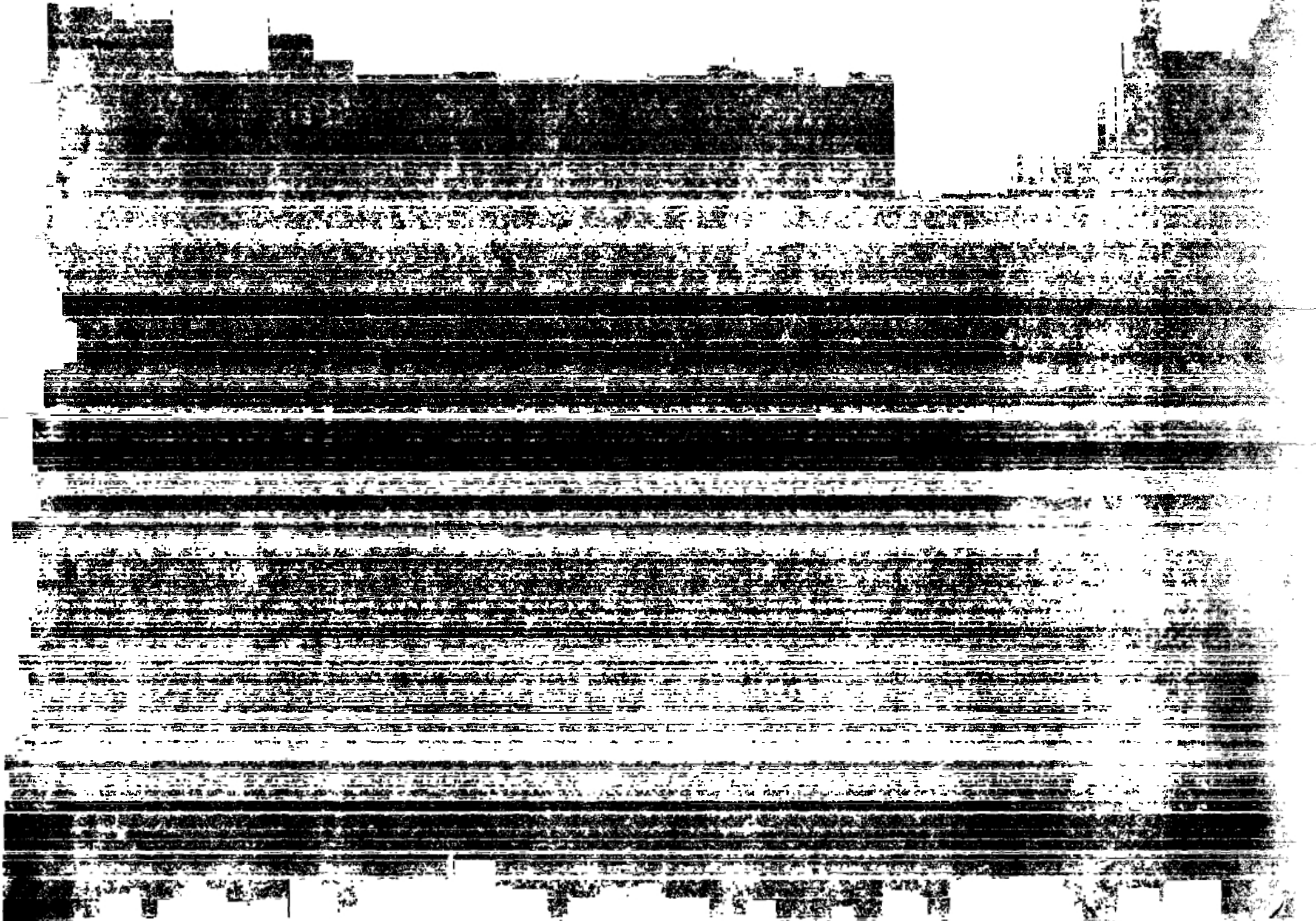


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**MTWARA LINDI RURAL WATER SUPPLY PROJECT TANZANIA
PHASE V**

FINAL REPORT JANUARY 1988- DECEMBER 1990

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1. GENERAL BACKGROUND

1.1 General

The governments of the United Republic of Tanzania and the Republic of Finland have agreed that within their development cooperation programme one of the key sectors is water supply and sanitation. Based on this agreement the Mtwara-Lindi Rural Water Supply Project in Southern Tanzania was identified in 1972. Since its beginning the Project has proceeded through the Feasibility Study, Housing Project and Water Master Plan phases (1972-1977), four implementation phases of the crash-programme, identified by the Water Master Plan (1978-1987) and finally the Integration and Institution Building Phase (1988-1990).

The VI Phase is starting from January 1991 and is going to end the Project and lead to an operation of the water sector by MAJI without an external support by FINNIDA in the area after 1994.

1.2 Project Area

The Project area comprises the Mtwara and Lindi Regions, which are situated in the south-eastern corner of the Tanzanian mainland (Figure 1). There are seven administrative districts in the two Regions: Mtwara, Newala and Masasi in Mtwara Region and Lindi, Nachingwea, Kilwa and Liwale in Lindi Region. The Project area includes the coastal plains and the dissected plateau with the elevated Rondo and Makonde upland plateaux forming the most distinct features of the landscape. The geographical area covers 82,753 km² out of which 16,707 km² belong to Mtwara and 66,046 km² to Lindi Region. The average annual rainfall ranges from 800 to 1,200 mm in the area. Most of it falls in the rainy season from November/December to April.

According to the 1988 census the population of the area was 1,536,044 with 889,494 inhabitants in Mtwara Region and 646,550 in Lindi Region. The average annual population growth rates are about 1.4 % and 1.7 % in Mtwara and Lindi Regions, respectively, the average being about 1.55 %.



FIGURE 1. PROJECT AREA

The economy of the area is mostly based on small-scale agriculture. The primary cash crop is cashew nut, but due to a disease and the aging of the trees the yields have been low in recent years and the economic status of the population has declined. Comparing to the average per capita GNP in Tanzania, TAS 3930 in 1984, the figures in Mtwara and Lindi regions were low, only TAS 1970 and TAS 1580.

1.3 Project History

The general development objective of all phases of the Project has been to provide possibilities for improvement of the health of the population and for economic development by providing adequate and safe water supply to the majority of inhabitants in the project area. The approach adopted in the implementation of the Project, however, has changed during time reflecting the new theories and practical experiences gained in the development cooperation.

The Project Phases implemented till the end of 1990 have been as follows:

Feasibility Study	1972 - 1973
Housing Project	1973 - 1974
Water Master Plan	1974 - 1977
Implementation Phase I	1978 - 1980
Implementation Phase II	1980 - 1981
Implementation Phase III	1982 - 1984
Implementation Phase IV	1985 - 1987
Integration and Institution	
Building Phase V	1988 - 1990

The main target of Implementation Phases I, II and III was to create a minimum level water supply system to the project area as soon as possible. As severe problems regarding the sustainability of water supplies became evident, the approach of the Project was revised towards more institution building and participatory mode.

Implementation phase IV already was a transition phase in which the actual construction as well as operation and maintenance activities were gradually transferred to the local water authorities. The main target of the Phase V was the promotion of the sustainability of the water supply systems. For that purpose development of management and O&M systems, human resources development and establishment of an effective system of community management for handpump wells were aimed at.

Since the beginning of the Project the water supply situation has improved considerably through the construction of 2,344 handpump wells and 13 piped water schemes by the Project by the end of 1989. Taking into account also water supply systems implemented by MAJI the theoretical sector coverage would be 69% in Mtwara and 78% in Lindi Region if the water supply systems were giving service according to standards, i.e. providing minimum 25 lcd water of acceptable quality at a maximum distance of 400 m. However, the actual

service coverage is estimated to be only 39% in Mtwara region and 35% in Lindi Region because a high proportion of water supplies are not functioning as intended. There are many reasons for the poor operation the most important ones being the lack of local funds, resulting in lack of fuel and spareparts, the lack of O&M skills and the late start of an adequate community involvement.

Because of poor management and maintenance, many water supply systems still deteriorate and need rehabilitation. The rehabilitation is, however, seen meaningless unless efficient management and O&M systems are established to prevent future collapses of the systems. Phase VI, which will phase out the FINNIDA support till 1994, will concentrate on issues of improved sustainability.

1.4 Sector Institutions

The responsibility for development, operation and maintenance of the domestic water supply sector rests with the Ministry of Water, Energy and Minerals (MAJI). (The water sector was still organized under the Ministry of Water in the beginning of the Phase). The Ministry of Health (AFYA) is responsible for rural sanitation, water pollution control and health education.

In the region the MAJI Regional Office, managed by the Regional Water Engineer, is in charge of water, the ARDHI Regional Office of urban sanitation and AFYA Regional Office of the rural sanitation.

In the districts the water supply falls under the District MAJI Office. The office is managed by the District Water Engineer who is an expert member of the District Council in matters concerning water. The District Water Engineer reports to Regional Water Engineer in technical matters and the District Executive Director in administrative and financial matters.

2. PROJECT IN PHASE V

2.1 General

Phase V of the Project started at the beginning of the year 1988. While the previous phases had a target of physical improvement of the water supply, Phase V clearly stated the institutional development as the main objective. The improved management of the water sector, human resources development and community participation were to form the instruments for making the water supply of the area sustaining.

2.2 Terms of Reference

The overall objective of the Project is to improve the water supply situation in the region in order to achieve an improvement in general health and economic development. For Phase V the following specific objectives were set:

- to increase the coverage of population by improved water supply from 27 % to 40 %
- to ensure the reliability of operation according to standards.
- to introduce the idea of cost recovery in order to make funds available for implementation and especially for operation and maintenance as soon as the new policy of the water supply sector has been made official

The responsibility to meet the overall objective was to be transferred to the Government of Tanzania during the Phase.

The activities required for the achievement of the objectives were divided into five separate key sectors:

1. Institution building
2. Physical improvements of water supply
3. Operation and maintenance
4. Training and manpower development
5. Community involvement

The sectors have been further divided into components. Sector development objectives and targeted outputs, separately given for components of each key sector, are shown in the following schemes:

1. INSTITUTION BUILDING

Sector development objectives:

- The strengthening of water development management, implementation and coordination of activities with relevant organizations by upgrading the managerial skills
- The ensuring of the implementation by improvement of supporting activities such as maintenance, transportation, procurement and storing

1.1 Management

- Planning
 - o Annual work plans and budgets
 - o Quarterly work plans and budgets
- Follow-up
 - o Follow-up systems
- Reporting
 - o Quarterly progress reports
 - o Annual reports
 - o Project termination report
 - o Proposal for continuation of support
- Coordination
 - o Steering Committee
 - o Advisory Committee
 - o Regional Coordination Committee
- Fund management
 - o Financial plan for the project
 - o Cash-flow plan
 - o MAJI's payment for material support

- 1.2 Offices
 - o Integration of offices with MAJI
 - o Construction of necessary additional buildings

- 1.3 Transportation
 - o Effective transportation system

- 1.4 Workshops
 - o Integration of vehicle and equipment maintenance with the respective regional MAJI organization
 - o Construction of necessary additional workshops
 - o Improved workshop operations

- 1.5 Stores
 - o Integration of existing stores to MAJI organization
 - o Construction of additional stores
 - o Improved storekeeping

- 1.6 Local staff
 - o Integration of local project staff to MAJI organization

2. PHYSICAL IMPROVEMENTS OF WATER SUPPLY

Sector development objectives:

- The consolidation of supplies to existing users by the implementation of appropriate physical improvements to the water supply systems
- The enabling of additional people to be served through the rehabilitation of existing supplies and the design and construction of new handpump wells and other water points as well as piped schemes compatible with the guidelines of MAJI and meeting the needs of the users

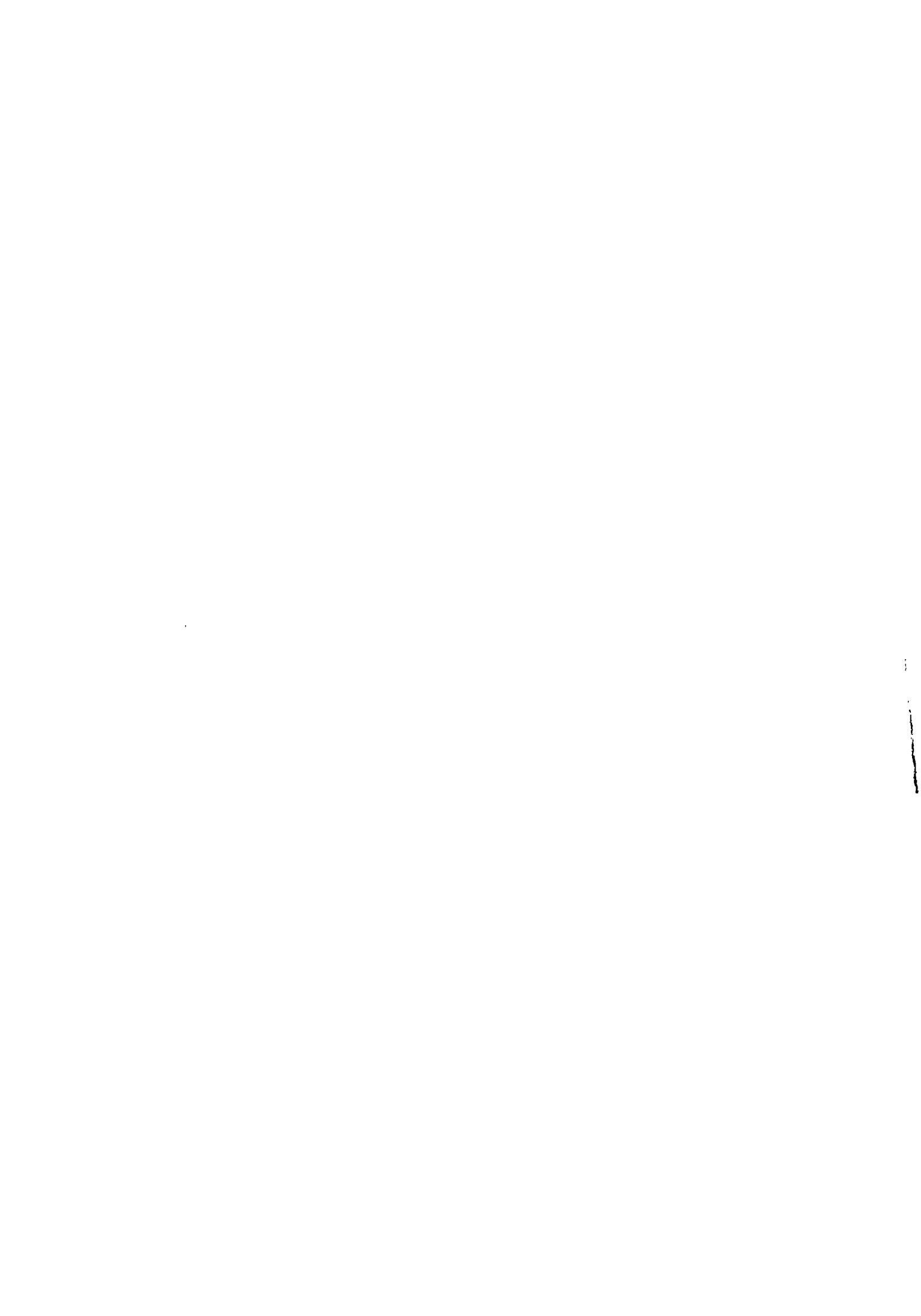
- | | | |
|-----|---------------------------------------|---|
| 2.1 | Studies | <ul style="list-style-type: none"> o Makonde Plateau W/S o Rondo Plateau W/S o Rehabilitation of existing W/S schemes in Lindi and Mtwara regions |
| 2.2 | Handpump wells and other water points | <ul style="list-style-type: none"> o Strong and active local community involvement of at all stages of planning, design, construction and operation o New handpump wells or spring protections constructed as agreed o Provision for O&M system to be established at each handpump well and spring protection |
| 2.3 | Piped water schemes | <ul style="list-style-type: none"> o Local community involvement at all stages o Existing piped schemes rehabilitated as far as possible within the budget allocated for this purpose and new piped water schemes constructed, developed and installed in cooperation with relevant groups o Provision for O&M system to be established at each piped water scheme |

3. OPERATION AND MAINTENANCE

Sector development objectives:

- The development of the local capability to adequately operate, maintain and repair the water supplies in each district through the active involvement and participation of the local community and suppliers as well as the specialist training of selected individuals to carry out appropriate regular preventive maintenance and repair activities
- The development of the O&M procedures and systems to meet the local requirements

- | | | |
|-----|-----------------------------------|---|
| 3.1 | Community operated water supplies | <ul style="list-style-type: none"> o Sufficient number of trained pump attendants, pump repairers, skilled labour and piped scheme operators o Appropriate procedures for operation and maintenance established at each water supply o Appropriate O&M manuals prepared for each type of community water supply o Appropriate management established to ensure effective O&M at each water supply |
| 3.2 | MAJI operated water supplies | <ul style="list-style-type: none"> o Sufficient number of trained operators for all piped schemes in the project area o Individual O&M procedures developed for all piped schemes in the project o Appropriate O&M manuals developed for all piped schemes o Reliable system for spares, tools, chemicals and other consumables established |

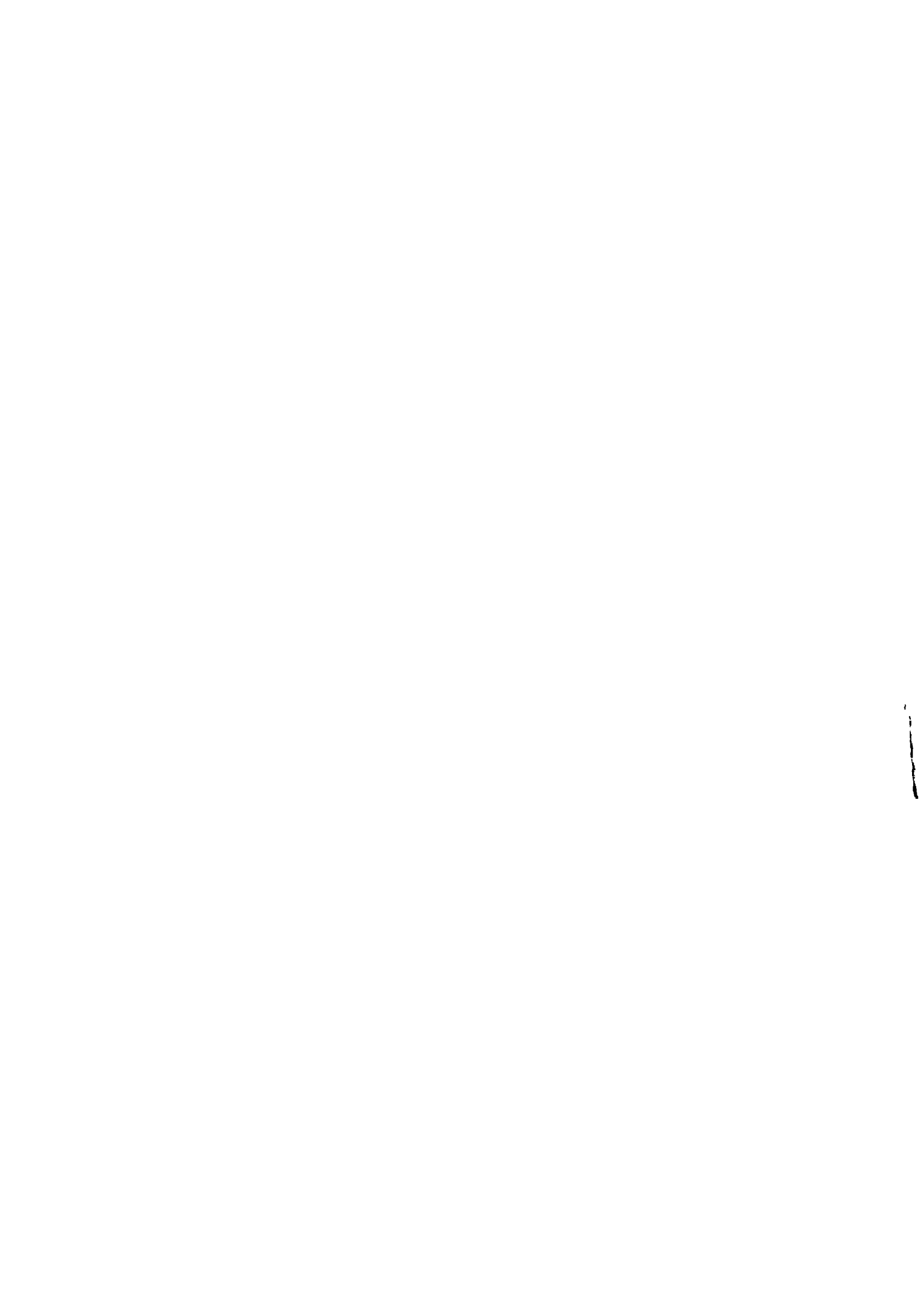


4. TRAINING AND MANPOWER DEVELOPMENT

Sector development objectives:

- The development of relevant knowledge, skills and expertise within the staff of MAJI and other relevant groups in management planning, design, construction, operation and maintenance in the water supply field generally and in the piped water supply schemes particularly through the implementation of a comprehensive training programme

- | | | |
|-----|------------------------------------|--|
| 4.1 | Training needs assessment | o Training needs study |
| 4.2 | Preparation of training programmes | o Comprehensive training programme |
| 4.3 | Local community training | o Capability within local communities to construct, repair, upgrade and properly use water supplies
o Selected individuals from each community trained and available in the project area for O&M activities related to the water supply system and to repair VLOM pumps |
| 4.4 | Skilled labour training | o Sufficient pump repairers trained and available in the project area
o Sufficient workers trained in construction and repair of small systems in the project area |
| 4.5 | Piped schemes operators training | o Sufficient personnel trained in operation and maintenance of piped schemes |
| 4.6 | Training of special groups | o Regular training courses, seminars and on-the-job training on relevant matters |
| 4.7 | Training abroad | o Selected individuals trained abroad on water supply in selected matters |
| 4.8 | Training of trainers | o Sufficient personnel trained in planning and implementation of training programmes |



- 4.9 Management training o Key individuals trained in effective management practice

5.COMMUNITY INVOLVEMENT

Sector development objectives:

- The active involvement of local communities in all stages of planning, design, construction, operation and maintenance as well as extension or rehabilitation of their water supplies
- The ensuring of the continuity and extension of water supplies through development of community based operation and maintenance system and training in preventive maintenance
- The encouragement and development of economic activities to enable the communities to carry the costs of the improved water supplies
- The development of public health education in order to stimulate public health benefits in the local communities served

- 5.1 Health o Increased awareness amongst the population in the project area of the benefits of safe water supply, proper water use and sanitation and their importance in public health terms
- 5.2 Decisions making and planning o Full and active involvement of local community in all decision making affecting their water supply
- 5.3 Design o Local views fully incorporated into detail design of water supplies
- 5.4 Construction o Strong local community involvement in construction of each water supply system
- 5.5 Operation and maintenance competence o Local capability to keep the facility properly maintained and operational



- 5.6 Management of facility o Facility completely managed and supervised by representatives of the local community as agreed with the community
- 5.7 Economic activity o Increased economic activity in the community arising from improvement of the water supply

2.3 Staff

2.3.1 Consultant's Staff for Technical Assistance

The number of staff, permanently employed by the Project, has varied between 6 and 12 persons and has been decreasing and during the Phase. A list of the Project Staff with the designations and working periods is shown below:

Designation	Name	Time of employment
1. Project Coordinator	Elis Karsten	01.01.1988- 31.10.1988
	Erkki Tiainen	01.11.1988- 30.06.1990
	Lauri Kattelus	01.07.1990- 31.12.1990
2. Community Participation Development Officer	Samuel Bushiri	01.10.1988- 31.12.1990
3. Community Participation Development Officer	Dolla Chekanae	01.10.1988- 31.12.1990
4. Training Adviser	Antero Savela	31.03.1988- 30.06.1990
5. Water Supply Adviser	Erkki Tiainen	31.03.1988- 31.10.1988
	Lauri Kattelus	01.02.1989- 31.07.1990
6. Waterworks Adviser I (Electrical Engineer)	Markku Valtokari	14.01.1988- 28.02.1990
7. Waterworks Adviser II	Teuvo Kuusela	01.01.1988- 31.12.1990
8. Groundwater Development Adviser	Jorma Suvanto	01.01.1988- 30.09.1988
	Esa Rönkä	01.02.1989- 30.11.1990
9. Handpump Well Adviser	Hannu Hieta	01.01.1988- 28.02.1989
10. Workshop Officer	Tapio Kuula	01.01.1988- 31-07.1989
11. Administrative Officer	Heikki Lepikko	01.01.1988- 30.09.1988
	Jorma Paavola	01.09.1988- 28.02.1990
	Markku Tuominen	01.03.1990- 31.05.1990
	Jouni Haurinen	01.06.1990- 31.12.1990
12. Project Secretary	Marjo Karsten	01.01.1988- 30.06.1988
	Kirsti Savela	01.07.1988. 31.01.1989

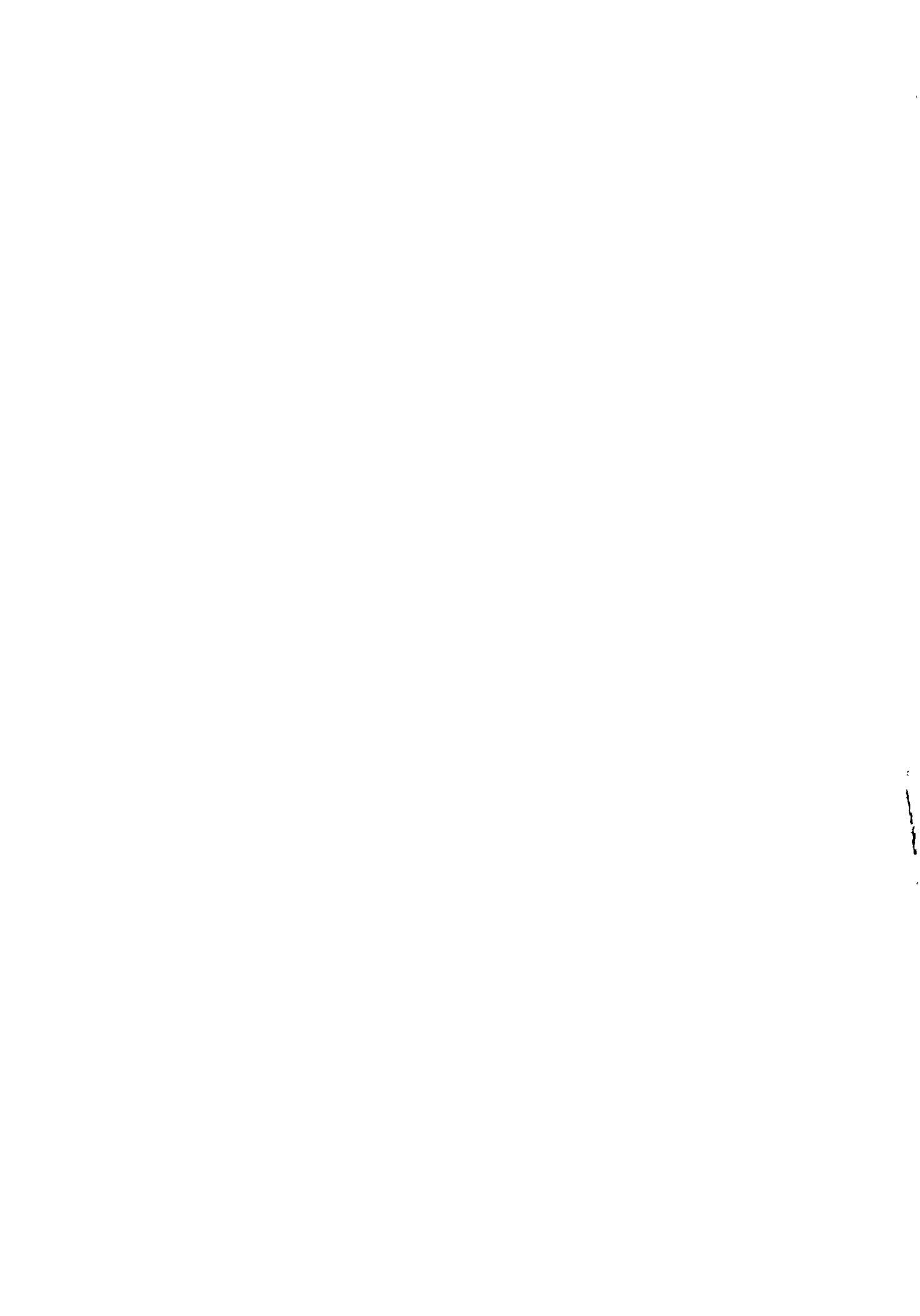


Short term Assignments:

The following short term consultant services have been provided by the Project during Phase V:

- **Mr Jari Rajamäki, Electrical Engineer, 3 weeks** in February 1988 for handing over his duties to Mr. Markku Valtokari, Waterworks Adviser I
- **Mr. Olavi Eloranta, Training Specialist, 3 weeks** in April- May 1988 and 2 weeks in February 1989, for preparation and introduction of the Comprehensive Training Programme
- **Mr. Pekka Sarkkinen, Mechanical Engineer, 3 weeks** in November- December 1988 and 2 weeks in May 1990, for Mkunya Makote Rehabilitation Programme
- **Mr Yrjö Honkanen, Electrical Engineer, 12 weeks** in March- May 1990, for Mkunya Makote Rehabilitation and design of electrical rehabilitation of Project houses *
- **Mr Yrjö Honkanen, Electrical Engineer, 12 weeks** in July- October 1990, for electrical rehabilitation of Project houses *
- **Mr. Ilkka Mikkola, Electrical Engineer, 8 weeks** in September- October 1990, for Feasibility Study on Electrification of Kitangari Pumping Station
- **Mr. Elis Karsten, Water Supply Engineer, 9 weeks** in October- December 1990, for Makonde Plateau Distribution Network Study and finalizing the Project Document for Phase VI

* Appointed by RIPS- Project, working only part time for the Water Project)



2.32 Tanzanian Staff

The Project has been integrated to the Regional Offices of MAJI in Mtwara and Lindi. The practical work has taken place between counterparts, i.e., the advisers and the sectional heads of the above mentioned offices. The counterpartship has been formed between the following officers of the parties:

Counterpart (Project)	Counterpart (MAJI)	
1. Project Coordinator	Regional Water Engineer	Mtwara
"	Regional Water Engineer	Lindi
2. Community Participation Development Officer	Regional Community Participation Officer	Mtwara
3. Community Participation Development Officer	Regional Community Participation Officer	Lindi
4. Training Adviser	Design Engineer	Mtwara
	Design Engineer	Lindi
5. Water Supply Adviser	Planning Engineer	Mtwara
	Construction Engineer	Lindi
6. Waterworks Adviser I (Electrical Engineer)	Electrical Engineer	Mtwara
	Electrical Engineer	Lindi
	Electrical Engineer	Kitangari
7. Waterworks Adviser II (Mechanical Engineer)	Mechanical Engineer	Mtwara
	Mechanical Engineer	Lindi
	Mechanical Engineer	Kitangari
8. Groundwater Development Adviser	Regional Hydrogeologist	Mtwara
	Regional Hydrogeologist	Lindi
9. Handpump Well Adviser	Construction Engineer	Mtwara
	Construction Engineer	Lindi
10. Workshop Officer	Workshop Officer	Mtwara
	Workshop Officer	Lindi
11. Administrative Officer	Administration Officer	Mtwara
	Administration Officer	Lindi

The posts of some advisers have expired during the Phase and the duties have consequently been shifted to the MAJI counterparts as far as possible.

2.4 Facilities

2.41 Offices

The Project staff has office facilities in connection to the Regional Water Engineers compounds in Mtwara and Lindi. Where possible the offices of the Project and MAJI counterparts have been combined.

The Project has hired a house with office facilities in Dar Es Salaam.

2.42 Workshops and Stores

In the beginning of the Phase the workshops, garages and stores, constructed or established by the Project, still were more or less managed by the Project. There were 1 200 m² of roofed service and storage area for workshop, garage and storing in Mtwara, which was divided into the following sections:

- general store
- vehicle sparepart store
- oil and chemical store
- garage
- plumbing, steelwork and welding section
- carpentry workshop
- fuel store

In Lindi there was a garage with sparepart store for basic service of vehicles.

The workshop with office and stores facilities at Kitangari pumping station in Mitema village, constructed in 1987, were furnished and equipped during the Phase. There is an old store for distribution network construction and maintenance at Kitangari from the previous Phases, as well.

Nanganga Quarry was handed over to RWE, Mtwara, early 1988 to be used for MAJI activities like ring production etc. The workshop at Nanganga Quarry, mainly utilized for field maintenance, was badly damaged during the floods in spring 1990. Only some of the facilities were at use in the end of the phase.

Establishment of proper workshops for districts was carried out during the Phase. Basic facilities have been provided for each district, except Mtwara, in the project area.

At the end of the Phase the Project does not have any separate workshops nor stores but all facilities have been handed over to the Regional or District Water Engineers Offices or to the Makonde National Scheme. By the end of June 1990 all the material in the stores were shared between the districts and the regions as agreed and only Peter Unde, the store keeper for Mtwara Regional Store was paid by the project. The sparepart store for project vehicles was, however, under the project up to the end of 1990.

2.43 Vehicles and Equipment

The number of vehicles at the Project's disposal has varied as follows:

	01.01.1988	31.12.1990
- light vehicles	24	38
- lorries	5	6
- motor cycles	4	17

The condition of the vehicles is partly very poor because of their high age. In the end of the Phase 18 vehicles of the total 44 (lorries and light vehicles) are more than 3 years old out of which 12 more than 5 years old. All vehicles still in use have been supplied by FINNIDA.

During the Phase most of the equipment was handed over to MAJI. List of the Project's equipment and vehicles in the end of Phase V is presented in Appendix 1.

2.44 Mtongwele Training Center

Training at Mtongwele Training Centre was initiated in late 1986. During the Phase the classroom, teachers' rooms and the trainees' accommodation facilities have been extended and improved. Design for extension of the centre was completed in June 1990. The implementation of the extension was agreed with MAJI and incorporated into the of Kitangari housing project, to be carried out by the Construction Supervisor under RIPS project.

2.45 Accommodation

There is a compound of 15 houses constructed by the Project during 1973- 1974. The Project had 7 houses at its disposal in the end of the Phase, while 8 houses were given to the use of other FINNIDA funded projects in the area.

There are one house with 2 combined departments, constructed by the Project, and one hired house at the disposal of the Project in Lindi as well as one dwelling house in Kitangari.

2.5 Financing of the Project

During the years 1988- 1990 the Project was financed by the governments of Finland and Tanzania.

Manpower costs and accommodation costs of Tanzanian staff as well as telecommunication costs were paid by the Government of Tanzania. All other costs were met by the Government of Finland.

The provision of funds has been as follows:

Government of Finland:	1988	1989	1990	Total	
	FIM	10.986	16.722	17.115	44.823
	USD	3.030	4.653	4.720	12.403
Government of Tanzania:	1988	1989	1990	Total	
	TAS	4.350	13.116	12.784	30.250
	USD	22.0	66.6	64.9	153.5

Exchange rates as per July 1990:

- USD 1 = TAS 197
- USD 1 = FIM 3.626

2.6 Reviews and Evaluations

Four review and evaluation missions visited the Project during Phase V. The members and time of each mission were as follows:

Review Mission 29th August to 03rd September, 1988

- Mr. J. Toivonen, FINNIDA (Team Leader)
- Mr. P. Silfverberg, FINNIDA
- Mr. A. Luukkainen, Embassy of Finland
- Mr. Y. Rugeiyamu, Ministry of Water
- Mr. M. Macha, Ministry of Water
- Mr. E. Kontula, Consultant

Monitoring Mission 31th March to 06th April, 1989

- Mr. J. Toivonen, FINNIDA (Team Leader)
- Mr. P. Silfverberg, FINNIDA
- Mr. Y. Rugeiyamu, Ministry of Water

Evaluation Mission 22nd January to 09th February, 1990

- Ms. U. Airaksinen, FINNIDA (Team Leader)
- Mr. N. Carefoot, WHO
- Mr. O. Purhonen, World Bank
- Mr. J. Kobalienda, Ministry of Water
- Ms. H. Gondwe, Ministry of Water

Appraisal Mission 22nd March to 28th March 1990

- Mr. P. Silfverberg, FINNIDA (Team Leader)
- Mr. H. Wihuri, FINNIDA
- Mr. J. Kobalienda, Ministry of Water

The report of the evaluation mission has been published in March 1990.

3. DEVELOPMENT IN PHASE V

3.1 Overall Development

The Project has made a clear progress towards the overall objectives of the project as well as the specific objectives set for the Phase. The development of the coverage of population by improved water supply has been positive even if the target figures for the Phase have not completely been reached.

Coverage of Water Supply

The coverage of the population of the project area by an improved water supply was estimated to 27 % in the end of 1987. The latest census, taken in 1988, showed a population of 1.56 million people. Based on this data the population covered with an improved supply was in the beginning of Phase roughly 421 000 people.

At the end of the Phase approximately 1 428 000 people, or 90 % of the population, lived within public water supply services as follows:

Type of supply	Population Total 1990	Population Served 1990	Coverage 1990 (%)

Handpump supplies (operational)			
- Mtwara	(914 572)	120 847 1)	13.2
- Lindi	(669 830)	221 044 1)	33.0
Handpump supplies (not supplying)			
- Mtwara	(914 572)	70 092 1)	7.7
- Lindi	(669 830)	90 268 1)	13.5
Piped supplies			
- Mtwara	(914 572)	381 408 2)	41.7
- Lindi	(669 830)	180 854 2)	27.0
Piped supplies			
- Mtwara	(914 572)	97 903 3)	10.7
- Lindi	(669 830)	-	0.0
Piped supplies (4)			
- Mtwara	(914 572)	90 542 4)	9.9
- Lindi	(669 830)	175 824 4)	26.2

Total	1 584 402	1 428 782	90.2

1) According to follow-up safari July- August 1990.

2) Figures show population receiving service up to standards more than 50 % of time. People with service less than 50 % of time excluded the figure.

3) Figures show population receiving service up to standards less than 50 % of time.

4) Population within schemes not operated

3 240 891
 3 160 360

 502 251

Only few of the piped schemes do serve the population continuously. Therefore an estimate of the actual coverage has been worked out on the following assessments:

- schemes operated more than 50 % of time give an acceptable level of service (i.e., up to standards) to 75 % of the (design) population within their distribution areas
- schemes operated less than 50 % of time give an acceptable level of service to 25 % of the (design) population within their distribution areas
- non functional schemes completely excluded the calculation

This reduced coverage would be 788 063 people or 49.7 % of the population. The target set for the Phase, 40 % or 634 000 people, was reached.

Health Situation:

The regional reports of occurrence of water born diseases have been showing slightly decreasing figures during the Phase. The situation got temporarily worse in 1990 when floods of Lukuledi River caused wide damages in Mtwara, Lindi and Newala districts. The floods were followed by a cholera epidemic which, however, was limited to the flood damage areas.

The situation in areas with operating improved water supplies has not been systematically followed up or reported. In general, the cases of water born diseases in these areas seem to be less and no epidemics have occurred. The statistics of water born diseases in the Project area from 1987 till the end of 1990 is given in the following table:

DISEASES	WHOLE PROJECT AREA IN			
	1987	1988	1989	1990
Dysentery	2 630	*	220	*
Diarrhoea	23 375	16 853	4 525	*
Typhoid	29	173	*	*
Hookworms	*	766	*	*
Bilharzia	5 485	6 602	*	*
Cholera	0	0	0	222 1)

* No data available

1) 24 death cases

Economic Development:

The Project has not been able to produce statistic data on the improved economic activity in the project area

that would originate from the improved water supply. Nor has such data been made available by the government.

The progress in the five key sectors has been assessed more in detail under paragraphs 3.2 to 3.6 where a comparison of the actual materialized outputs to those given in the Project Document has been made as well.

3.2 Integration of Organizations

The stage to stage integration of the separate organization of the Project to those of MAJI was initiated already during Phase IV. Shallow well construction and maintenance activities were integrated into the district organizations of MAJI and personnel, trained by the Project, was transferred to the District Water Engineers Offices. The necessary equipment was handed over to districts as well.

Integration of the supporting activities, still under the Project in the beginning of the Phase, was organized during the first one and half years of the Phase and was finalized during summer 1989. However, the sparepart store for vehicles was under the project up to the end of 1990.

Organizing the integration of the Project organization (expatriate adviser organization) to the Regional offices of MAJI was started right from the beginning of the Phase. This was carried out through the following steps:

- up-dating the organization charts of MAJI; defining all posts and occupations
- reorganizing counterpartships between sectional heads of the Regional Water Engineers Office and advisers in order to cover all activities
- each adviser getting acquainted with the pieces of organization to cooperate with
- integration of office facilities
- each adviser advising and cooperating with his counterpart in planning and organizing the activities of his sections and developing improved management practices

Negotiations on changes in the Project Document for the Phase, which delayed the recruitment of some advisers, however, retarded the progress and the integration was completed only in June 1988.

3.3 Institution Building

3.31 Management

3.311 MAJI

Institution building has taken place through strengthening the management of MAJI in the Project area, improving the physical working conditions and developing the supporting activities in the Regions and Districts.

Management procedures

Activities still run under the Project in the end of Phase IV were transferred to the Regional or District organizations of MAJI during Phase V. As similar activities already existed under MAJI, arrangements to incorporate these activities did not require changes in the organizational setup but only improved management practices needed to be developed.

Procedures for planning, design, construction and operation and maintenance of water supply systems as well as for supporting activities were developed and documented during the Phase as follows:

- selection of type of water supply
- criteria for selection of waterworks for rehabilitation
- planning and design of waterworks rehabilitation
- agreement form for construction or rehabilitation of village water supplies
- construction or rehabilitation of village water supplies
- handpump replacement
- construction of waterworks
- handing over certificate for water supply systems
- O&M handpump sector
- O&M manuals of piped schemes
- material support
- transport services
- material issuing procedures
- garage and workshop procedures

The introduction of the new procedures has been organized through on-the-job training. The overall development and improvement of daily management practices has been implemented through daily discussions and cooperation between the advisers and their counterparts. Additional development of the managerial skills has taken place by management

training on special courses organized by the project. Detailed information on training is given under paragraph 3.3, Training and Manpower Development.

Workplans and budgets

Workplans and budgets have been prepared and regularly revised according to the project document. These plans, however, have showed only limited influence towards more effective activities of MAJI, which continuously are hampered by the poor and untimely release of the agreed local funding.

The following plans and budgets have been worked out during the Phase:

- General and Sectoral Action Plans for the Year 1988
- Complementation of the Action Plan 1988
- Proposal for arranging some activities of Mtwara- Lindi Rural Water Supply Project in accordance to the agreed minutes of the meeting between the Ministry of Water and FINNIDA
- Continuation of Sanitation Programme after 1st January 1988
- Budgets for Material Support 1988
- Concept and Working Approach Community Participation
- General and Sectoral Action Plans for 1989
- Budgets for Material Support 1989
- Comprehensive Training Programme 1989-1990
- Training Schedule 1989
- Budgets for Material Support 1989-90
- Action Plan of Activities for the First Half of the Financial Year 1989-1990
- Revised Action Plan for the Second Half of the Financial Year 1989-1990
- Budget 1990
- Budgets for Material Support 1990
- Training Schedule 1990
- Action Plan of Ground Water Sector for April-June 1990
- Action Plan for Community Participation from April to June 1990
- Action Plan for Water Laboratory for April-June 1990

Even if financial problems, which have frustrated the planned progress, have occurred the planning has facilitated a generally better operation and an improved coordination of activities such as design, community involvement, transportation and purchasing of the imported and local materials.

Fund management

The fund management has become emphasized when aiming at incorporation of the project funds for material support into the budgets of the Regional and District Water Engineers. Efforts have been taken to achieve an undisturbed cash flow but the rather inflexible budgeting and fund management practices have made it difficult for the advisers to fully participate in the financial planning.

Lack of liquidity, caused by late release of local component of the funding, has occurred during the Phase. This has affected the operations of the project negatively and delayed the activities. Decreased budget allocations and liquidity problems also form the main reason for MAJI failing to pay its share for material support as defined in the Project Document.

Follow-up and reporting

Follow-up and reporting systems have been simplified and improved during the Phase. The intention has been to create a reliable system that would provide the management with accurate and up-to-date information for correct and timely decision making.

According to the recommendation of the Evaluation Mission 1990, a Management Information System (MIS) was drawn up and submitted for comments to MAJI. The introduction of the system was started at the very end of the Phase and will be completed during the beginning of Phase VI. Till that the present follow-up and reporting will be run parallel with the new system.

The Project progress reporting has been during the Phase as follows:

- Semi-annual Progress Report 1st January-30th June 1988
- Semi-annual Progress Report 1st July-31th December 1988
- Quarterly Report 1st January- 31th March 1989
- Annual Report 1st July 1988- 30th June 1989
- Quarterly Report 1st July- 30th September 1989
- Quarterly Report 1st October- 31th December 1989
- Quarterly Report 1st January- 31th March 1990
- Annual Report 1st July 1989- 30th June 1990

The Proposal for continuation of support, the Draft Project Document, was worked out by the Evaluation Mission 1990. The Draft Final Project Document was

prepared by the Project at the turn of the year after receiving comments on the draft from MAJI.

Coordination of activities

The coordination of Project activities has been organized on three levels. The Steering Committee has formed the central institution for monitoring and evaluation of the water development in the Project area. Two Regional Coordination Committees which are sub-committees of the Steering Committee, one in Mtwara and one in Lindi, have coordinated the activities on the regional level. The Advisory Committee has been monitoring the Project at the operational level.

The meetings held by the committees are less in number than stated in the Project Document. This is partly due to the late acceptance of the Project Document by the Tanzanian party, which limited all Project activities during the first year of the Phase. Thereafter the committees have met more or less regularly. Regional Water Engineer meetings were held monthly. Management meetings between the RWEs, and the Project Coordinator were held every 1-2 month.

3.312 Collaborating Organizations and User Communities

The successful provision of improved, sustainable water supply services to the project area calls not only for an clear awareness of the beneficiaries of their obligations but also an institutional readiness of the user communities to apply, construct and operate their water supply systems. The activities in the villages have since phase IV been under the Village Water Sub-Committees.

Procedures have been developed by the Community Participation Advisers to define the process and division of responsibilities in all stages of water development from application for improved services, mobilization of the community and the final taking over the operation and maintenance as well as running the systems. The future cost recovery system, which is essential for sustaining development, is possible to be directly incorporated in these procedures.

Training, transport and material support has been provided to the organization of MAENDELEO to strengthen its readiness for effective mobilization of communities. Also AFYA has been participated in this activity in order to involve the health education closely to water use issues in the villages.

The achievements of promotion of the community involvement is reported in detail under paragraph 3.5, Community Involvement.

3.32 Supporting Activities

Transportation

The vehicle fleet of MAJI in the project area has been rather poor during the whole Phase and the vehicles provided by the Project have formed a significant complement to the transportation situation. 18 new light vehicles and 3 lorries were purchased to replace old vehicles written off.

Criteria and procedures for providing transport support were worked out and the new system introduced right in the beginning of the Phase. The control of the use of vehicles was delegated to the Workshop Officer of the Project.

Later on the transport support system was further developed and divided into following three categories:

- permanently allocated vehicles
- regional transport pools
- project pool

The intention was to provide MAJI with a minimum permanent transport capacity supported by periodical allocation of vehicles from the pools for clearly identified purposes.

During the Phase the annual transport support has been in average 250 000 km by light vehicles and 150 000 km by lorries. At the end of the Phase the condition of MAJI vehicles, provided by the Government of Tanzania, was poor and the activities of Regional and District Water Engineers' Offices were strongly dependent on the Project's transport support.

Workshop Services

The workshop facilities of MAJI in general, and at the district level in particular, were assessed quite poorly organized or in practice completely missing when studied in the beginning of the Phase.

During the Phase all districts missing proper workshop facilities, except Mtwara District Workshop which still was under construction in the end of the project, were supplied with workshop units, furnished in containers. These units were equipped with basic workshop tools and machines. In districts where the facilities already

existed the workshops were rehabilitated. The basic tools and machinery was provided to these workshops, too. A training programme for workshop operations and working methods was launched for full utilization of the improved services as well.

Regional Maintenance Units were supplied with complete workshop handtool sets. The staff of the units were included in the Garage/workshop training programme.

Stores

The handpump sparepart stores, with developed procedures for all actions of the material flow, were transferred to MAJI regional and district offices already during phase IV. The training to maintain and develop the effective operation of the system continued through the Phase.

Project stores in Mtwara and Lindi were integrated into the regional organizations of MAJI. The Kitangari stores were transferred under the Kitangari National Scheme. Only the sparepart store for vehicles was kept under the project. The stores procedures were in first hand developed for organizing the extensive material support to MAJI. This included the practices for stock keeping as well as for applying mechanism for support and the follow-up of support given.

General improvement of stores operations has taken place through the training programme for the sector.

3.4 Training and Manpower Development

3.41 Comprehensive Training Programme

The preparation of the Comprehensive Training Programme was started already during the IV phase by tentative training and manpower need studies. In the beginning of the V phase the manpower survey, covering about 700 employees of the two regions and seven districts of the Project area, was carried out.

Training needs were studied separately for personnel on the different levels in the organizations. Training needs of personnel within the management and administration were identified based on the revised job descriptions worked out in connection of the manpower survey and interviews of executive officers of the Regional Offices. On skilled worker and supervisor/foreman levels detailed task analyses for 30 key professions and skill analyses for some 400 employees were carried out.

The comprehensive training programme was worked out during the first year of the Phase. It contained the information of the identified training needs, training course specifications with revised syllabuses given separately for different sectors of MAJI, information on training institutes and cost estimates of separate courses and an implementation programme with training of trainers included.

The Comprehensive Training programme was used to guide all training from beginning of the year 1989.

3.42 Training Courses

Training was given out during the first year of the Phase as a continuation to the training plans from phase IV. It was pointed to handpump and waterworks sectors. Starting from beginning of 1989 management training was introduced. Training of trainers was also emphasized and garage and workshop sector included in the training programme.

During the Phase training has been given as follows:

	Number of Courses Held		
	1988	1989	1990
Management Training	-	6	3
Training of Trainers	-	7	-
Handpump Sector	16	27	31
Waterworks Sector	15	19	21
Garages and Workshops	-	5	16
Sanitation and Health Education	1	1	1
Others	2*	1**	-
Total	35	66	72

* Village chairman seminars

** Eastern Africa Regional Conference
on Industrial Waste Water

Three out of the top management level courses were arranged abroad. See "Training abroad", page 30.

Training on sanitation and health education has been mainly limited to support to AFYA carrying out ordinary training and education through the Primary Health Care Programme. Village Sanitation Assistant training has gone on during the Phase as well.

The training on different levels and sectors during the Phase has been as follows (number of courses within parentheses):

Local community training

- village well caretaker training camps (36)

The mobilization training is reported separately in connection to the chapter 3.5, Community Involvement.

Skilled labour training

- brush-up course for District maintenance and construction foremen (3)
- preparation course for trade tests for shallow well constructors, handpump maintenance technicians and surveyors (1)
- brush-up course in shallow well surveying (1)
- course for district maintenance technicians, well construction foremen and areal technicians (3)
- shallow well maintenance for supervisors (2)
- shallow well construction for foremen (1)
- shallow well surveying for foremen (2)
- areal technician course (1)
- drillers and deep well mechanics' course (1)
- storekeepers course in stock control and stock keeping (2)
- storekeeping of waterworks (1)
- storekeepers course (9)
- well drilling course (1)
- blasting certificate course (1)
- motor vehicles course (1)
- motor vehicle mechanics grade I (2)
- motor vehicle mechanics grade II (2)
- motor vehicle mechanics grade III (1)
- plumbing course (3)
- carpentry course (1)
- masonry course (3)
- draughting (1)

Piped scheme operator training

- basic electronics (1)
- electrical trouble shooting for plant operators (1)
- control circuits of diesel generators (2)
- control circuits for electricians (1)
- operation and maintenance manuals for electrical engineers (1)
- motor starter course for electricians (2)
- design course I for electrical engineers (2)
- practical installations for electricians (2)
- trouble shooting I for electricians (2)
- trouble shooting II for electricians (2)
- electrical components and switch boards course I for electricians (1)

- diesel generators I for electricians (1)
- control diagrams for electrical engineers (1)
- diesel and pump mechanics 2 (2)
- diesel and pump mechanics 3 (1)
- trouble shooting of plant operators (1)
- plant operators course (12)
- pump and diesel mechanics course (9)
- mechanical engineers' workshop (10)
- Mkunya- Makote and Mahuta plant operators special course (1)
- water treatment technology (2)

Training of special groups

- geophysical investigations (3)
- hydrology for technicians (1)
- hydrogeology for surveyors (1)
- geophysics for surveyors (1)
- shallow well surveyor course (2)
- district drivers orientation course (1)
- geophysical investigations in hydrogeology III (1)
- operation and maintenance of hydrological stations (1)
- basic english for administrative personnel (2)

Training abroad

- Management for sustainability, Netherlands (2)
- Eastern Africa Regional Conference on Industrial Waste Water, Kenya
- study trip of groundwater development officers to Western Kenya Water Project

Training of trainers

- village sanitation assistant course (1)
- instructional methods course (1)
- areal technicians (1)
- pump and diesel mechanics (1)
- operation and maintenance of piped schemes (1)
- waterworks storekeeping II (1)
- motor vehicle mechanics (1)
- handpump drilling surveying (1)
- topographic surveying (1)

Management training

- general management (19)
- supervisory techniques for middle level management (1)
- management development follow-up seminar (1)
- management for sustainability (1)

- workshop management seminar (1)
- training in management for rural development (2)

3.43 On-The-Job Training

The course formed training has been complemented with on-the-job training. This has taken place in the daily cooperation of the advisers and their counterparts as well as in connection of the visits of the Regional and district Water Engineers' staff in the field.

3.5 Community Involvement

3.51 Working Approach

The direct responsibility for the promotion of community participation lies with the local MAENDELEO organization most of the actions falling upon the district offices. The regional offices have a guiding and monitoring role.

In the beginning of the Phase the working approach applied was that of the IV phase, only revised according to the experiences gained from the field work. The system intended to involve MAJI, AFYA, ELIMU, CCM, UWT to the practical operations in the villages. In order to strengthen the organizational set-up at all levels in the Project area the District Water Sub-Committees were formed in each district. They were to activate and coordinate the community involvement with the main emphasis on organizing the management of water supply in each village.

The responsibility for managing the water supply in the villages was assigned to the Village Water Sub-Committee, to be established in every village. The existence of this committee was also defined as the absolute precondition for any action to improve the water supply in the village by government (including donor) funding.

The revised Project document, that was finalized in late 1988, included the requirement of revision of the working approach of community participation. The integrated approach follows the previous one in main lines. It emphasizes all actions on the village level as the handpumps, domestic points and protected springs are becoming the property of the village. The village has the obligation to operate and maintain these facilities.



The new approach bases on the process of community participation turned into a mass campaign in all villages of the seven districts. A special emphasis shall be placed on leaders at all levels but especially on the village leaders. Mobilization training shall be conducted through the districts, divisions and wards to village level. To facilitate spreading the idea of communities participating in construction and operation of their water supply, organizing training of trainers for work within community involvement is essential.

The new approach underscores the flexibility of the system in regular development of the working methods and procedures as well as a proper follow-up of the effect of actions undertaken.

3.52 Training

Training within the community involvement has concentrated on training for mobilization skills for leaders, i.e. members of District and Village Water Sub-committees including CCM and Government leaders at all levels. The training was planned to base on training of trainers so that members of regional organization, after receiving the training, would teach the district level and the process continue down to the village level. Trainees have been obtained mainly from MAJI, MAENDELEO, AFYA, CCM, UWT, FOREST and District Councils. Till the end of the Phase almost 7600 people have been participating in 38 training occasions for mobilization skills as Follows:

- regional to ward levels 595 persons
- village level 6956 persons

Till the end of the Phase more than 700 villages have been involved in the training programme of the community involvement activities of the project.

Training on health education has been mainly limited to support to AFYA carrying out ordinary training and education through the Primary Health Care Programme. Village Sanitation Assistant training has gone on during the Phase as well. Cooperation with AFYA has been constant and close. Preparation of new as well as revision of old training material is continuing.

3.53 Village activities

The developed procedures require an active input of the communities in all stages of development and upkeeping as well as operation of their water supply services. As a consequence of the new dynamic community involvement activities all parties, the villagers included, are well informed and aware of their obligations and rights. The willingness for participation of the beneficiaries seems to have improved during the Phase.

490 villages out of some 800 have established a Village Water Sub-Committee. This is some 61% of all villages in the Project area. In practice this means that an institutional readiness towards the village managed water supply already exists. Consequently, as soon as the National Water Policy fully will be accepted, there will be all possibilities to proceed with the cost recovery system, too. In some 265 villages there is a village water fund raised.

In villages with a Village Water Sub-Committee the handpumps, protected wells or other water points have been handed over to the community. The latest follow-up figures indicate over 50 % of the supplies to operate properly in villages where the supplies have been handed over. In all villages the percentage is 39. The period studied is, however, short and more accurate figures can be obtained during Phase VI.

Results in the pilot areas, where training was given for community mobilization, have been promising. The villagers have contributed to the construction in 6 water supply projects with some one million shillings. The projects have included pipeline rehabilitation, construction of pump attendants' quarters and handpump replacement. The contribution has taken place in form of construction materials and labour provided free of charge. The results come from all districts, except Liwale.

3.6 Operation and Maintenance

3.61 General

The development of operation and maintenance of water supply systems has been closely linked to institution building, training and community involvement components of the project. This is also clearly stated in the output specifications of the Project Document which call for trained staff, effective management, appropriate O&M procedures and manuals as well as reliable supply of spareparts, tools and consumables.

Improved possibilities to take correct measures for development of operation and maintenance will be created by introduction of the Management Information System which provides the decision making with accurate data.

The main objective of the project is to achieve a growing and sustaining coverage of the population with improved water supply services. Effective operation and maintenance plays a central role in reaching the objective. Extensive efforts have been made to fulfill the preconditions for this: Sufficient staff, clear working procedures, appropriate manuals, well organized village management and continuous supply of spareparts. This task, however, still still requires actions during the next phase.

3.62 Community Operated Water Supplies

3.621 Handpump water supplies

The operation and maintenance of handpump water supplies has been organized on three levels as follows:

- regional maintenance centre, central sparepart store and regional maintenance officer under Regional Water Engineer's Office
- district maintenance centre, district sparepart store and district maintenance officer under District Water Engineer's Office
- village pump attendants under village leadership

The Village Water Sub-Committee is organ in charge of the water supply operations in the village.

The training of village well caretakers has continued during the Phase. In all villages, where new or rehabilitated supplies have been handed over, 2 well caretakers have been selected by the communities to be trained well caretakers. More than 700 trainees have received the training.

Guaranteeing a sufficient number of staff in the villages is not a question of training only, but also creating such conditions for the staff that they will stay in the duty. Payment for the work should be arranged at the latest in connection to the introduction of the cost-sharing.

Training of district and regional level officers for supervision, follow-up and assistance of activities in villages has continued and consisted mainly of brush-up

courses. 75 officers have received training during the Phase.

The procedures for operation and maintenance of handpump water supplies at the three administrative levels, are presented in the Handpump Maintenance Handbook. Manuals for operation and maintenance of shallow wells have been revised and translated to Kiswahili. The manuals for Village Caretakers, maintenance of NIRA AF-85 and India Mark II are available and used in Village Well Caretaker training.

Establishing a Village Water Sub-Committee in all villages is under process. In all cases of activities for improved supply in the villages the forming of the committee is required before any work can be initiated. The active operation of the committees has been emphasized and continuous mobilization training including a follow-up component is going on.

The sparepart supply for handpumps is decentralized. The regional stores in Mtwara and Lindi supply the areal stores in the districts. The village well caretakers do fetch spareparts from the areal stores. The storekeepers in the regions and the districts have received training in stock keeping and stock control.

3.622 Piped water supplies

Village Water Sub-Committees have been established in some villages where projects for rehabilitation of piped schemes has been introduced. This has been an extension of "community operated water supplies" into piped schemes. The responsibilities of the villages are planned to be in principle similar to those in villages supplied with handpumps. Development of an operating and sustaining system for community operated piped schemes is in the end of the Phase still under process. The division of financial and operational responsibilities between MAJI and the communities need careful consideration.

No persons for operation and maintenance of piped schemes by the community have been trained. Consequently the responsibility still lies on MAJI. All sparepart supply is centralized under MAJI as well.

The sustainability of the piped systems, operated by the communities, is most vulnerable because of the defects in government funding. Therefore the cost-sharing should be organized before rehabilitation of any scheme is initialized.

Proper accommodation for the waterworks attendants should be arranged at the latest in connection to the introduction of the cost-sharing.

3.63 MAJI Operated Water Supplies

Training of plant operators has continued. Follow-up of the performance of the operators has been organized in order to assess the need for additional and brush-up training.

Operation and Maintenance manuals have been prepared for schemes included in the annual workplans. The manuals have been drawn up by the regional MAJI, assisted by the Water Supply and Waterworks Advisers. Where possible the manuals have been used in training of operators the respective scheme. Manuals are available for the following schemes:

- Kitangari
- Mkunya-Makote
- Mahuta
- Mbawala Chini
- Nanyamba
- Masasi
- Chiwale
- Nachingwea
- Kilwa Masoko
- Tingi
- Simana
- Lake Kitere- Nyangamara- Litipu
- Mnazimmoja
- Ruangwa

Manuals will be prepared for each individual scheme to be rehabilitated. The manuals will include descriptions of O&M procedures for each individual scheme. As the rehabilitation is going on the work still continues during the next phase.

At the end of the phase all commonly used KSB- pumps and Lister- engines have manuals translated in kiswahili.

Sparepart supply takes place centralized through the regions. The bottle-neck seems to be in preparation of estimates for need of spare parts. On-the-job training has been given to the staff District Water Engineers' Offices in order to improve the situation.

3.7 Physical Improvements of Water Supplies

3.71 Studies

The Project Document for the Phase included three studies to be worked out to guide the physical improvement of the piped water supply systems. Two of the studies were for the problematic plateau areas of Makonde and Rondo. The third concluded all other existing schemes in Mtwara and Lindi regions. It should assess the feasibility of rehabilitation of each individual scheme and work out clear priorities for rehabilitation of feasible ones.

Rondo Plateau Study

The feasibility study for Rondo Plateau was worked out during the first half of 1989. Population and water demand forecasts were prepared, the extent of rehabilitation assessed and costs of rehabilitation as well as for operation and maintenance estimated. Figures of annual per capita costs for the rehabilitation were found to 620 TAS. As the willingness of the population to participate in the costs of the implementation was strong the project was included in the rehabilitation programme of the Project.

Makonde Plateau Study

The first part of the study comprised the invention of the present situation and condition of 7 piped schemes supplying the population of Makonde Plateau. A report was worked out in October 1989. It contained information on population, water demand, and a preliminary assessment on operation of the schemes, distribution capacities, defects of Kitangari scheme as well some detailed design for Mkunya-Makote Scheme with material and cost estimates. The study was worked out in collaboration between Water Resources Institute and the Project.

Preparation of Makonde Plateau Network Study was started in October 1990. The interim report was submitted for comments in December 1990. It contained revised forecasts for the study area, the description of the design criteria, the network model for the computerized analysis of the system and a preliminary assessment of the performance of the present network in 1990, 2000 and 2010. The final report was under process at the end of the Phase. It will include, in addition to the above mentioned information, the proposal for

improvement of the performance of the system till 2010 and the development plan for development of the water supply in Makonde Plateau.

A separate study on electrification of Kitangari Water Supply was worked out in September- October 1990.

Rehabilitation Study of Existing Schemes

The Rehabilitation Study was carried out during the first year of the Phase and the report finalized in January 1989. The study comprises the updating of the rehabilitation programme worked out in connection to Water Master Plan Revision, 1986. In the work the following components of the schemes were inspected: Condition of source, pumps and engines, condition of pipelines and domestic points, condition of reservoirs, condition of pump houses, availability of pump attendants quarters, availability of water.

Based on the inspections the need for rehabilitation and general feasibility was assessed. The priorities were worked out taking into consideration the aspects of sustainability and the importance of the scheme for the community. Schemes with high priority were studied in detailed and rehabilitation plans drawn up.

3.72 Handpump wells

Institution building, training and community participation activities carried out in order to increase the water supply have been reported under their respective paragraphs 3.3 to 3.5.

The target figures for improvement the handpump water supply as well as the achieved results are as follows:

	Achievement/Target During Fiscal Year		
	1987/88	1988/89	1989/90
Survey Activities **	24/*	33/148	68/124
Construction	36/*	38/67	60/88
Handpump Replacement	80/*	193/268	233/404
Maintenance/Rehabilitation	86/*	126/173	144/338
Well Deepening **	26/*	19/80	3/68
DTH-Drilling **	8/*	18/15	13/34

* First half or 1988 only; no target figures set

** 85 seismic profiles investigated and 25 geoelectric soundings carried out

The figures show that only some 60 % of the targets were reached during the Phase. One of the main reasons for this has been the Districts failing in allocation of funds for the programme. The performance of MAJI and

the communities, partly caused by the financial constraints, has been rather low. Finally, the result of the Phase was affected by floods in Spring 1990 which cut off the main roads in the area and hindered all normal activities.

3.73 Piped Water Supplies

Waterworks construction during the Phase was concentrating on Mkunya-Makote rehabilitation, and some schemes included in the rehabilitation programme. Rehabilitation of Rondo scheme was started in the end of 1990. Minor construction works was carried out in the Kitangari scheme.

Mkunya-Makote

The rehabilitation of Mkunya-Makote was carried out during the Phase. The work consisted the general repair of the intake and pump house structures, renovation of chemical house, replacement of defective pipe sections of the raising mains, electrification of Mkunya and Makote pump houses and installation of new pumps with piping.

The system was taken into use in summer 1990 and is supplying Newala town with its surroundings with a daily pumping of some 1200 m³.

Rehabilitation programme

The following rehabilitation projects were initiated during the Phase:

-	Kitere	(completed 40 %)
-	Lulindi	(completed 60 %)
-	Majembe Juu	(destroyed by floods)
-	Nyangamara	(completed 70 %)
-	Ruponda	(completed 100 %)
-	Mbaya/Kichonda	(completed 50 %)
-	Tingi	(completed 100 %)
-	Kiranjranje	(completed 45 %)
-	Kiwawa	(completed 45 %)
-	Mnacho	(completed 10 %)

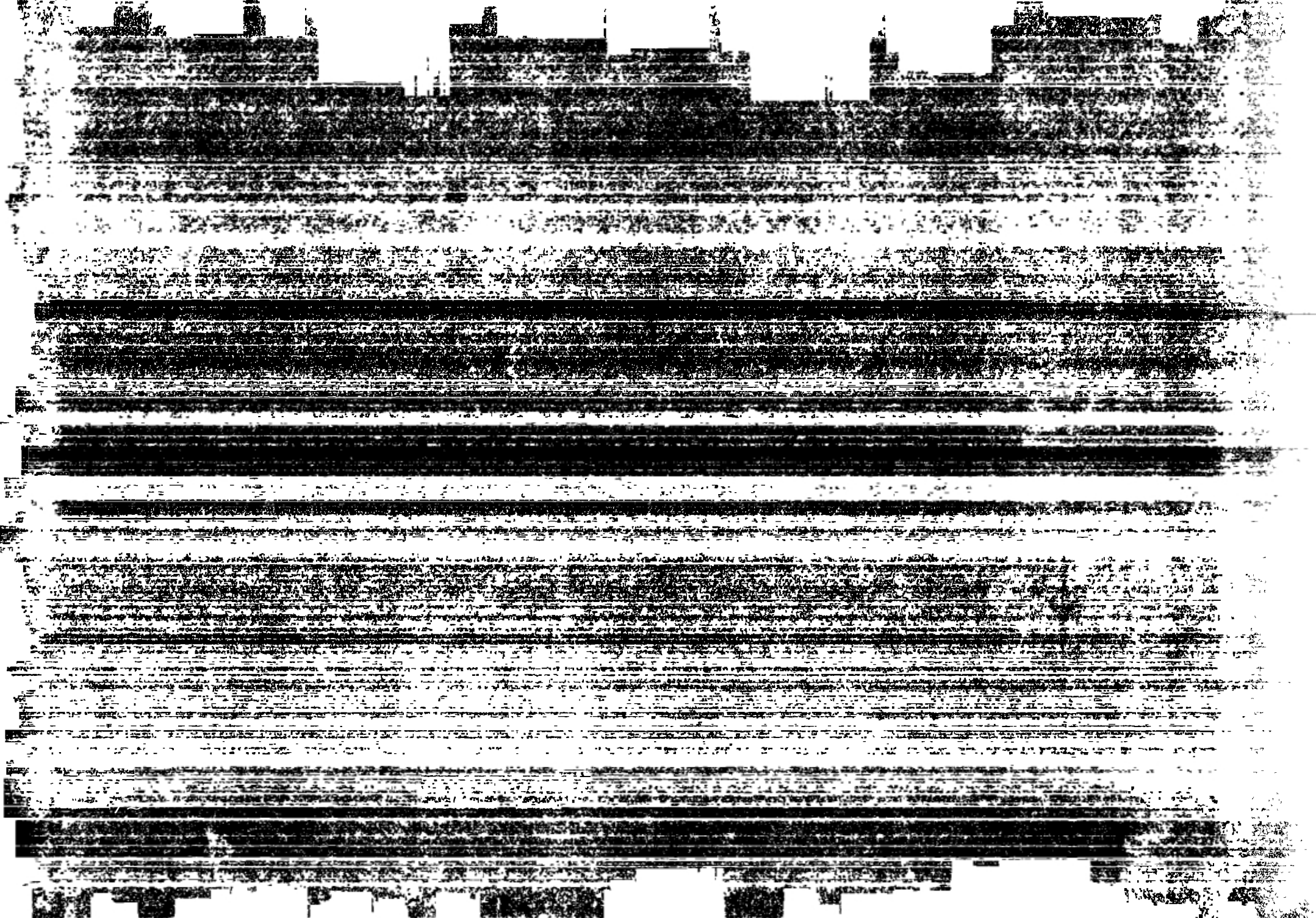
The situation is from 31th December 1990. The rehabilitation continues in the VI phase, starting from 1991.

4. LIST OF EQUIPMENT AT THE END OF THE PHASE

A stores inventory was carried out by the project in connection to the preparation of this report in March 1991. It shows item by item the stock in the beginning of of the VI Phase.

A list of equipment (excluding stock keeping records of materials, such as pipes, spare parts etc.), **still managed by the project at the end of the Phase**, is presented in Appendix 1. The stock inventory is available at Finnwater office in Mtwara and the Headquarters in Helsinki, Finland.

[REDACTED]



1. Water Laboratory

1. WATER
LABORATORY

LIST OF EQUIPMENT

ITEM	TYPE	QUANTITY	SERIAL NOS	YEAR OF PURCHASE	REMARKS
Refrigerator	Helkama	1			Good
Oven	T5042 Heraeus	2			Good
Incubator	FB 420	2			Good
Conductivity meter	BR3-338	1			Out of order
pH meter	17200 Hatch	1		1985	Good
pH kit	1470	2		1985	One not working
Conductivity meter	17200 Hatch	2		1985	Good
Analysing kit	DREL/5 Hatch	1		1985	Good
Platinizing kit	3139 YS1	1		1985	Good
Balance	7730 Microwa	1			Reported stolen
Water bath	Sybron	1		1985	Good

1. WATER
LABORATORY

LIST OF EQUIPMENT

<u>ITEM</u>	<u>TYPE</u>	<u>QUANTITY</u>	<u>SERIAL NOS</u>	<u>YEAR OF PURCHASE</u>	<u>REMARKS</u>
Hot plate	Sybron Nuova II	3		1985	Good
Stop watch	Seiko S 101 A	1		1985	Good
Bunsen burner incubator	Aqua box	1		1987	Good
Ion charger	Analyze	1		1987	Good
Turbimeter, laboratory model 2100A	2100-10	1			Good
Distiller	4867-00	1			Good
Desicator		1			Good

2. **Vehicles**

2. VEHICLES

LIST OF EQUIPMENT

MAKE/TYPE	REGISTER NO	PROJECT NO	YEAR OF PURCHASE	ALLOCATION	REMARKS
L/Rover P/U 110	TX-13225	006	1987	Lindi	
L/Rover H/T 110	TX-13224	007	1987	Mtwara/seismic	
L/Rover H/T 110	TX-13008	008	1987	Lindi	Overtuned
L/Rover H/T 110	TX-13010	010	1987	Mtwara/construction	
Toyota P/U	TX- 9564	011	1985	Lindi	
Toyota S/W	TX- 9562	013	1986	Mtwara/project	
Toyota S/W	TX-10957	014	1986	Mtwara/workshop	
Toyota P/U	TX-11458	015	1986	Mtwara/survey	
Toyota P/U	TX-11459	016	1986	Lindi	
L/Rover P/U 109	TX- 5644	021	1982	Mtwara/drilling	
L/Rover P/U 109	TX- 5920	024	1983	Mtwara/urban	
L/Rover P/U 110	TX-14703	28	1988	Makondeko/RE	
L/Rover P/U 110	TX-14704	29	1988	Lindi/Nachingwea	
L/Rover P/U 110	TX-14705	30	1988	Kilwa/DWE	
L/Rover P/U 110	TX-14706	31	1988	Liwale/DWE	
L/Rover P/U 110	TX-14762	32	1988	Masasi/DWE	
L/Rover P/U 110	TX-14919	33	1988	Lindi/DWE	
L/Rover P/U 110	TX-14920	34	1988	Newala/DWE	
L/Rover P/U 110	TX-14921	35	1988	Mtwara/DWE	
L/Rover S/W 110	TX-14922	36	1988	Mtwara/DTH-drilling	
L/Rover S/W 110	TX-14758	37	1898	Project/mech.engineer	
L/Rover S/W 110	TX-14759	38	1988	Project/constr.engineer	
L/Rover S/W 110	TX-14760	39	1988	Lindi/training	
L/Rover S/W 110	TX-14761	40	1988	Mtwara/sanitation	
L/Rover S/W 110	TX-14915	41	1988	Mtwara/training	

2. VEHICLES

LIST OF EQUIPMENT

MAKE/TYPE	REGISTER NO	PROJECT NOO	YEAR OF PURCHASE	ALLOCATION	REMARKS
L/Rover S/W 110	TX-14916	42	1988	Lindi /C.P.-adviser	
L/Rover S/W 110	TX-14917	43	1988	Mtwara/C.P.-adviser	
L/Rover S/W 110	TX-14918	44	1988	Lindi	
L/Rover S/W 110	TX-15080	45	1989	Mtwara /RWE	
L/Rover S/W 110	TX-16301	46	1989	Project/DSM	
L/Rover S/W 110	TX-16303	47	1989	Lindi /RWE	
L/Rover S/W 110	TX-16299	48	1989	Project/GW-adviser	
L/Rover S/W 110	TX-16302	49	1989	Project/coordinator	
L/Rover P/U 110	TX-16304	50	1989	Project/administrator	
L/Rover P/U 110	TX-16300	05	1989	Kitangari	
Toyota S/W 80	TX-18647	51	1990	Project/O&M-adviser	
Toyota 4-runner	TX-18648	52	1990	Project/adm.adviser	
L/Rover P/U 109	TX- 1057	20	1983	Lindi	
Honda M/C	TX- 9568	-	1985	Mtwara/workshop mech.	
Honda M/C	TX- 9566	-	1985	Mtwara/workshop keeper	

3. **Drilling**

3. DRILLING

LIST OF EQUIPMENT

ITEM	TYPE	QUANTITY	SERIAL NOS	YEAR OF PURCHASE	REMARKS
Drilling rig	Aquadrill 461	1		1984	
Air compressor	XR210 Atlas Copco	1		1984	
L/rover P/U	TX-14922 (no 36)	1		1989	See also list of vehicles
Camping trailer	150 POL	1		1982	
Welding machine	Esab 160 KHE	1		1990	
Radiophone	Motorola	1		1990	
Pumping test eq.		1		1986	
Generator	Honda GX 4500	1		1986	
Refrigerator	Zanussi	1		1986	Mtwara/RWE's office
Water bowser	1000 litres	1		1982	
Fuel bowser	1000 litres	1		1987	
Container	Steel	1		1986	Used for drilling equipment store

4. Container Stores

4. CONTAINER
STORES

LIST OF EQUIPMENT

ITEM	TYPE	SERIAL NOS	QUANTITY	YEAR OF PURCHASE	REMARKS
Container store no 9:					
U.P.S.	Cartridge		1		
Card system	Kardex		10		
Container store no 13:					
Compressor	Atlas Copco		1		
Electrical motor	H&R 225SMB2B3		2		
Water tank			1		
Container store no 23:					
Water meters	Danfoss		3		
Control box	Danfoss		2		

4. CONTAINER
STORES

LIST OF EQUIPMENT

ITEM	TYPE	SERIAL NOS	QUANTITY	YEAR OF PURCHASE	REMARKS
Container store no 25:					
Pump	Ahlström 6FLG-3-Z	61988	1		
Container store no 35:					
Mould for concrete well rings	Steel, dia 80 cm		1		
Electrical motor	HXA 8022 B 3		1		
Electrical motor	HXA 132 SMA 2B3		1		
Electrical motor	HAX 90SCB 2B3		1		
Container store no 40:					
Engine assembly	Lister TS2	40001727TS2A001	1		

4. CONTAINER
STORES
LIST OF EQUIPMENT

ITEM	TYPE	SERIAL NOS	QUANTITY	YEAR OF PURCHASE	REMARKS
Container store no 40 (contd.):					
Engine assembly	Lister TS2	40001721TS2A001	1		
Engine assembly	Lister TS2	40001730TS2A001	1		
Container store no 41:					
Pump with motor	KSB MOVI 50/15		1		
Pump with motor	KSB MOVI 50/ 8		1		
Engine	Lister HL4	3900189HL4A10	1		
Container store no 45:					
Welding machine	Esab LHE 260		1		
Welding machine	Handy 130/380V		1		

