) and results of handpump testing in the UNDP/World Bank programme, the Mission concludes, that handpumps installed by the project are not suitable for depths over 25 metres.

Gravity Supply

Results of water sampling by the Mbeya zonal water quality lab show that in many cases water at the intakes is heavily polluted. Some positive effects are gained through retention in storage tanks. The Mission concludes, that water quality can not be effectively controlled in many gravity schemes.

11.6 Use of Project Resources

Cost control procedures

Considering the cost control procedures and efforts to develop a monitoring system on cost related to physical progress in the regions, the Mission concludes that financial management has much improved.

Use of project resources

Project resources are effectively used to construct village water supplies. Costs of overhead and transport are within reasonable limits.

11.7 Operation and Maintenance

Affordability

Income figures for a sample of 10 villages and tentative estimates of maintenance costs allow to conclude, that operation and maintenance of schemes constructed by the project are affordable for the majority of the villages.

Feeling of ownership

Villages appears to have a feeling of ownership for the schemes thus a basis is created for village operation and maintenance. However, as handing-over of completed schemes to villages has been relatively slow, the viability of village maintenance can not yet be confirmed.

Maintenance support

The project policy on maintenance support to villages is not yet clear. Present experiences in schemes handed over show that the villages need further follow-up training support for scheme attendants, and water committees.

Maintenance of group schemes

From discussions with district authorities and project staff, it can be concluded that the responsibility for maintenance of intakes, main lines and distribution mains of group schemes is not clearly defined. Schemes committees were mainly established for implementation, and do not seem to be functioning after completion of schemes.

11.8 Improvement of Village Hygiene

Water Use

Studies indicate that water from taps and pumps is generally used, and increasing amounts of water are being consumed, and used for personal hygiene. Provided the water supplies keep functioning and moving of villagers back to agricultural land does not take large forms, this certainly contributes to laying a foundation for health.

Health Education
Considering the results of the project's attempts to promote cleanliness around DPs and HPs from region to region, and lack of information health education activities, it is concluded that the project has not systematiccally developed this activity.

Sanitation
In spite of earlier recommendations by JARMs and short-term consultancies, little progress was made. The Mission concludes that efforts to develop this component of the project's activities have been insufficient.

11.9 Village Participation

Awareness
The project has contributed to understading and acceptance of village participation being more than organizing free labour. District authorities have become aware of the need for village participation, but do not have experience in this field.

The process
A practical approach to village participation has been developed. Exchange between regions, and reporting on experiences is not fed back into the system. Consequently, there is a risk that experiences gained will be finally lost.

Community organization for maintenance
Villages are well organized during construction, and collaborate with VPAs in planning and construction. The role of the VWC after completion of schemes needs to be clarified, and training needs and methods established.

Collaboration with MAENDELEO
There are good opportunities to gradually integrate the work of VPAs and the Community Development Department. Considering present capacities of MAENDELEO, continued inputs of VPAs in the implementation project remain necessary.

Women involvement
Women have participated as members of the community and of the VWCs. However, attention paid to the practical problems that women face, e.g. in attending and speaking out at meetings, is still limited. Neither do VPCs follow a co-ordinated strategy in strengthening women's roles in management and health issues.

11.10 Policy aspects
Judging from recent statements from key policy documents (Budget Speech 1986/87) and economic recovery programme it is clear that water supply still ranks high on the priority list of the Tanzanian government. This is confirmed by annual budget allocations for water supply. For example, in 1986 approximately 2.4% of the development budget went into rural water supply.

12. RECOMMENDATIONS

12.1 Project Continuation

In view of the present project results in terms of coverage, costs, functioning, use and development of a village based maintenance system, it is recommended that after completion of Phase II, the project is continued doing a third phase.

In this phase, special emphasis should be placed on further development and strengthening of village-based maintenance and maintenance financing, on integration of village participation into the Department of Community Development on, the development of a supplementary health and sanitation programme within the Ministry of Health and on establishing the role of the districts in the projects.

12.2 Project Objectives

It is recommended that for Phase III specific project objectives are formulated with special attention paid to water resources management and environmental control, maintenance, utilization, hygiene improvements, women's involvement, project organization and institutional development. Where possible, practical indicators should be established so as to be able to assess progress made.

12.3 Implementation Rate

Iringa and Mbeya were already a considerable momentum has been created, emphasis should shift from implementation to consolidation and integration. In Ruvuma, which has until recently suffered from a low accessibility, construction could continue at a somewhat higher rate than the two other regions, with technical capabilities adopted accordingly. Separate construction targets should be set for each region.

12.4 Priority Setting

In order to smoothen present procedures it is recommended that a joint meeting is called of the Regional Steering Committees to review priority allocation procedures while retaining the priority criteria of the WMP. Any changes in the priority list should be supported by documented evidence from the IO and VPC.

12.5 Organization and Management

A stepwise approach is needed to develop a clearer and recognized organizational structure for the project defining roles and responsibilities of all parties involved in the project. In this context, it is recommended that the VPCs become members of the advisory team in the RWE's organization. All expatriate staff should have job descriptions.

It is recommended that DSU delegates the responsibilities for technical control and programme development to the regions, but retains its functions in logistic support and general project management, with emphasis on project progress and cost control. DSU should also develop its collaboration with the Ministry of Water in

the supervision and monitoring of the project. The Ministry of Water should strengthen its role as member of the Regional Steering Committees and take an active part in project supervision and monitoring. The Ministry should also take an active role in establishing its general policy framework with regard to community participation in rural water supply projects, establishing a system of co-ordinatiom, and in collaborating with the Department of Community Development and Ministry of Health and Local Government.

Within the project, the Ministry of Health and Department of Community Development should be invited to chart their roles in the project and develop a programme for discussion in the Regional Steering Committee.

It is recommended that the village participation programme of the project is integrated gradually into the project. VPAs should continue their work in construction projects but get opportunities to join MAENDELEO training courses, provided that their return to the regions is ensured, training costs would be born by the project.

MAENDELEO should be more closely involved in the development and co-ordination of the village participation programme at regional level, and in planning the involvement of CDAs in the project at district level.

12.6 Water Resources Monitoring and Development

It is recommended to continue low-flow measurements, including continued monitoring of complexed schemes, using improved methods as proposed by the regional hydrologists of the Ministry of Water.

Systematic procedures need to be introduced to keep the total water resources picture up-to-date, so that the general review established at the time of the WMP is maintained and updated according to experience gained through implementation.

It is recommended to increase the involvement of the regional hydrologists in the selection and analysis of potential gravity intake sites, and groundwater sources.

It is recommended to develop more systematic methodology to make a proper choice between ground water and surface water, taking into account factors of cost, water availability, water quality and acceptability of preferred technology.

12.7 Technology Selection

It is recommended that technology selection is also reviewed with the villagers, in terms of costs, water quality and maintenance requirements. In view of considerable differences in village income and accessibility least cost-technology options, for example, improvement of traditional supplies should not be excluded. Increased use of handpumps should be viewed in the perspective of availability of spare parts on the local market and reliability of handpumps at greater depth.

The issue of house connections demands timely consideration in Regional Steering Committees and Ministry of Water, as it is not realistic to assume that limited house connections can be avoided in all cases. Any policy formulated should take into account the capacity of the systems to serve all users and realistic cost-recovery of larger water use.

In designing group schemes, more consideration should be given towards the economy of the design. The number of villages should be minimized wherever possible for socio-organizational reasons.

12.8 Water Quality Control and Environmental Protection

Continued monitoring in a number of gravity schemes, particularly group schemes subject to pollution is recommended at both source and tap, in order to gain more insight in environmental health hazards due to faecal contamination of drinking water.
The possibility of introducing home treatment (slow sand filtration using local pots) should be tested on a pilot basis.

A close liaison is recommended with the Department of Forestry and the Project for Environmental Protection and Afforestation which is under preparation in Iringa.

The aspects of source protection and risks of contamination of drinking water during transport, storage and use in the home should become part of the village participation and health education programmes.

In some areas, more attention should be given to proper drainage at DPs.

12.9 Use of Project Resources

It is recommended that accounting and engineering staff in all 3 regions are trained in using the cost monitoring and control systems as currently developed in DSU and the Mbyea Implementation Office.

12.10 Operation and Maintenance

Present high enthousiasm of the villagers about their water supply should be preserved by assisting them in building up the organizational and financial management system necessary to keep the water supply operating.

In view of the limited number of handed-over schemes and envisaged role of the mobile maintenance units, these units are recommended to remain at the regional level.
Meanwhile, giving the RWEs some responsibilities in implementing part of the work in their districts would give them a sense of involvement and practical experience which would be valuable for their future support to village-based O & M.

Monitoring of maintenance costs and performance should be developed as soon as possible. In view of the emphasis of the mobile maintenance units in guiding villagers rather than doing the actual work themselves, it is suggested that the units are renamed as Mobile Training and Monitoring Units.

It is recommended that improvements of maintenance and maintenance organization in group schemes receive special attention. Involvement of district authorities is important in order to make suitable institutional arrangements.

12.11 Village Participation

There is a need to further discuss and define the task and task division between VWC and VG with all VPCs and assistant VPCs before continuing training of present VWCs. Villages should be presented with clear options on all aspects of management water supply and be assisted and financing of the village in choosing the best solution in their particular circumstances. Extra training should be given on these aspects to the VPAs on the mobile units.

The project should take more systematic steps to facilitate and encourage participation of women in planning, management and health issues.

As the village participation handbooks are no longer found suitable in their present form it is recommended that they are reviewed and adapted jointly by VPCs and assistant VPCs in close collaboration with MAENDELEO. It is also recommended that the revised handbooks become more flexible and process oriented, reflecting the different experiences gained in the field. Particular attention should be paid to the sections on maintenance, financing and organization. Final copies should be processed in Kiswahili.

12.12 Health and Sanitation

Recommendations by Ole Therkilson (1985) are still valid. The proposed support to the VHW programme should adhere in general to the national PHC guidelines of the Government of Tanzania. Curriculum development and practical training as water and sanitation (e.g. home water treatment, latrine slabs) should get particular attention. Emphasis on marketable technical skills and first aid might avoid bias towards curative work.

It is recommended that encouragement of 100% latrine coverage and improvement of traditional latrines with local materials is continued as a valuable strategy towards the achievement of health benefits. In addition, specific technical and material support should be given to villages with problems of pit collapse and flooding where possible on a cost recovery basis.

It is also recommended that the construction and financing of latrines at schools and clinics is carried out as planned.

12.13 Research and Development Aspects

The following studies are recommended as part of Phase III of the project.

- action research on the use of water treatment by households in villages with a relatively high pollution of the water supply;

- studies on the use of village knowledge and techniques in sanitation improvements, such as lining of latrine pits with wickerwork, use of ashes for strengthening traditional latrines slabs and against flies; and use of local material, e.g. green bamboo to reinforce concrete latrine slabs;
- investigation of the degree to which young children are involved in water collection from taps and pumps, the amounts of water carried by them and the possible implications for their health and well-being;
- a before-after study in one or more selected villages on the economic use of time savings in water collection by women, and the implications for the women, their families and the national economy.

12.4 Institutional Development

It is recommended that DANIDA and other donors consider to reserve a small percentage of the project funds for support to national level institutions so as to assist the government in the follow-up of the 26 recommendations of the Arusha Seminar in 1986.