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EVALUATION OF DANIDA SUPPORTED WATERMASTERPLANS AND  
IMPLEMENTATION PROGRAMMES FOR IRINGA, RUVUMA  
AND MBEYA REGIONS IN TANZANIA

BRIEFING DOCUMENT PREPARED FOR  
PREPARATORY DISCUSSIONS ON  
11 AND 12 MAY 1987 (DRAFT)

Christine van Wijk-Sijbesma  
and  
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International Reference Centre for Community  
Water Supply and Sanitation,  
The Hague, The Netherlands

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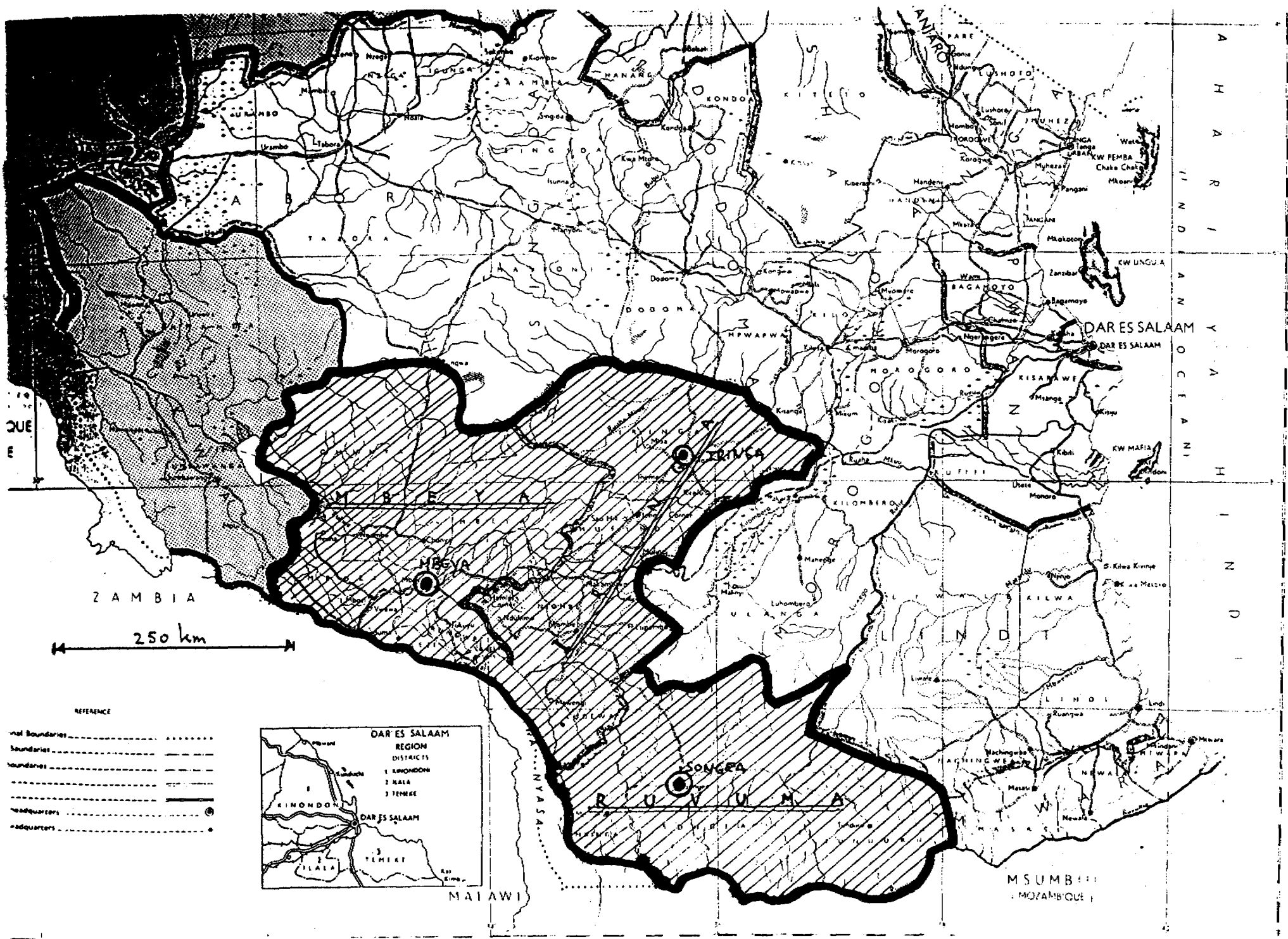
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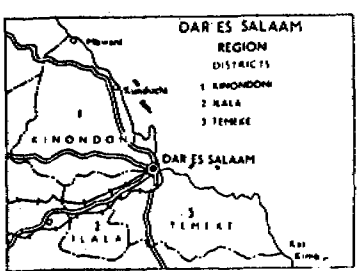
Attached copies from project documentation:

1. Proposed participatory project objectives (1983) (From WMP Socio-Economic Studies, Volume 13)
2. Proposed implementation project objectives (From Annual Review Mission's report, October 1985)
3. Water Master Plan village water supply proposal: Diagrammes indicating numbers of villages and existing or proposed water supply system types (From WMP-Summaries)
4. Organigrams as presented in the first three year implementation plan (1983)
5. Organisation Chart for Personnel Administration (1986 Review Mission Report)
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THE PROJECT AREA



- REFERENCE
- National Boundaries
  - District Boundaries
  - Regional Boundaries
  - Provincial Boundaries
  - Headquarters
  - Sub-headquarters



MALAWI

MSUMBI  
MOZAMBIQUE

## ABBREVIATIONS AND ACRONYMS

AFYA	- Ministry of Health
AJRM	- Annual Joint Tanzanian/Danish Review Mission
AT	- Appropriate Technology (for village self-improvements)
BRALUP	- Bureau of Resource Assessment and Land Use Planning (now:IRA)
CCKK	- A consultancy consortium of Carl Bro International A/S, Cowiconsult A/S and Kampsax-Kruger
CDO	- Community Development Officer
CDR	- Centre for Development Research, Copenhagen
DANIDA	- Danish International Development Agency
DC	- District Council
DKK	- Danish Kroner
DP	- Domestic Point
DSM	- Dar es Salaam
DSU	- DANIDA Steering Unit
GoD	- Government of Denmark
GoT	- Government of Tanzania
HPW	- Hand Pump Well
IRA	- Institute of Resource Assessment, University of Dar es Salaam
KILIMO	- Ministry of Agriculture
MAENDELEO	- Ministry of Community Development, .....
MAJI	- Ministry of Water and Energy (now: Ministry of Water)
MMU	- Mobile Maintenance Unit
O&M	- Operation and Maintenance
PS	- Piped Supplies
RIU or IU	- Regional Implementation Unit
RSC	- Regional Steering Committee
RWE	- Regional Water Engineer
RWMP	- Regional Water Master Plan
SEC	- Socio-Economic
SECA	- Socio-Economic Assistant
SW	- Shallow Well
TAS	- Tanzanian Shillings
VPC	- Village Participation Coordinator
VWC	- Village Water Committee
WMP	- Water Master Plan

## 1. INTRODUCTION

### 1.1 Origin and history of the project

In 1971, a declaration was issued by the GoT "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" (1). As part of this endeavour, bilateral donor agencies were asked to assist in preparing Regional Water Master Plans. The first plan was completed in Shinyanga Region in 1974. The plans for Mbeya, Ruvuma and Iringa were prepared with assistance from DANIDA. All regional plans were originally meant to contribute to a national water master plan.

A joint appraisal study was carried out by MAJI and DANIDA in October 1978 (2). The 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, an independent (?) 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. *(Don or Sakam)*

*Piped supply*  
The engineers' part was carried out from January 1980 to March 1982. The socio-economic part took from March 1980 to May 1983. Concurrently, between January 1980 and December 1983, the RWEs carried out a pilot (Phase I) implementation project with assistance from CCKK, CDR and IRA. This pilot phase covered schemes originally planned by MAJI (RWE), and aimed at community participation in planning and O&M, next to the more rural self-help contributions during construction (4, 14). A total of 11 PS for 23 or 24 villages and 113 HPWs were constructed (1;20). Total number of villages served were 49 (33, IX). Ten more PS for 21 villages were under construction at the end of Phase I (20, 33). The interim period from (officially) March 1982 ended in September 1983 when the agreement for Phase II was signed. It envisaged serving 300 high priority villages with an improved water supply according to the RWMPs in five years. Pilot projects on hygiene and sanitation would be carried out in an unspecified number of villages (1, 17, 20). The agreement also indicates that a programme covering 633 villages which have been given high priority would cost approx. DKK 400 million and could be implemented over a period of 10 years (22).

The 1984-1986 implementation plan (19) indicates MAJI (RWE) as executing agency, and emphasizes organizational improvements within the regional water engineer's office as a prerequisite for success. Much attention is paid to operation and maintenance next to developing long-term construction capacities. Progress reports (25, 26) show, that independent implementation units were created with increased responsibility for DSU and CCKK.

In October 1985, a total of at least 90 villages had been served (49 PS, 34) with HPWs, plus at least 7 villages with HPWs in Ruvuma (22, 21, p.41). In 61 villages, a PS was under construction (22, p.8, 10-13). Another source gives these figures as 53 and 40 villages respectively per 31/12/85 (33, IX, p.5). In one village, a hygiene and sanitation improvement programme has been carried out. Five systems in Mbeya (4 single PS, 1 two-village system) had been handed over to the villages. During 1986, another 16 village supplies were handed over. A mobile support organization for O&M has been set up under the Mbeya RWE (22).

The work is coordinated by a DANIDA Steering Unit established in 19.. within the DANIDA Mission in Dar es Salaam. Further, 3 annual joint review missions (20, 21, 22) have been carried out by DANIDA and GoT to review the work done and make recommendations on the direction to take.

An in-depth study on the functioning, use and village participation has been carried out by students from CDR and IRA in 6 villages. Initial results of this study will be made available to the evaluation team before departure.

Progress has been slower than assumed, so that it is expected that by 1988, 150-200 villages will have been served using most of the planned budget (1).

The budget for the RWMP preparation was DKr. 74 mill. (price level 1979), (1, 5). The budget for the implementation project was DKr. 249 mill. (price level Sept. 1982) (1).

## 1.2 Purpose of the evaluation

"The primary objective of the Mission is to perform an evaluation of **project objectives, implementation and performance** from a **general Tanzanian development perspective** as well as from the point of view of the **overall development strategy for the water sector**" (1).

Discussions in Copenhagen revealed that DANIDA is not so much interested in the Mission's views on possible links between water and development, as well as in the views of the Tanzanian authorities other than MAJI about the priority of the water sector as compared to other development sectors like transport and communications. Recent developments in economic policy in Tanzania (5) are of particular relevance in this respect.

After almost 10 years, DANIDA wants an independent outside evaluation on whether what was done so far was right and in what direction to proceed. Of particular concern appears to be the choice of surface or groundwater. Originally, surface water was considered most suitable for various reasons, including geohydrology and geomorphology (see 3.2). Problems with capacities of surface water sources, water quality control, greater availability of groundwater, and user acceptance of groundwater may now require a different emphasis. This is related to water resources studies carried out during the first phase of the project (WMP). These studies provided useful regional data, but possibly did not provide sufficient guidance as to local water supply source selection. In view of this, it will be important for the project to recommend an approach to improve procedures for source and technology selection.



## 2. WATER SUPPLY AND SANITATION IN TANZANIA

### 2.1 Sector policy

#### 2.1.1 Sector policy objectives

Tanzanian **sector policy objectives** as formulated in 1971 were:

- "to provide a source of clean, potable and dependable water within a reasonable distance (less than 4 km) of every village by 1981 as a free basic service" (2);
- "to provide a piped water supply to the rural areas by 1991 so that all people will have ease of access (less than 400 m) to a public domestic water point (2, p.2) and a quantity of 30 l/c/d (2, p.11).

Later, the **target** was reset as 1990, coinciding with the IDWSS target.

Revision of the 1991 target was recommended at the Arusha Seminar in March 1983. The seminar brought together the Tanzanian sector depts. and the donors involved in RWMPs and implementation and was organized by NORAD in cooperation with MAJI. The seminar resulted in an action plan for the formulation of an integrated sector policy with emphasis on operationalization and institution building (31). A follow-up meeting has been announced by MAJI on 21 June 1987 (32).

The 1980's have seen a steady decline in design and construction of water supply schemes, in particular large and complex ones. The national budget for operation and maintenance of water supplies increased from TAS 96 million in 1980/81 to TAS 138 million in 1983/84. Actual requirements were estimated at TAS 700 million (34).

DANIDA does not have specific **water sector policy**, but has recently formulated general policy guidelines for DWSS projects (3). Major aspects are:

- support to IDWSS targets of basic quantity of safe drinking water and basic sanitation (incl. waste water disposal) for all;
- reduction of time and burden of water collection by women and children should lead to improved quality of life and sometimes increased productivity;
- equal access to maximal number of people;
- simple and affordable technology, suitable for village O&M; deep boreholes, motor-pumped schemes and water treatment to be avoided when possible;
- a policy for water quantity, quality, design criteria, selection (p.4-5), access (p.2) and reliability must exist;
- a policy for O&M and financing must exist or be formulated (p.3), including, if feasible, user charges and kiosks (p.6);
- on-site sanitation (p.3) and health education (p.7) to be included;
- implementation to be part of institution building (p.4) and training for planning, implementation and maintenance (p.7);
- negative environmental (overgrazing, erosion, standing waste water (p.4) and health (p.7) effects to be avoided;
- village participation, including especially women in all phases and including self-help (p.5-6);
- pilot projects or water master plans often needed before implementation (p.5);
- combination with other economic and social development to be considered.

The policy guidelines do not give a "hierarchy of short and long-term objectives", but emphasize low-cost design and construction, good access for all, reliable maintenance and supplementary sanitation, hygiene education and other development inputs as means for health benefits (p.7), quality of life (p.2) and economic gains (p.2).

### 2.1.2 Relationship with general Tanzanian development

In the 1960s, the GoT started a village programme for easier provision of social services (including water), higher economic production and reduced urban migration. The programme took off with a gradual and voluntary approach but was accelerated in 1975 for completion by 1976 (5). A crash programme for construction of new water supplies was initiated in March 1975 to prevent that the villagers would leave the new cooperative settlements. The schemes provided free water for domestic purposes through public taps (2).

The internal and external economic crisis led to a deficit in the Tanzanian economy of US\$ 300 mill. in 1985. Half of the export had to be used for debt servicing. In June 1986, Tanzania signed a loan agreement with IMF. By emphasizing imports for 3 years and stimulating internal consumption, GoT has prevented the social unrest it feared as a result of stringent loan conditions. The IMF loan also opened the door for new loans from the World Bank and other donors.

The loans are directed especially at the increase of production, consumption and export of food and cash crops and the transport sector. In 1986, lack of transport meant that a great part of the (good) harvest could not be redistributed and exported. Approximately half of the estimated 11.500 lorries were out of order due to lack of spares and tyres and the others suffered from the lack of (imported) fuel.

It has to be found out to what extent the new economic policy affects the views of the Tanzanian authorities on the priority of the water and sanitation sector. This regards such issues as the choice between quick, large-scale coverage of high need villages versus the slower institutional development (32). It also regards DANIDA's decision to import construction materials. The over-valuation of the Tanzanian shilling means that a choice must be made between short-term project economy and efficiency and long-term development policy. This and other economic decisions appear not to have been taken consciously (33). Another decision to be taken appears to be the proper balance between construction and longer-term activities such as training and health education (32; 33, p.38).

## 2.2 Project objectives

The feasibility study (2) gives as general objectives for water projects: **improved health conditions, time savings, and indirect benefits of economic development and stimulation community spirit.** It mentions as conditions a more integrated project approach, including sanitation, health education and agricultural extension. Benefits for women are questioned as they may have to spend time-gains on other, heavier and less social work than water collection. The sec. study should look into these aspects.

Stated objectives for the master plan study are:

- "to provide the GoT with firm recommendations for the development of the water resources of Iringa, Ruvuma and Mbeya Regions over the

period 1981-1991, and in brief outline for an additional 10 years"... with "particular emphasis ... to the supply of water to villages for human and livestock use. Reliable low-cost sources of quality acceptable to Tanzanian authorities are to be identified for every village within the regions" (5);

- to carry out socio-economic studies at village level in all villages and at household level in selected villages in order to:
  - \* establish guidelines for water master plans prior to implementation;
  - \* provide a baseline for evaluation;
  - \* determine additional inputs to achieve health impact (2) (subsequently reformulated and expanded: see (13)).

It appears that no development concept and objectives for rural water supply projects have been agreed upon, either as part of the water master planning or at the start of the implementation project (32, p.5). The sec. group formulated some recommended objectives for community participation (14, copy p.2.1-2.2), but these were never accepted at the level and by the organizations necessary (32).

This situation has especially affected the planning and implementation of the relatively modest health education, sanitation and training components (33, p.38). Recently, proposals have been made for filling in these components (for details see sections 4.7 on health education and 5.2 on training).

The 1985 annual joint review mission confirms the lack of formal project objectives. It states the implicit project objectives and gives recommendations for operational objectives or means including maximum number of people served with available resources, highest degree of village participation, low maintenance costs through simple and reliable technology, and selection of reliable and protected sources (22).

ToR for CCKK contain suggestions for village-based maintenance and maintenance support system and implementation plans to be realized "before the end 1991, including timing, financing and manpower plans for each phase", but without detailed designs (5, copy p.2-4). The ToR also contain details on the data to be collected on water resources and existing schemes. As guideline to cost, an average of TAS 240 (1976) per design capita was given, based on WHO/WB (sector?) survey data in Tanzania (5).

The target for completion of the RWMPs was 2 years, in line with recommendations of joint Tanzanian/Danish appraisal. Fines on delays were mentioned (32, p.3, point 5) but not found in ToR for CCKK (5).

The target of the implementation project was to serve 300 as yet unserved high-priority villages by 1988 (not including those served during the WMPs (?)).

### 3. WATER MASTER PLANNING

#### 3.1 The concept of water master plans

The plan for a WMP originated from a Tanzanian engineer in the 1950s and resulted in a proposal prepared by a Swedish consultant. The original idea was to select a self-contained area, make a master plan for that area, implement it and then go on to the next area. In the 1970s, the plan had changed to the preparation of a master plan for each of the 19 Tanzanian administrative regions (the twentieth is DSM-urban). Various donors agreed to support the preparation of regional water master plans, each in two or three selected regions: DANIDA (Iringa, Mbeya, Ruvuma), SIDA (Kagera, Mara, Mivanza), DGIS (Morogoro, Shinyanga), NORAD (Rukwa, Kigoma), and FINNIDA (Mtwara, Lindi). The first region to prepare a WMP was Shinyanga Region, with Dutch assistance. Thereupon Dutch assistance was divided between implementing a part of the Shinyanga WMP (handpump wells) and directly implementing a handpump and piped water supply programme in Morogoro Region, with only a limited regional survey, as a WMP was considered not necessary. In most other regions, full WMPs have been prepared.

Opinions on the value of WMPs vary. A former member of the sec. group criticises the concept and approach, stating that it is an urban concept, geared towards collecting massive data, part of which are outdated at the time of actual implementation and with emphasis on construction and planning for a target which was already known to be unrealistic at the starting time. Stated is that only ca. 10 pages are devoted to maintenance, which is crucial. Further, WMPs without incorporating some field work (pilot projects, action research) in an early stage does not allow learning-from-doing and feeding those experiences back into the planning process (32).

CCKK spent most time on visiting each village and collecting basic demographic, physical and socio-economic data. They feel that the overall effort has been valuable because hardly any reliable data existed before. A good data base has now been established and is continuously being built up. But if they had to advise DANIDA now, they would propose to select any area which is manageable (for implementation?) and make a good impact on that area, using the data of the WMP for that purpose (32).

#### 3.2 Preparation of water master plans

##### 3.2.1 Procedures

The WMP teams visited each village in the 3 regions and collected data on the existing water and socio-economic situation. Questions on the sec. aspects had been prepared by BRALUP. Village studies were carried out by Tanzanian water supply engineers and survey staff. Standardized sheets and sketch maps were prepared for each village. Much effort was put in computerizing the collected data in view of future use. Computerization was carried out in Denmark. Meanwhile, the socio-economic (BRALUP) group carried out an in-depth study on sec. aspects of RWSS in selected villages (see 3.4). In addition, separate hydrological and geo-hydrological studies were carried out in specific areas, guided by the premises of the WMP (1. surface water; 2. groundwater) and already available data at MAJI etc.

### 3.2.2 Surface water investigations

The feasibility study had strongly recommended gravity schemes because of the simpler technology and availability of good quality mountain streams (2, p.19). CCKK supported this view: gravity schemes are low-cost, incl. for O&M; labour intensive; good potential for CP; observations showed good sources available and potential for expansion present (12). Moreover, very few geo-hydrological data were available for the regions and based on general observation, the potential for HPWs seemed low. Further, the sec. group study also recommended surface water, because people used mostly surface water and rated spring/stream water as highest perceived quality. Being used to soft water of high acidity, the harder groundwater might be rejected as being too saline, even when tests show levels within accepted norms. The water resources study therefore first investigated if a surface source of sufficient scope could be identified near each village or group of villages and if it was above upstream of all human settlement. Single samples confirmed good water quality at high levels. In some areas additional low-flow gaugings were recommended (8). (See further briefing document prepared by Mr. van der Gun).

### 3.2.3 Hydrological study

In the overall area, separate hydrological studies were carried out on rainfall, evaporation and run-off, including a complete field-measurement programme in 1980, and analysis of rainfall records from 289 stations and run-off records from 74 stations. The first objective of this study was to assess water availability for human use. A secondary objective was a more general study to determine the overall water balance in the area, to determine the distribution of water availability for all purposes in the area, including existing water rights (also informal rights of use?). This has resulted in regional and zonal maps on water availability and balance. (See further briefing document prepared by Mr. van der Gun).

### 3.2.4 Groundwater investigations

Where no adequate surface sources of good quality was found, groundwater for shallow wells was checked as second priority. An additional drilling programme was carried out in potential groundwater areas. Thus, relatively small zones for groundwater development were identified in each region. CCKK meanwhile recommended continuation of geo-hydrological studies, as no detailed data could be collected. The Joint Review Mission states in Febr. 1984 "the potential for shallow wells in Iringa and Mbeya is unfortunately nearly exhausted" (20, Ann.4, p.2). Since then, and through additional short-term consultancies for investigating, it appears that a larger potential for groundwater exists than originally assumed (see section 4.2). (See further briefing document prepared by Mr. van der Gun).

### 3.3 Water supply studies

Based on the initial survey and the supplementary data from the hydrological and geo-hydrological studies, a choice was made on the type of technology (piped gravity scheme or handpump well) and size of scheme (single village scheme/group scheme). In a limited number of cases, additional treatment was planned. An overview of the selected water

supply technologies for each village or group of villages is given in Ref.8, 10 and 12, copy Figs. 6.3 and 6.4 (attached).

The WMP also proposed revised design criteria for rural drinking water supply. These were based to a great extent on the input from the sec. group, which studied women's source selection criteria and actual water use practices of rural households. Proposed were: 25 l/c/d (instead of 35), a peak factor 3, and 400 m maximal distance to a water point, but with adaptation to specific local conditions possible (when necessary for 100% use? this is not explicitly stated). The planning period remained 20 years according to national design criteria (except in case of excessive growth, then 2 phases of 10 years) (8, p.5.18-5.20).

For each piped scheme, a general sketch-plan was made. During the implementation plan, detailed designs and plans would be made. Estimates of implementation costs were prepared for each scheme component in TAS (July 1981 prices) and the per capita costs estimated for each scheme by dividing total estimated costs (July 1981) by the estimated design population in the year 2006. Costing was based on the use of local materials, construction by MAJI staff and adoption of the proposed design criteria. During implementation (Phase II), it was decided to use imported pipes, as these would reduce construction costs by an estimated 30% (see section 4.9).

Each village then got a summary sheet, stating the most appropriate type of system, whether single or multiple village supply and per capita cost for the village concerned. Total cost-estimates in million TAS (price level July 1981) for each region are given in Fig. 6.5 of Ref. 8, 10 and 12 (copy attached).

For implementation, high priority villages were selected, depending on: 1. need and 2. least cost/most people. Indicators of need are high health risk (as indicated by outbreak cholera/typhoid within last 3 years, high density settlement and/or poor water quality); low accessibility (distance etc.) and low source capacity (water shortage) (13).

#### Other water uses

In addition to the potential and proposed utilization of water for improved drinking water supply, the WMP also established data on water availability for other uses. The WMPs assess in broad lines, potentials for agricultural irrigation and hydropower in each region and give general recommendations on its development. For hydropower, 35 potential sites are identified in the 3 regions. Development of small-scale plants is favoured (8, 7.16-7.18).

Before starting an irrigation programme including detailed studies, infrastructure (especially roads, transport) and agricultural extension should be improved first and a good credit system for small farmers established. Also needed are soil protection programmes (afforestation of catchment areas and firewood programme for villagers) and control on mechanized cultivation (a soil conservation unit next to the planned mobile irrigation unit in KILIMO). Mention is also made of effective snail and mosquito control programmes in irrigation elsewhere in Tanzania (8, 7.8-7.10).

### 3.4 Socio-economic studies

#### 3.4.1 Concepts and approaches

The feasibility study recommended to include a sec. study in the master plan in analogy of the Dutch survey in Shinyanga water master plan. The study should include a general and in-depth part and be implemented by IRA (previous experience in water use studies) and CDR. In addition, and in contrast to Shinyanga, DANIDA would also support an action research project as part of the WMP study.

ToR for CCKK directed that CCKK should collaborate with the sec. group, follow its recommendations to the highest degree, involve the group in the preparation of the general village questionnaire and share office facilities with the group (5, p.5). For this purpose, the sec. researchers and WMP staff shared their offices on MAJI (RWE) premises.

The sec. group formulated specific objectives for their work (13). In accordance with the feasibility study, activities consisted of:

- assisting WMP staff in incorporating sec. variables in the overall village study carried out as part of the technical planning;
- an in-depth study on sec. conditions, water supply conditions, functioning and use, village participation, sanitation conditions and use, village and health knowledge in 6 villages (2 with PS, 2 PS planned, 2 none) in each major agro-ecological zone. In each village, one man and one woman were interviewed in 30 randomly selected households. Thus, a representative cross-section was obtained of existing project-related conditions and practices;
- an action research study on village participation and the involvement of women in a selected piped rural water supply schemes. This was part of the DANIDA-supported implementation programme of the RWEs during WMP;
- a participatory and health education pilot project in one village in Mbeya Region, in cooperation with a Tanzanian female social scientist from the university of DSM (14).

For the action work, the sec. group employed school-leavers (male and female) whom they trained on the job. During a later stage of the WMP, attempts were made to involve MAENDELEO and AFYA staff at regional and national level, but attempts were isolated and with limited success (32 and pers. comm. members sec. group). The work was reported on in two separate volumes for the 3 regions together (13, 14).

#### 3.4.2 Water use, sanitation and health knowledge

The study (13) showed that in most parts of the regions, improved water supply is a highly felt need by both men and women, though perhaps influenced by coming project (Ch.4). Latrine coverage is excellent (Ch.11): iringa 94%, Mbeya 88%, Ruvuma 81%. Health knowledge is also high, reflecting the longstanding and concerted efforts of GoT in latrine promotion and health education. Absence of latrines is positively correlated with low-formal education, low wealth and female heads of households (so no labour for pit-digging etc.). Problems exist more in quality of latrines and hygienic use. Most households would like some improvements on their pit latrines, but priority appears to be low (not in felt needs list of Ch.4).

Users select the water source with the shortest collection time. Perceived water quality (i.e. rating type of water sources) tallies with findings of Broconsult water quality study. It is an additional source selection criterium, but not for all users. In dry zones, 11% of the households interviewed takes the next source due to the quality of the first (Ch.5). Average amount of water used is 12 l/c/d, with a range of 8-17 l. Average use at the taps is 2-9 l/c/d. A design criterium of 25 l/c/d, including water losses of 5 l/c/d should be adequate for public water points. Peaks in water collection occur before 9 a.m. and from 2 to 4.30 p.m. (Ch.8). These observations were incorporated in the recommended WMP design criteria (see section 3.2.2).

A small-scale study on contamination of drinking water between "source" and "cup" was carried out in two villages, showing a significant increase in E-coli during collection of water from a safe source, a non-significant increase during storage of water from a safe source, and a significant reduction in E-coli during storage of water from a contaminated source (13, Ch.10).

### 3.4.3 Functioning and use of improved water supplies

The general village survey shows that the following situation existed in the regions at the time of the WMP (baseline for implementation):

	Iringa	Mbeya	Ruvuma
Total no. of villages	616	591	302
No. of villages with impr. supply	150 (24%)	132 (22%)	62 (21%)
Water supply system functioning at time of visit	117 (78%)	106 (80%)	48 (77%)
Water supply system in need of rehabilitation	146 (97%)	102 (80%)	53 (85%)
Use of improved water supply system by less than 60% of population	69 (46%)	58 (44%)	31 (50%)

### 3.4.4 Participation in planning, construction and O&M before the DANIDA financial implementation programme

During implementation of water supply systems before 1980, villagers were involved as voluntary labour in inskilled construction (self-help). Village involvement in the planning was restricted to completing and forwarding a request to the authorities concerned. Local knowledge was not used, and designs were not adapted to local needs. Operation and maintenance rested fully with MAJI through the DWEs with 100% government financing. Increased problems with execution and financing of O&M as well as the planned massive construction of new water supplies in remote



areas led to the proposal of a new approach in the WMP: local maintenance, management and financing of recurrent costs of facilities within the village boundaries by the villages, and maintenance support system (training, procurement of spares, difficult repairs, monitoring and evaluation) by MAJI.

A first step in this direction had already been taken by President Nyerere in October 1982 when in his position as Chairman of the National Party he stated that whatever the technology used, all water supplies must be adopted in consultation with the local people, that the responsibility for looking after the facilities must clearly be theirs and that the government cannot finance local parts of maintenance and repair and at the same time continue construction (14, copy p.3.3). However, a formal GoT decision on these issues has not yet been made, although Cabinet Papers in this direction appear to have been prepared by the Prime Minister's Office (administratively in charge of RWS and Local Government) and MAJI (technically in charge of RWS).

The sec. study also investigated village interest in, and potential for greater participation among the villagers. As far as could be seen, MAJI's interest and capacity for a participatory approach were not investigated. As part of the pilot implementation, they developed and tested practical procedures for involving the villagers in local planning (accepting the project, including village participation in construction, maintenance and financing, organizing community-based maintenance and management, siting taps), construction (voluntary labour) and local maintenance and management. Special attention is also paid to enhancing women's involvement in the project as main users and direct interest group (13, 14). The procedures have been laid down in a first field-tested "step-by-step" handbook on village participation (14, see also 6.1).

#### 3.4.5 Research and development: A.T.

To make villages more self-reliant in building and maintaining improved water supply for all, the sec. group recommended also the investigation (check, 13, Ch.7) of other technologies, including rainwater catchment, surface water run-off harvesting and shallow wells.

#### 3.4.6 Integration and findings

Findings of the sec. study are reflected on the WMP proposals for design criteria, village project allocation criteria and operation and maintenance. Sanitation and hygiene, water contamination, AT and institution building (see 3.5) are not represented in the overall documents.

#### 3.5 Institutional studies

No specific institutional study appears to have been carried out. The WMP recommends implementation of the planned improved water supplies (piped gravity systems, HPWs) by MAJI survey, design and construction teams with village participation in construction and O&M. Reasons for village involvement are the large manpower requirements in construction and the overburdening of existing MAJI capacities for maintenance and maintenance financing (8/10/12, 6.5).

Implementation is recommended to start at regional level. "Consequential changes within the national water administration and district water engineers administration should then be made as appropriate ..... To ensure sufficient capacity for organizational and procedural changes external assistance will be needed" (8, section 6.6).

It is not clear if the capacity of MAJI for the new approach has been investigated, apart from the applicability of the approach which was tested in the pilot schemes (13, 14). This issue, as well as the lack of involvement of the Local Government and Party and the involvement of MAENDELEO and Depts. of Health and Adult Education, is raised in the sec. study (13, Ch.6). It is not clear how these recommendations have been used.

### 3.6 Organizational aspects of the WMP study

#### 3.6.1 General set-up

The studies were mainly carried out by the CCKK construction, assisted by the Danish Hydraulic Institute (DHI) (see organigramme). The project manager was stationed in Dar es Salaam.

A regional manager was stationed in each of the three regions, and were responsible for day-to-day organization of the work, as well as administrative matters. Implementation of schemes financed by DANIDA during the WMP study was not directly linked to the WMP organizational set-up, but coordinated by the DSU.

Relations with RWE were not formalized, but organized on a day-to-day basis.

Regional authorities were consulted on a regular basis through regular meetings of Regional Steering Committees under chairmanship of the Regional Planning Office.

Required counterpart professionals and support staff were made available by MAJI, to carry out the studies.

#### 3.6.2 Manpower

Staffing of the project was a combination of expatriate (CCKK, DHI) staff and staff allocated by MAJI, including engineers, hydrologists, water technicians, laboratory technicians, drill crews, and various support and administrative staff.

Average staffing is given below:

	Iringa	Lungea	Mbeya/Inter-regional	DSM/Inter-regional
Expatriates	2	2	7	5
Counterparts	3	3	6	
Technicians/clerks/drivers	14	3	13	3

These figures do not include drilling crews, crews for pump tests, and short-term advisors.

The sec. group consisted of one sec. specialist per region, two Danes from CDR in Iringa and Mbeya and one Tanzanian from IRA in Ruvuma. As no manpower arrangements for sec. activities had been made, the specialists employed and trained some school-leavers for field activities.

Initially, there was no cooperation with the Depts. of MAENDELEO or AFYA (check).

### 3.6.3 Regional coordination

Coordination at regional level was through **Regional Steering Committees**, consisting of (5):

- Regional Planning Officer (chair person)
- Regional Water Engineer (secretary)
- MAJI Hq. representative (added by MAJI Hq., 5)
- CCKK Project Manager
- Head DANIDA Steering Unit
- Sec. group representative
- WMPCU representative (added later, see 6)

It is not clear since when representatives from MAENDELEO and AFYA were invited. The Annual Joint Review Mission repeatedly advocates that they should attend more regularly, but no background is given for this situation.

Main tasks of the RSCs, as abstracted from the meeting minutes are (21):

- approve 3-year regional water implementation plan;
- monitor progress of works;
- take decisions for smooth coordination and implementation.

No specific mention is made of coordination with other implementation projects or studies in the regions.

## 3.7 Costs

### 3.7.1 Costs of WMP study

The total budget for the WMP study was DKr. 74 m. This included:

	<u>Budget</u>	<u>Actual contract</u>
CCKK	30 m.	21,5 m. (incl. 20% cont.) (5)
Sec. study	2 m.	
Steering and review	1 m.	
	37 m.	
Contingencies	<u>4 m.</u>	
Total	74 m.	

From these figures, it is not clear which amount was used for the socio-economic inputs from IRA (BRALUP) and CDR. Funds for pilot implementation are not included.

Expenditures for the study included:

Consulting engineers	
CDR	
IRA	
Housing CCKK/Sec. group	
Equipment for WMP	TSh. 10 m. (6)
Materials, transport & equipment RWE (Phase I)	21 m. (6)
Remaining capital costs (for MAJI)	....

For the implementation project during the WMP study (Phase I), annual allocations were made by DSU of DDK 10 million, 12 million and 15 million, in 1979/80, 1980/81, and 1981/82 respectively.

### 3.7.2 Cost estimates for construction in WMP

In April 1986, a special economic and organizational review mission was carried out. The original WMP estimates were not checked, but the impression was that alternative methods for construction were poorly substantiated (33).

### 3.7.3 Costs of constructed water systems (Phase I)

It appears that no actual costings have been made during Phase I, as no system-wise accounts were kept initially regarding the work done for implementation by DSU and IU. The November 1984 Joint review mission recommended scheme-wise accounting (21, p.14), after which a special consultancy was carried out, and a new accounts system introduced by mid 1985. It is not yet clear if this system is fully adequate (33, p.1). So far, a suggestion has been made to improve comparability between estimated and actual costs (33, p.3). A recent progress report shows that efforts are being made to improve the necessity of cost data on construction and overhead costs (30, copy p.8.2, 8.4 adjunct). However, final figures for construction costs per scheme are not yet available.

Meanwhile, MAJI-estimated costs for the 113 HPWs completed during Phase I are TAS 20.000-25.000/HPW, or, assuming 250 users/well, a cost per capita of TAS 80-100. Estimated costs for the 11 piped schemes are on assumption of 100% use TAS 500/cap for present population and TAS 250/cap for design population (20, Ann.4).

#### 4. IMPLEMENTATION PROJECT

In August 1982, negotiations about Phase II (implementation of WMP) were concluded successfully. The actual agreement was not signed till September 1983, mainly because project status had changed from national project (WMP) to regional project (implementation). The change in status also meant that very cumbersome national procedures for transfer of funds had to be followed (see 4.9.1). Per 1 July 1984, the project became a national project again, which solved the financing delays. Implementation is based on 3-year rolling implementation plans prepared in each of the three regions. The first plans date from December 1983. It describes the required basic organizational structure including regional water engineer's department and district water engineer's departments (19). Annual reports (25, 26) and annual review missions mainly emphasized CCKK project organization. Thus, it appears that during the past years, less attention was paid to developing institutional capacities at regional and district level.

#### 4.1 Rural water supply technology, implementation and procedures

##### 4.1.1 Water supply technology

##### Source capacity

As recommended in the WMP, additional low-flow gauging measurements were carried out (2 short-term consultancies, see 4.8.2). These and the experiences with ongoing implementation showed that sometimes, actual source capacity is lower than estimated in the WMP. The November 1984 Review Mission reports only a few cases of serious overestimation (21, p.16 etc.). However, end of season measurements in 1984 and 1985 and low-flow gauging studies indicate less available surface water. Of the 132 sources measured, 50% were found deficient for supply up to 2006. In Ruvuma, 70% of the sources in the 3-year implementation plan are dubious. Data analysis by a short-term consulting hydrologist has therefore been strongly recommended (22). Meanwhile, the ongoing survey of the shallow wells and a special consultancy on the potential for shallow and medium-depth wells indicates a larger potential for groundwater. A suggested limited drilling survey by a CCKK contractor is therefore supported by an annual joint review mission (22, p.45).

##### Planning and design

Procedures: overall 3-year plan, based on highest priority villages approved by RSC      1-year implementation plan approved by RSC (?)  
detailed study and design by Implementation Units (MAJI/CCKK) with assistance costing by MAJI with assistance from CCKK      approval by MAJI Hq.      initiation (32).  
Duration: survey 6-12 months, implementation 8-9 months (single scheme) or 2-3 years (group scheme) (21).

As WMP design criteria give 25 l/c/d while national Tanzanian design criteria give 35 l/c/d (check), MAJI Hq. initially withheld approval, despite bilateral project agreement which states (in general) that recommendations WMP shall be followed. Therefore, DSU initially allowed 25% addition for water losses. This was rejected by the AJRM which suggested sending a standard letter referring to the bilateral agreement

to MAJI Hq. with every design. This ad-hoc arrangement appears to have solved the particular issue.

#### Group schemes

Experience showed that large group schemes were difficult to handle, also with regard to village participation/management and O&M (32). In these schemes, it appeared difficult to mobilize the population for self-help labour, and to establish local organizations to assume the responsibility for the schemes after completion. Cumbersome procedures had to be followed to organize joint meetings of committees representing connected villages. As far as possible, they are therefore re-planned as smaller group schemes. A special consultancy was carried out in October 1984 by CCKK on request of DSU after an earlier proposal from CCKK. The consultancy resulted in the identification and outlining of alternatives for two large (53 and 34) village schemes in Iringa Region. (Not clear if meant as model for local staff or if more such consultancies will follow)

#### Shallow wells

At the end of 1984, the shallow well programme was evaluated (21). According to this evaluation, shallow wells constructed so far were not always of satisfactory standard. The November 1984 joint review mission "observed that in several cases, completed wells were too shallow, and therefore unable to sustain the anticipated yield with the available possibilities for drawdown by the end of the dry season". In view of this, the mission recommended that:

- surveys for shallow wells be performed at the end of the dry season;
- wells should be constructed (after positive survey findings) to the largest possible depth irrespective of survey findings.

It was also found that the marking of completed installations, including handpumps, were often not satisfactory.

Progress reports and reports of review missions do not clearly indicate to what extent this situation was improved. No information appears to be available on the functioning of these shallow wells, even though mention is made of user acceptance of the facilities.

#### 4.2 Allocation of projects to most disadvantaged communities

Due to the cut in implementation funds for 1984-86, the project focused on highest priority villages. Lower-priority villages are acceptable when they are part of a group scheme. The AJRM therefore criticized the inclusion of some low-priority single village schemes by the Regional Steering Committee in the 1984-86 implementation plan (20). It is not clear for what reasons villages were included (logistic or otherwise, see also 4.4).

#### 4.3 Village participation

The implementation projects followed the short-term recommendations of employing special VPCs. WMP-recommended tasks were assistance in improvement participation procedures, training of MAENDELEO staff and continued contacts re RWSS projects with MAJI and AFYA (14). Assigned tasks are village motivation and organization for participation.

The Sec. group has accordingly been especially involved in developing and improving VP procedures.

Benefits of VP as stated by the annual joint review mission (20) are:

- to make villagers aware of what to expect from GoT and what to contribute in return;
- more freedom in decision-making regarding labour organization, distribution network, tap location etc.;
- easier and more systematic manpower mobilization;
- villagers in control of water supply project, signing contract defining mutual responsibilities;
- process seems to guarantee that village will do O&M.

#### 4.4 Implementation progress

A summary of existing water supply systems, their functioning and use as a "baseline" preceding implementation is given in the WMP summaries (8, 10, 12). (See also Ch.3).

The proposed improvements concerned (8, 10, 12):

	Mbeya	Iringa	Ruvuma	
Shallow wells	52	17	0	
Boreholes	53	13	8	
Pumped schemes	61	189	79	
Gravity schemes	407	389	215	
Total (villages)	573	608	302	(Not including improved traditional sources)

For the project's 2nd phase, some 300 priority villages were selected (see procedure adjunct).

Initial progress was hampered by the problems on project status and manpower, as well as by insufficient attention of the RSC to logistics in the 3-year implementation plan (scattered schemes) (20).

Implementation progress is difficult to estimate from the documents due to different reporting systems.

Completed systems:

#### November 1984 (21)

	Iringa	Mbeya	Ruvuma
No. of villages with HPWs	15	20	7
Population	(21,728)	(27,291)	(11,417)

#### February 1984 (20)

	Iringa	Mbeya	Ruvuma
No. of villages with PS	8	7	8
Present population	(18,228)	(13,152)	(15,231)

October 1985 (22)

No. of villages with HPWs	17	17	7
No. of HPWs	97	57	78
Estimated no. of users (200/HPW)	(19,400)	(26,570)	(15,149)

December 1985 (33)

No. of villages with PS	9	16	7
Present population	(16,818)	(22,506)	(11,055)
No. of villages with HPWs	6	10	5
No. of HPWs	51	45	38
Present population	(10,200)	(9,000)	(7,600)

December 1986 (30)

Total no. of villages served	116
No. of villages served in 1986	14
Total population served	203,433
Population served in 1986	54,507

According to the figures of December 1986, population served at the end of 1985 would have been about 150,000.

According to the figures presented in December 1985, the total population served by that time was about 77,000.

A number of systems are under construction and are being prepared through the community participation process (33, 30). During 1986, the number of systems in the process of preparation or construction increased:

end 1985: 40 villages  
end 1986: 152 villages

At the end of 1985, 5 systems had been commissioned; at the end of 1986, 21 systems had been handed over to villagers.

#### 4.5 Operation and maintenance

So far, 5 schemes in Mbeya have been handed over to the villages. A first O&M mobile unit for supporting the villages has been set up at regional level under the RWE in Mbeya. The unit is staffed by MAJI (?) and equipped with tools and spares by DANIDA. Scheduled visits are 1x/6 months. The villagers can purchase spares from the unit at approved standard rates (cost price + small administration charge). A Sec. Assistant (DANIDA-financed) has been attached to the unit to report on the sec. aspects of O&M. The IU has prepared a handbook for the maintenance unit.

Although O&M within MAJI rests with the DWEs, these lack the necessary equipment. Until more schemes have been handed over, it has therefore been decided to locate the mobile maintenance unit under the RWE. In future, they should be stationed under the DWE, with financial support from the District Councils. Organization and financing still need to be looked into (22).



Normally, O&M funds are reserved by central government. In recent years more emphasis has been placed on maintenance. However, funds allocated only covered part of the total O&M costs (34).

First data on functioning of village-level O&M can be expected from the present CDR/IRA study.

DANIDA allocation for spare parts is DKK 10 m. for the period 1984-1988 (33, p.25). The 1986 budget gives an expected O&M expenditure of DKK 737,000 for 1986. It is not clear if this is only for the operational unit in Mbeya, or also for the planned units in Iringa and Ruvuma.

The 1987 budget (30) shows, that about 1.3% (DKK 660,000) was expected to be necessary for O&M.

#### 4.6 Functioning, use and village development

Information on findings of the study presently carried out by IRA/CDR will be made available to the evaluation team before departure to Tanzania.

#### 4.7 Sanitation and hygiene education

Until May 1984, no steps were taken to implement recommended procedures for health education according to an earlier developed handbook. A pilot project was conducted in Magarura village. This project included selection of health promoters, identification of mass health problems etc. Original recommendations from WMP on latrine construction and rehabilitation were rejected after programme proposals by the Technical Advisory Group were judged too costly.

A second consultancy (29) proposes to carry out a specific programme focusing on those health aspects most directly related to the RWS projects. These are (1) hygienic water use and good drainage at standposts, and (2) 100% latrine coverage and improvement, incl. at public institutions. At present, there is no capacity to organize and sustain a programme in all project villages which also covers hygiene practices within the households. For this, DANIDA should actively support the recently started VHW programme in the 3 regions. The AJRM supports the proposal, but support to VWH training and functioning should be given on a pilot basis for selected water project villages, since the project objective is not improvement of health but "to lay the foundation for improved health conditions in the area" (22, p.51).

By the end of 1986, primary health care teams had been selected in three districts, one in each region, and had undergone a one-month training course in Arusha (30). By then, funds and manpower for long-term implementation had yet to be released by District Councils, and no commitment to do so had been made. Consequently, progress was considered to be slow.

#### 4.8 Organizational aspects (of implementation projects)

##### 4.8.1 Overall structure

An overview of the organizational set-up is given in the organigrams attached (33). The organigrams do not give formal or actual links for project implementation with regard to the RWE and the sec. group, and also does not include the position of the annual joint review mission. These organigrams can usefully be compared with organigrams presented in the first implementation plan (1983), which were then indicated as necessary for ultimate success (adjunct).

##### 4.8.2 Implementation Unit

Between the completion of the RWMP (March 1982) and the start of Phase II (September 1983), 3 CCKK engineers stayed on in newly established Implementation Units (IUs) for initially one year, to "maintain a suitable activity level until a decision on large-scale implementation .... has been taken" (6, 1.5). Evaluation planned after one year by Joint Review Mission. Not clear if carried out.

Staff defined for the IUs, starting in the interim period between Phase I and II were:

###### DANIDA-financed:

- 3 expatriate engineers (+ overhead)
- 3 typists (nationals)
- 3 drivers

###### MAJI-financed:

- 3-6 counterpart engineers
- draughtsmen etc. when required

When Phase II was started in 1983, the CCKK engineer in Iringa initially became both coordinator of the overall implementation project in the 3 regions, and advisory water supply engineer to the Iringa RWE. Three mechanical engineers (1/region) were stationed in April 1984 (20). Also in April 1984, and on recommendation of the review mission, it was decided that one more expatriate engineer would be stationed in Iringa, because it was considered necessary that the so-called CCKK Res. Rep. would give full-time attention to his inter-regional supervision and standardization task (33, p.30).

At present, two categories of staff are working on the implementation of the WMP (30):

Personnel assigned to the project and being paid by the Government of Tanzania.

Personnel being paid by DANIDA either directly as DANIDA employees or indirectly via funds transferred to the RWE and employed by him.

The division is as follows:

	DSU	Iringa	Mbeya	Ruvuma	Total
Government of Tanzania	-	41	101	84	226
DANIDA	39	30	33	18	120
Total	39	71	134	102	346

It should be noted, that the second categorie includes a total of 18 expatriates, including 7 CCKK engineers, 2 volunteers, and 9 DANIDA staff.

*4 = DSU + 5 = the Region - UPC*

The DANIDA employees also include socio-economic assistants working with 3 VPCs (17, 13, and 9 in Iringa, Mbeya and Ruvuma respectively).

Staff allocated by the Tanzanian Government combine the work in the project with other duties.

The total of 7 CCKK staff is in line with the agreed bilateral minutes of 28 August 1982. (check)

The following short consultancies were carried out for the implementation project. (to be completed)

<u>Field</u>	<u>Period</u>	<u>Recommended by, in</u>
Hydrology (low-flow gauging)	? 84, 85	
Hydro-geology (potential SW)	? 85	
Evaluation SWS	February 85	
Water quality survey (institution, procedures)	? 84, June 85	
Training surveyors		
Group scheme evaluation		
Design manual		
Manpower training		

All short-term consultancies were carried out by CCKK (check) on request of DSU after an original proposal by CCKK and/or suggestion by the JARM (check, see also ToR DANIDA, letter 25 May 1984, and revised ToR by CCKK letter to DSU, 5 June 1984). A further consultancy recommended concerns training of well-constructors in better construction techniques (21).

#### Evaluation of input expatriate consultants

A review mission (of 2 independent consultants and 1 DANIDA advisor), concludes that in case of project continuation on the same scale, present CCKK input is justified in view of the reasonable balance between capacities allocated and their utilization (33, p.2), as well as CCKK's commitment to WMP and pool for short-term consultancies (33, p.49). The mission was a Danish mission, aiming at improving internal Danish

management. It has therefore not looked at organizational and management issues of MAJI and also not at the broader issue of implementation with DANIDA assistance vs. increasing Tanzanian implementation capacity.

#### Lines of responsibility

It does not seem very clear to whom the IU are responsible (6, section 2.5). CCKK has reacted to this (16, copy p.6) but the situation appears to be still unresolved (32, p.4.8). The November 1984 review mission recommended more formalization. Since then, a special mission on management and financing was carried out and has recommended that technical responsibilities for implementation are left to CCKK instead of DSU (33, p.41). No mention is made here of the role of the Regional Steering Unit and flow of finance.

After consulting local and central Tanzanian authorities, CCKK presented a revised ToR (including lines of responsibility, and revised flow of funds and manpower tasks), a plan of operation and approach, staffing (expatriate and local) and costs (16). The revised task description proposed by CCKK emphasizes assistance of RWE in scheme construction and quality control, instead of direct implementing tasks and include specific mention of source selection (16, p.5). It is not clear if the training and management support task (6, p.7) has been dropped.

Shortage of qualified Tanzanian staff has been a critical bottleneck to the programme (33, p.47) and still is, especially in Ruvuma Region.

#### 4.8.3 Sec. group

The sec. group continued to exist during Phase II, but with 2 new Danish staff. The group's tasks for Phase II were village motivation and practical organization for participation (6).

The Tanzanian VPC worked in Ruvuma since 1983 (?). In March and April 1984, the VPCs for Mbeya and Iringa arrived from Denmark (21).

Sec. assistants (school-leavers recruited and trained on the job by the sec. group?) have been stationed at the field-camps to guide village participation and involvement of women in the local projects. MAENDELEO has delegated a field officer to the project in Iringa (see Fig.).

#### 4.8.4 Coordination

A Regional Steering Committee for the project exists in each region. For its composition etc., see section 3.6. Meetings are held 3x/month. In any case until February 1984, participation of AFYA and MAENDELEO appears to be rare (20).

#### 4.8.5 Housing

DANIDA provides accomodation for the 7 CCKK expatriates and the 3 VPCs. They also provide accomodation arrival/departure, office facilities, and office materials and equipment (6?).

#### 4.8.6 Transport

Planned transport (6?):

- 3 Landrovers/unit
- unspecified no. of O&M Landrovers

Actual: total car pool (DSU and IUs) appears to be 100 vehicles. In WMP, use of local haulers was foreseen, but due to the economic crisis and to prevent delays, this became impossible. Vehicles used for (a) transporting materials from DSM and cement from the factory in Tanga to the regions; (b) actual implementation; (c) DSU; and (d) IU.

It is estimated that 20 vehicles per year need to be replaced (30). The main bottleneck is fuel supply.

#### 4.9 Financing and costs

##### 4.9.1 Budget allocations and financing procedures

Total DANIDA budget allocation for Phase II was DKK 249 m. (1982), DKK 200 m. for direct construction, and DKK 49 m. for additional technical support (33, p.25). During 1983, RWE and IU prepared implementation plans for 1984 and 1985.

When Phase II was classified as a regional project during the Tanzanian 83/84 budget preparation, funds had to be channeled from DANIDA to DSU to MAJI Hq. to Treasury to RDD to RWE to IU. This took up to 5 months, forcing schemes under construction to a virtual halt (20).

In the bilateral talks of February 1984, it was decided to reduce the implementation funds from DKK 42 m. to 30 m. for 1984, from DKK 53 m. to 40 m. for 1985, and DKK 72 m. to 50 m. for 1986. Reasons were the slower implementation pace caused by a.o. the general economic crisis, lack of fuel and qualified MAJI staff. The AJRM commented "As the cost of consultancy services and administration and operation of the transport sector are more or less fixed at 12-13 million D.Kr. per year and are only in minor ways influenced by the implementation pace, it means that the consequences of reductions in the financial resources will be severe on the planned implementation activities in the regions" (20, p.10-11). The AJRM recommended limiting CCKK short missions and sending a training expert before end 1984.

GoT allocated TAS 2 m. for financial year 1984/1985. Disbursements have in fact been higher in 1985 (DKK 57 million). Total disbursements in the years 1984-1986 have been about DKK 140 million. The budget for 1987 was fixed at DKK 50,000 (see also attached copy of figures (30)).

A credit of the project's accounts started in October 1986, and was planned to be finalized early 1987 (30).

##### 4.9.2 Per capita construction costs

In preparation of the overall evaluation, special study was carried out on costs and management aspects of the implementation project (33). The estimated per capita costs in the WMP were corrected for inflation and a number of managerial/technical/political decisions made on construction (33, Table 1). Per capita costs were calculated, based on WMP estimates for systems which had been completed by December 1985, and the future design population. Schemes under construction were included as 50% completed. Results are a revised estimated per capita cost of DKK 289 versus an actual cost of DKK 303, or an increase of 5% (33, p.24). Considering the various assumptions and lack of cost data, these figures should be considered as indicative.

Another comparative cost study for selected cases of three types of supplies (village, group and HPW) gives a total increase of 45% (22).

The figure of 5% does not include a number of unquantifiable costs, such as transport, administration, communication (radio) and technical supervision by DSU. The figure also does not include the costs of additional support activities in 1984-85 of DKK 16 m. on top of the direct construction expenditures of DKK 48,8 m. (33, p.25, 23). Technical consultancy (CCKK + CDR/IRA?) forms 79% of this cost, and has already taken up 84% of the total budget for 1984-88. Costs of the AJRM are not included. That the expenditure for support activities has not surpassed the budget, is because the activity is lower than was planned for health education, sanitation, research and O&M (33, p.2, 25).

#### 4.9.3 Recurrent costs

Data on recurrent costs do not seem to be available. First mobile units just formed and no village-level data, or information as to the kind of monitoring system for village-level O&M activities and expenditures. Allocated budgets for O&M in 1986 and 1987 reflect the cost of a mobile unit, and do not reflect the total recurrent costs.

## 5. ORGANIZATION AND MANAGEMENT AT POLICY LEVEL

### 5.1 DANIDA

#### a) DANIDA - Copenhagen

##### Tasks DANIDA Hq.:

- overall project management
- contacts with relevant Danish authorities on approval, financing, audit, yearly reporting etc.
- project-related public relations
- contacts CCKK, including approval personnel and payment fee as recommended by DSU/DANIDA Mission
- processing of purchase orders.

Ref. 33 reviews its functioning and recommends delegation of all implementation-related tasks (signatures, purchase orders etc.) to DM/DSU and to focus more on policy matters such as general development policies, sector policies, bilateral negotiations, donor coordination in the sector etc. (33, p.44).

#### b) DANIDA - Dar es Salaam

In DSM, the DANIDA Mission, headed by the Mission Chief, is formally responsible for management of the overall project (33, p.32).

##### Tasks DANIDA Mission:

- formal project responsibility to Tanzanian authorities and DANIDA
- supervision and management guidance to DSU
- reviewing project reports and forwarding to Hq.
- participation in bilateral negotiations
- contacts Tanzanian authorities other than MAJI.

In practice a substantial, but not very clearly defined part of the responsibility is delegated to the DSU.

##### Tasks of DSU during WMP:

- coordination of the WMP study activities and Phase I implementation between CCKK, Sec. group, GoT and DANIDA
- assistance with procurement and import (5, p.5; 6, p.1).

##### Tasks of DSU during implementation (6, p.11, 32, p.9; 33, p.34):

- technical checking of proposed schemes before approval on priority and design criteria WMP
- control of project expenditures
- implementing and perfecting new accounting system
- supervising IUs and VPCs
- representing DANIDA in RSC meetings
- procurement and transport of materials including imports through DANIDA Hq. (estimated 50% of resources).

Its staff consists of 5 expatriates, and 34 Tanzanian staff, which is about one third of all staff paid from the DANIDA grant. It has recently been proposed to add a VPC (32) and a health specialist (33, p.43). It has also been suggested to consider appointing a managerial specialist when staff change occurs at DSU (32).

### 5.2 MAJI - Ministry of Water

No details found so far on who is involved in what and to what degree. Idem - no information on contacts AFYA, MAENDELEO Hq.

### 5.3 CCKK

CCKK - Copenhagen

Project Steering Group composed of high-level executives of the four Cons. Eng. Firms. Meet 4x/year. One meeting attended by CCKK project manager.

#### Tasks CCKK Hq.:

- overall CCKK personnel management and administration
- personnel recruitment
- technical backstopping (low-scale)
- contract-related contacts with DANIDA.

The CCKK office in Dar es Salaam had no specific involvement in the project, but provides some logistic services (33).

### 5.4 Annual Joint Tanzanian/Danish Review Mission

The missions were stipulated in the bilateral agreement of September 1983. Three Annual Joint Tanzanian/Danish Review Missions were carried out in February 1984, November 1984, and October 1985 (20-22). These missions had different terms of reference, and focussed on specific topics as considered necessary by the two governments and project management.

Strengthening of management, economy and financing expertise has been recommended (34). Also recommended is that the authorities concerned take more explicit decisions on the basis of the recommendations of the joint review missions, so that "the project is not de facto managed by Review Missions" (33, p.45). For DANIDA, this is ascribed especially to a lack of distinction between general issues and implementing details in reporting (see further) and insufficient division of management responsibilities between the DANIDA Mission in DSM and desk staff at Hq. (33, passim p.42, 43, 44).



## 6. INSTITUTIONAL DEVELOPMENT AND TRAINING

### 6.1 Planning

During the WMP studies, the existing institutional set-up was found to present problems, mainly related to lack of decentralization of financial powers, and executive responsibilities.

Institutional change was viewed as essential for further O&M. Recommendations (9, 10, 12) concerned a significant transfer of O&M responsibilities from MAJI to villages.

It was recommended, that the District Water Engineer's Office should provide paid assistance to villages, and have monitoring control tasks. The Regional Water Engineer's Office should be responsible for coordination and training.

Recommendations indicate, that the regional water administration should be considered as the most appropriate point to concentrate initial structuring activities.

Decentralization of O&M responsibilities to the district and village level has received strong backing through the **District Reform** of 1984. This reform transferred essential political and administrative powers to the district and village levels, including the right of taxation and the levying of fees to finance local activities and facilities like water schemes.

### 6.2 Implementation of WMP recommendations

The first three-year implementation plan for 1984-86 (19) attaches great importance to development of institutional capacities on the basis of the set-up recommended in the WMP, but emphasis is put on developing capacities at the regional level but it is considered a pre-requisite to success of the WMP that sufficient trained and educated manpower is allocated to the RWE's organization.

Developing capacities at district level was not given priority.

Manpower constraints are indicated at management level, while most sections are found to be over-staffed. Lack of management combined with over-staffing leads to lack of discipline.

During the WMP, the following structural problems for implementation of the master plans were identified by the consultants (10, p.1):

- inadequate quality of construction may affect functioning;
- design capacities insufficient for implementation requirements;
- Tanzanian policy targets cannot be met by construction programme RWE.

DSU identified the following areas for strengthening:

- training of personnel;
- equipment and material management;
- workshop performance;
- rehabilitation of existing schemes.

In consultation with MAJI, DSU therefore proposed the establishment of Regional Implementation Units (9). It is not clear how these units fit into the original strategy of developing local capacities. The units

were created to carry out a mix of mainly direct implementation activities with a limited training component (copy 6, 2.1-4, 2.10). CCKK indicated that a single interim engineer cannot do specific training apart from on-the-job, but that intensive and systematic training would be part of the larger implementation. CCKK also declined workshop assignment and actual construction management, but would supervise and assist (16).

CCKK stressed as its tasks:

- integration with RWEs
- cooperation with Sec. group
- involvement Tanzanian staff in increasingly complex tasks.

At present, DANIDA considers institution building and training weak elements in the project (32). As far as these elements are incorporated, they focus mostly on enhancing progress of the implementation project (6, 2.2-2.4). Although the IUs are all stationed within the RWE's office, integration varies between the regions. In Iringa region, RWE and IU carry out implementation projects independently, in Ruvuma and MBeya, RWE and IU work together in an integrated manner (22, p.14). It is not clear from available information if this is on both Danish-financed and regional schemes, or only DANIDA-assisted. Recommendations by the 1986 review mission (33) aim at improving organization and management, but do not mention roles to be played by national executing agencies or others. It would thus seem, that the present set-up does not fully correspond with the original intention.

### 6.3 Community development and involvement of district authorities

As part of improving implementation and developing community-managed O&M, manuals in English have been developed by the IU for construction (20) of piped supplies and by the Sec. group for village participation in piped systems (15, processed by DSU). An annual joint review mission recommended the development of a design manual and manual for village participation in handpump projects, and the editing and translation of all manuals in Kiswahili. It is not clear to what extent Tanzanian departments concerned have been involved in the preparation of these manuals and if there has also been contact with implementation projects in other regions of Tanzania.

So far, the DWEs have hardly been involved in the projects (22). It is expected that their role will increase during O&M, as well as those of the newly established District Councils. For the moment, mobile O&M units are part of the RWE office, with financing of (imported) spares by DANIDA. It is not clear if the planned training for DWE workshop staff has been undertaken and how this fits into the present O&M set-up (6, 2.10).

### 6.4 Training

Education and training were an important part of the ToR for the WMP study and covered (8, p.11):

- training local staff for hydro-meteorological observation network and other field data collection personnel;
- counterpart training on water resources study, project design, planning and implementation;
- training local staff, including village operators and regional staff for O&M, coordinated with other regions.

On the initiative of MAJI Hq. it was added that Tanzanian counterparts will also participate in work done outside Tanzania (8, p.17). As a result, five counterparts have come to CCKK headquarters (5, p.7).

The above training component mostly concerns training on the job. CCKK stated in an early stage that its staff had no time for specific training activities (16). There has been a growing need for such specific training, as the lack of qualified staff and workmanship affects negatively the quality of construction work (20).

So far, one special course (3 weeks) was organized for 34 well surveyors by the Water Resources Institute in DSM (21).

In February 1984 when implementation funds for 1984-86 had been cut back, the annual joint review mission recommended to limit CCKK short missions and send a training specialist before the end of 1984. The AJRM also commented repeatedly on the shortage of trained middle-level technical staff and craftsmen. This resulted in a short-term consultancy to prepare a training programme for RWE construction and workshop technicians and craftsmen and village caretakers for O&M in February 1986 (27). Its ToR is limited to the identification of training possibilities within existing Tanzanian programmes and institutes for ad-hoc demands (construction, village maintenance) for the implementation project. Consequently, it does not look at longer-term manpower demands (inclusion of village support in O&M and local management) and capacities of the Tanzanian training institutes and regional administration to fill these demands with staff trained according to the new approach and insights.

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2. OBJECTIVES OF VILLAGE PARTICIPATION

2.1 Village Participation for self-reliance

Why should village participation be a key factor in the development of the rural water sector ? In the improvement of sanitary conditions ? And in a rural health education programme ?

Questions like these were never explicitly answered in volume 12. However, as a guideline for the formulation (and future reformulation) of policies, principles of organization, and procedures for village participation, explicit objectives are needed. Furthermore, it is impossible to monitor and evaluate the village participation component of a programme on water-related activities without specifying its objectives (see chapter 13).

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.

Health education and sanitary improvements should similarly be promoted with a minimum of outside assistance, using village participation to ensure villagers' sustained interest and efforts in improvements of health conditions in their own community.

The political foundation for these objectives for village participation is self-reliance, a cornerstone in Tanzania's ruling ideology, which aims at improving the living conditions for the rural people.

2.2 Village participation for increased benefits

More specifically the objective of village participation in water related activities is also to increase the benefits and cost efficiency derived from them.

Village participation in water supply improvement thus aims at ensuring that:-

- The water scheme and its service level is in accordance with the expressed needs of the community
- The need is so strongly felt, that 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.

Village participation in health education and sanitation aims at:-

- Health and sanitation measures that are directed towards problems recognized as such by the villagers
- Health and sanitation measures which are affordable and acceptable to the community
- Mutually supportive and sustained efforts that are understood to increase the combined benefits from water, health education and sanitation, at a higher cost efficiency.

5. FUTURE OUTLOOK

5.1. Objectives

A formal statement of Project objectives has not been made in the Government to Government Agreement of 10th September 1983, which describes the implementation of Water Master Plans in the three regions over a 5-year period 1983-1987 and which specify that the implementation shall be carried out on the basis of the proposals and recommendations contained in the Water Master Plans especially as regards priority and design criteria.

From the Water Master Plans and from documents presented to the Danish authorities in connection with the approval of the Danish support for the above implementation of Water Master Plans it is, however, possible to extract that the Project objectives are: "Implementation of a reliable supply of clean water sufficient in quantity all year round with the objectives of reducing time consumed in collecting water, which is especially the task of women; and to lay the foundation for improved health conditions in the area, supplemented with activities related to sanitation and education."

The Review Mission recommends that the following aspects are taken into consideration as means to achieve the above mentioned long term objectives:

- to reach as many people as possible inside available resources of funds and manpower;
- to achieve the highest degree of participation on all matters by the villagers; (or?)
- to design and construct schemes in order that O & M costs are minimised in the future;
- to aim for small and simple schemes from reliable and protected sources, which do not require treatment.



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## MBEYA WATER MASTER PLAN

SUMMARY

VOLUME 3



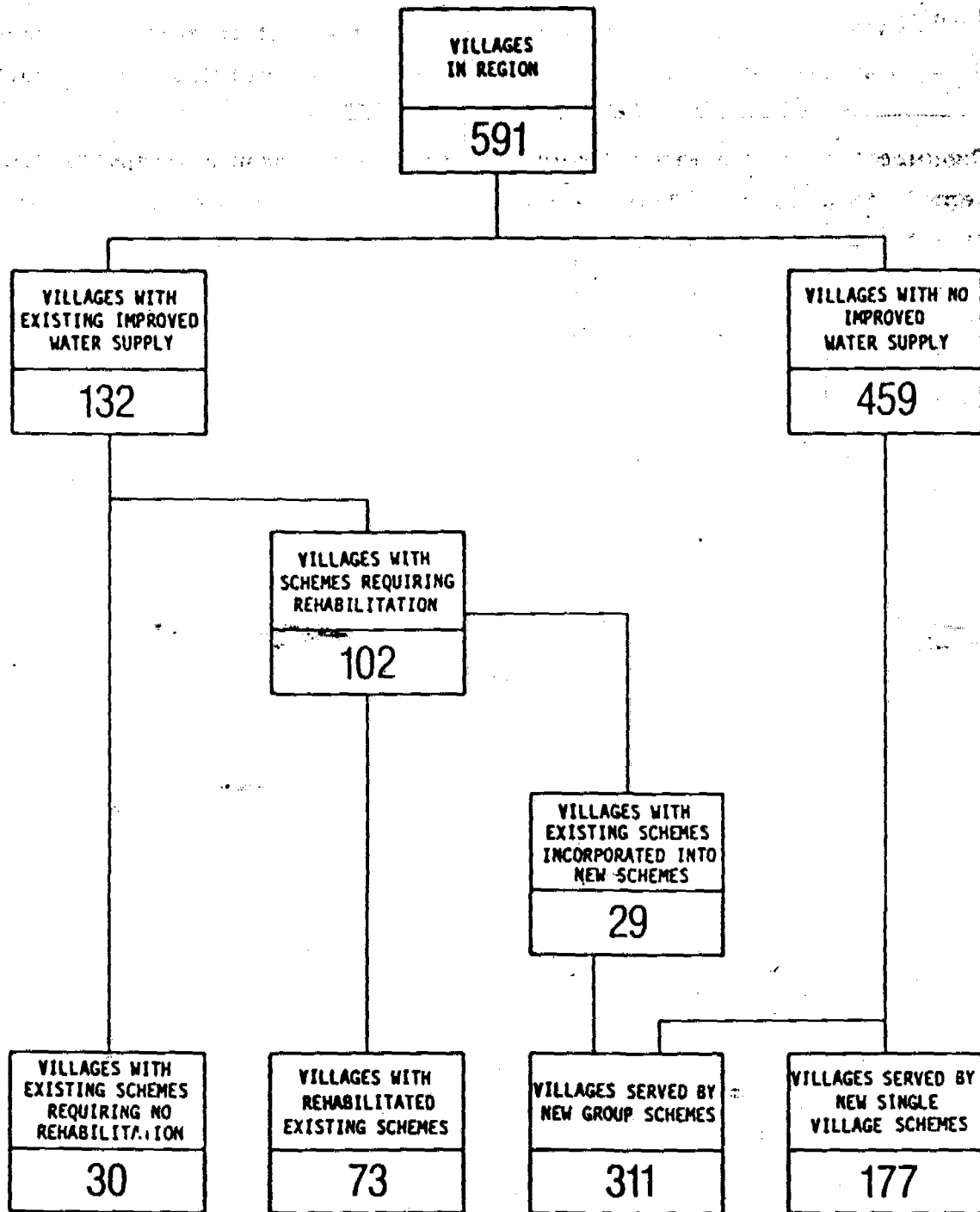


Figure 6.2 - Water Master Plan village water supply proposals.

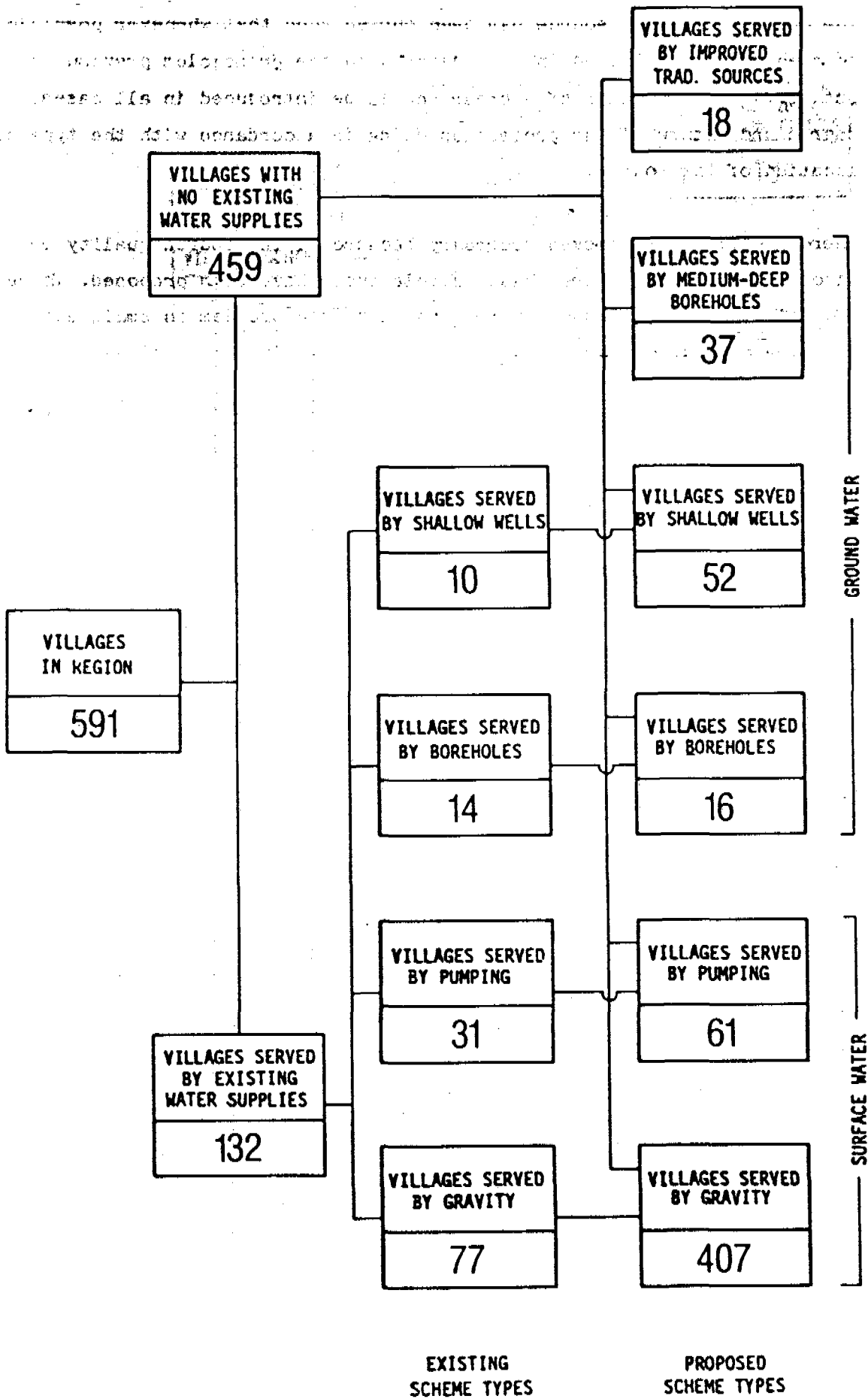
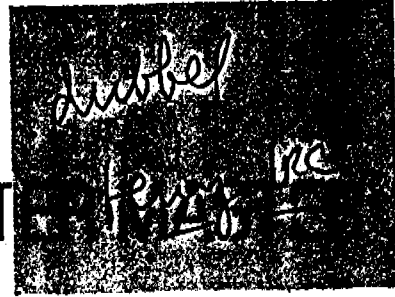


Figure 6.3 - Water Master Plan proposals - village water supply scheme types.

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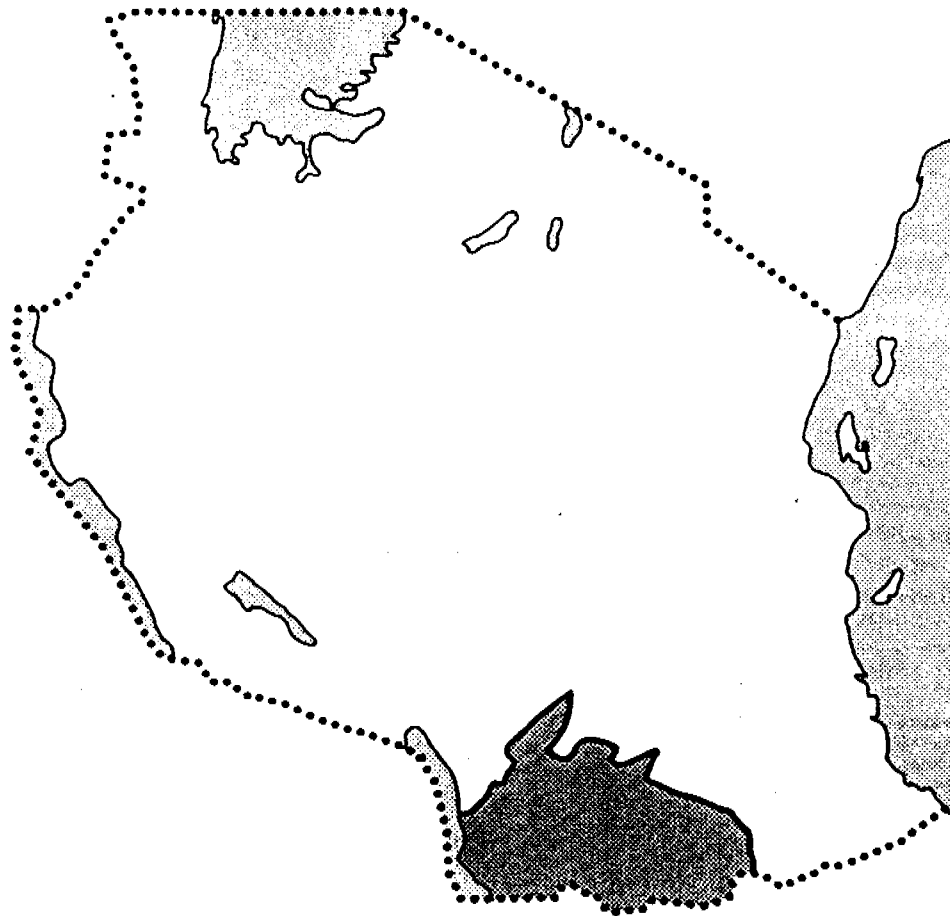
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## RUVUMA WATER PLAN

SUMMARY  
VOLUME 3



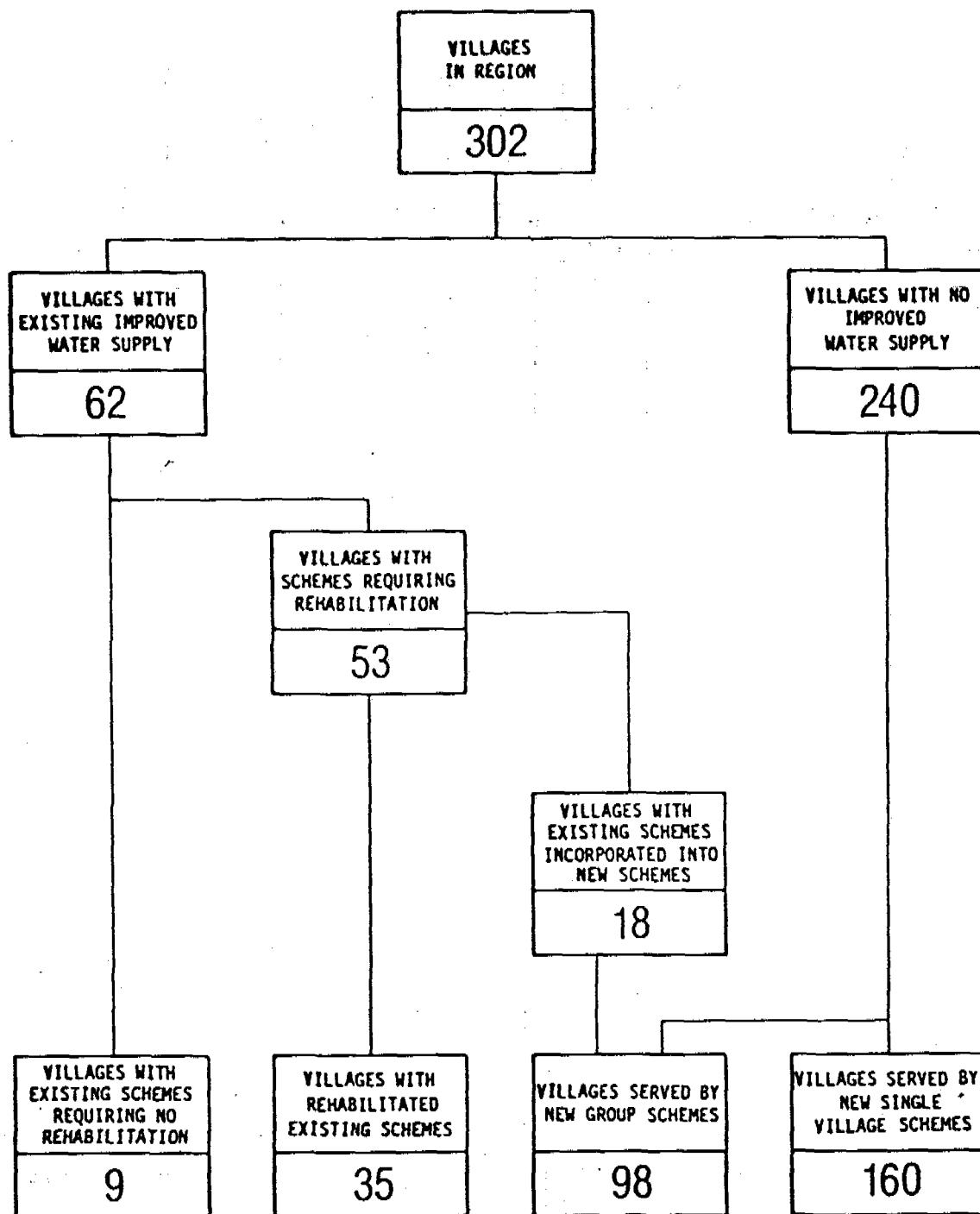


Figure 6.2 - Water Master Plan village water supply proposals.

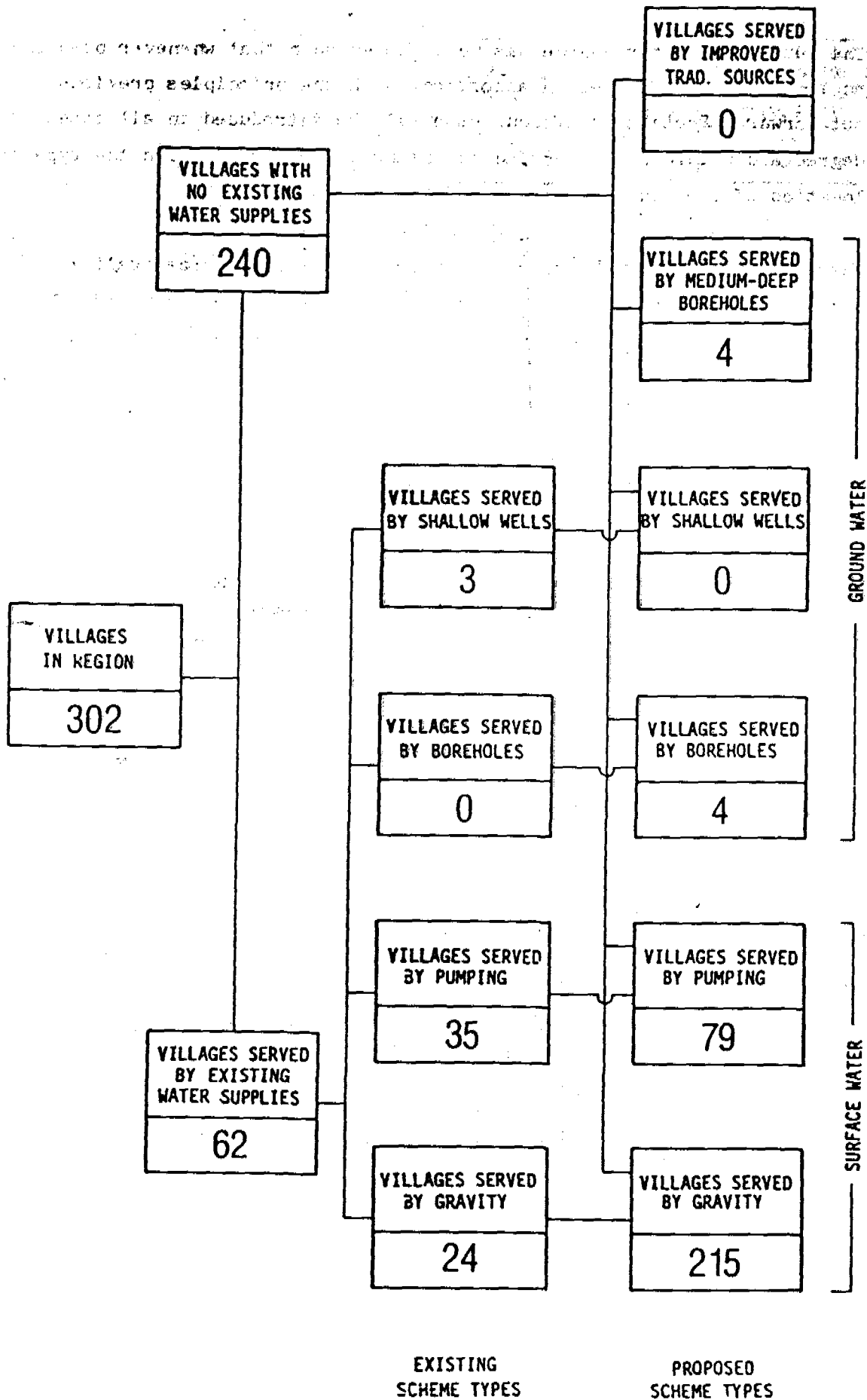


Figure 6.3 - Water Master Plan proposals - village water supply scheme types.

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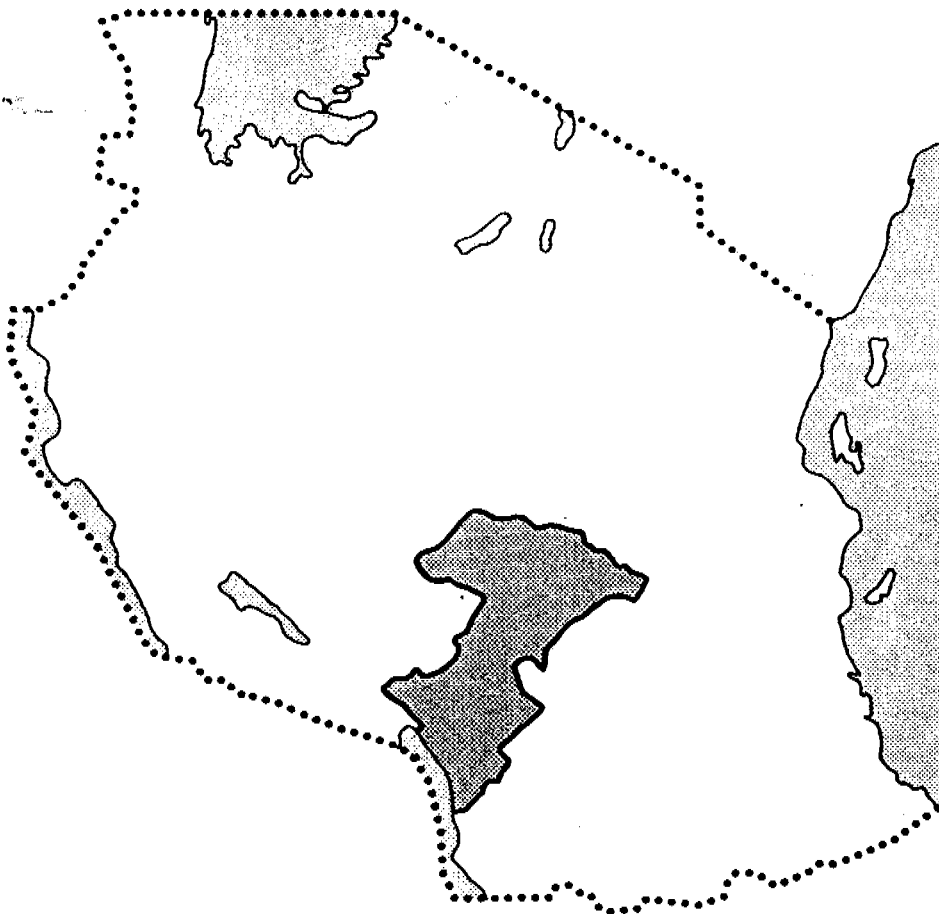
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## IRINGA WATER MASTER PLAN

SUMMARY  
VOLUME 3



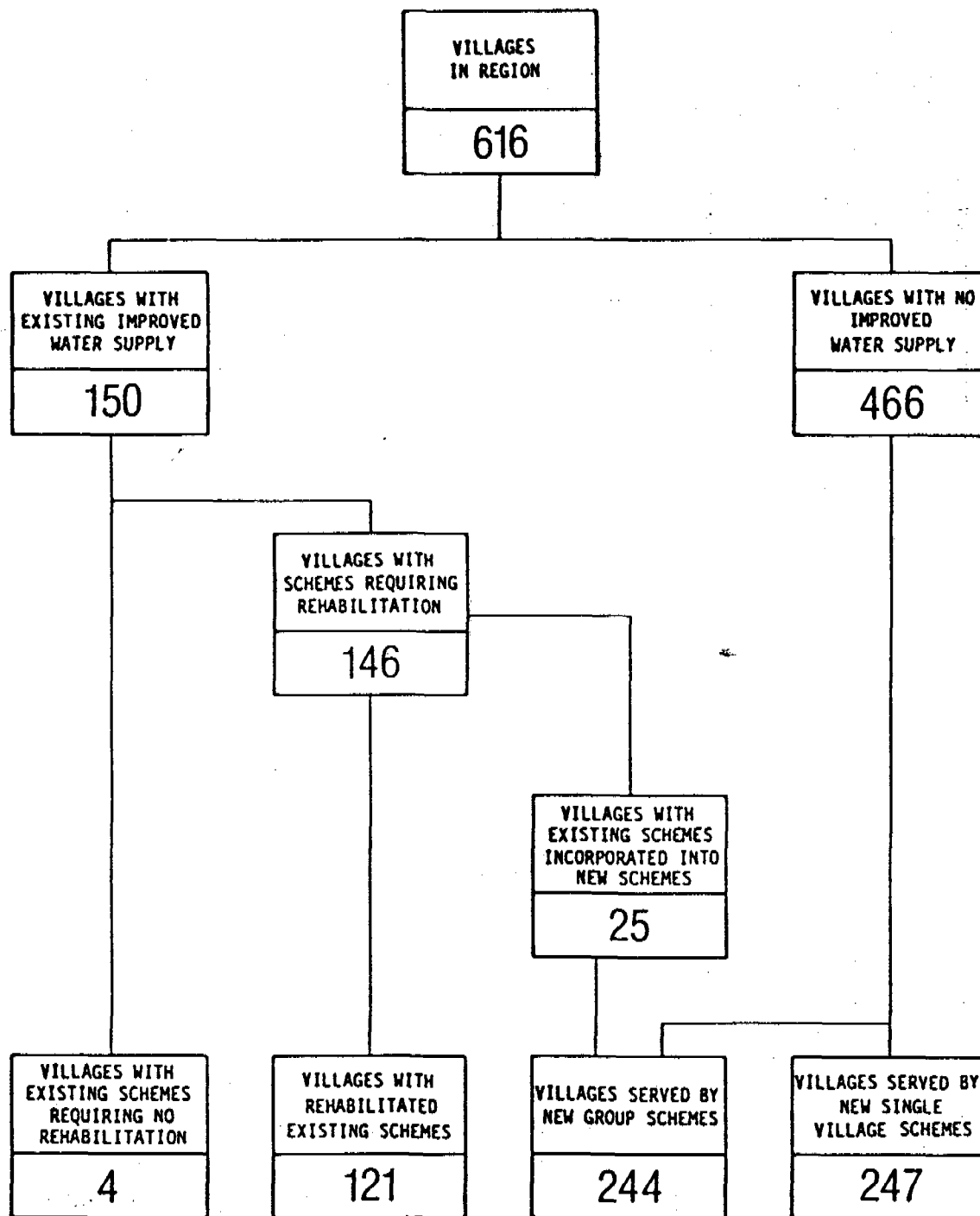


Figure 6.2 - Water Master Plan village water supply proposals.



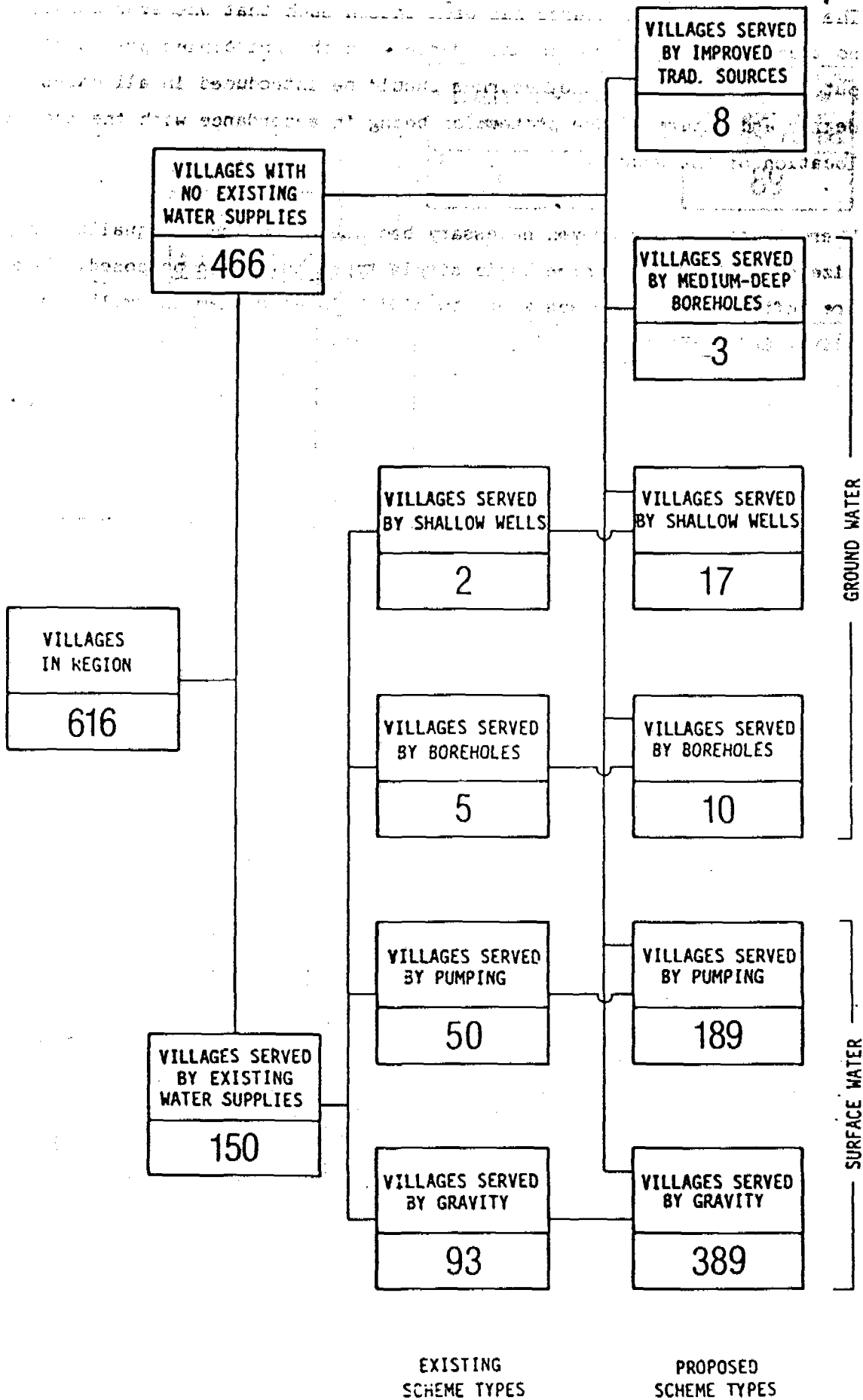
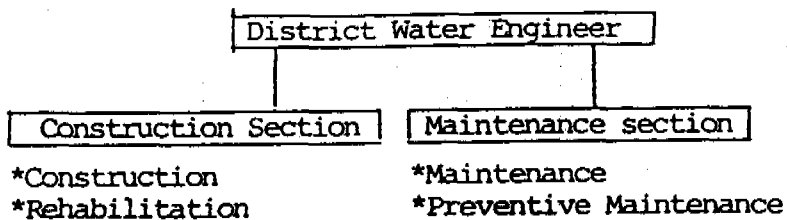
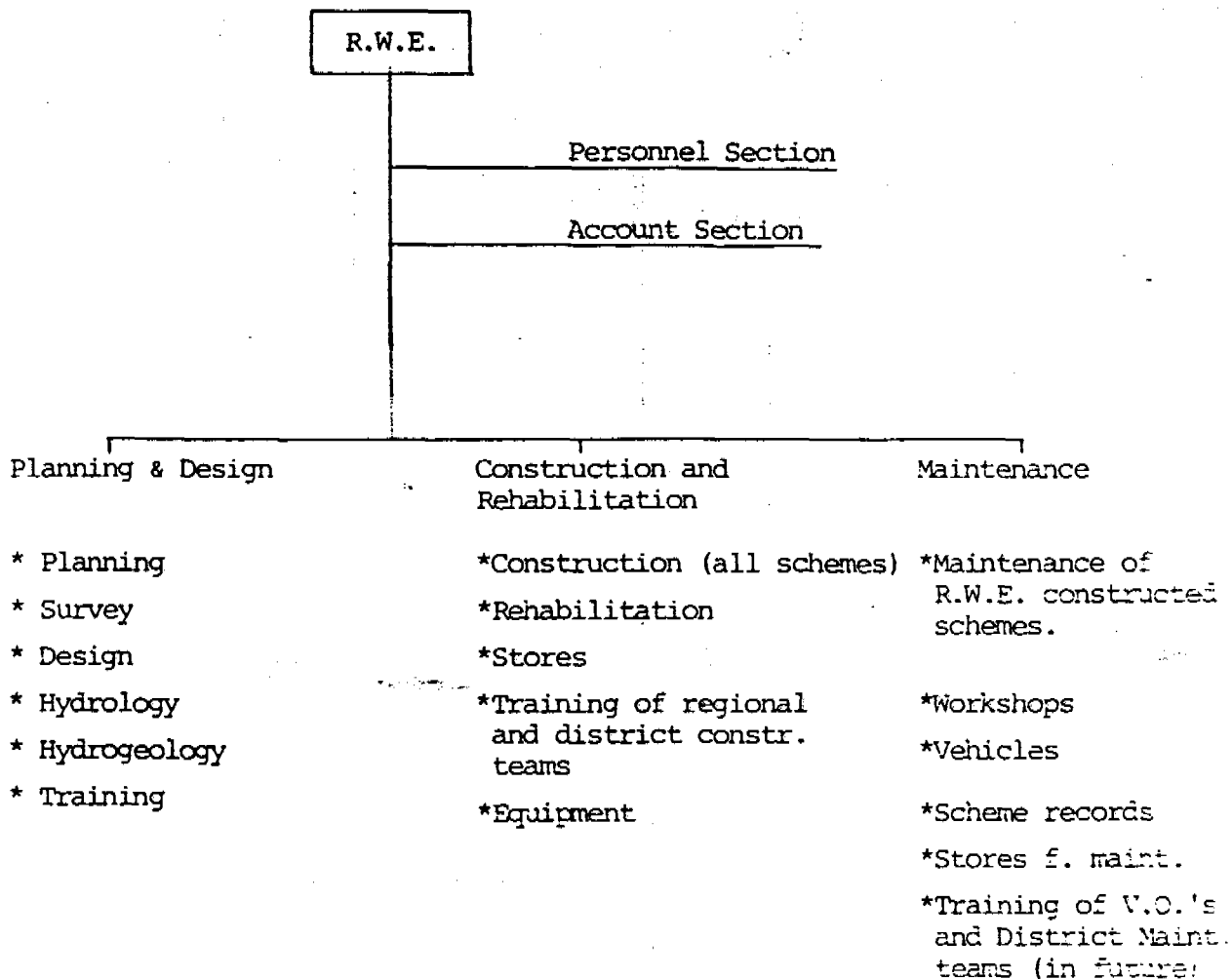
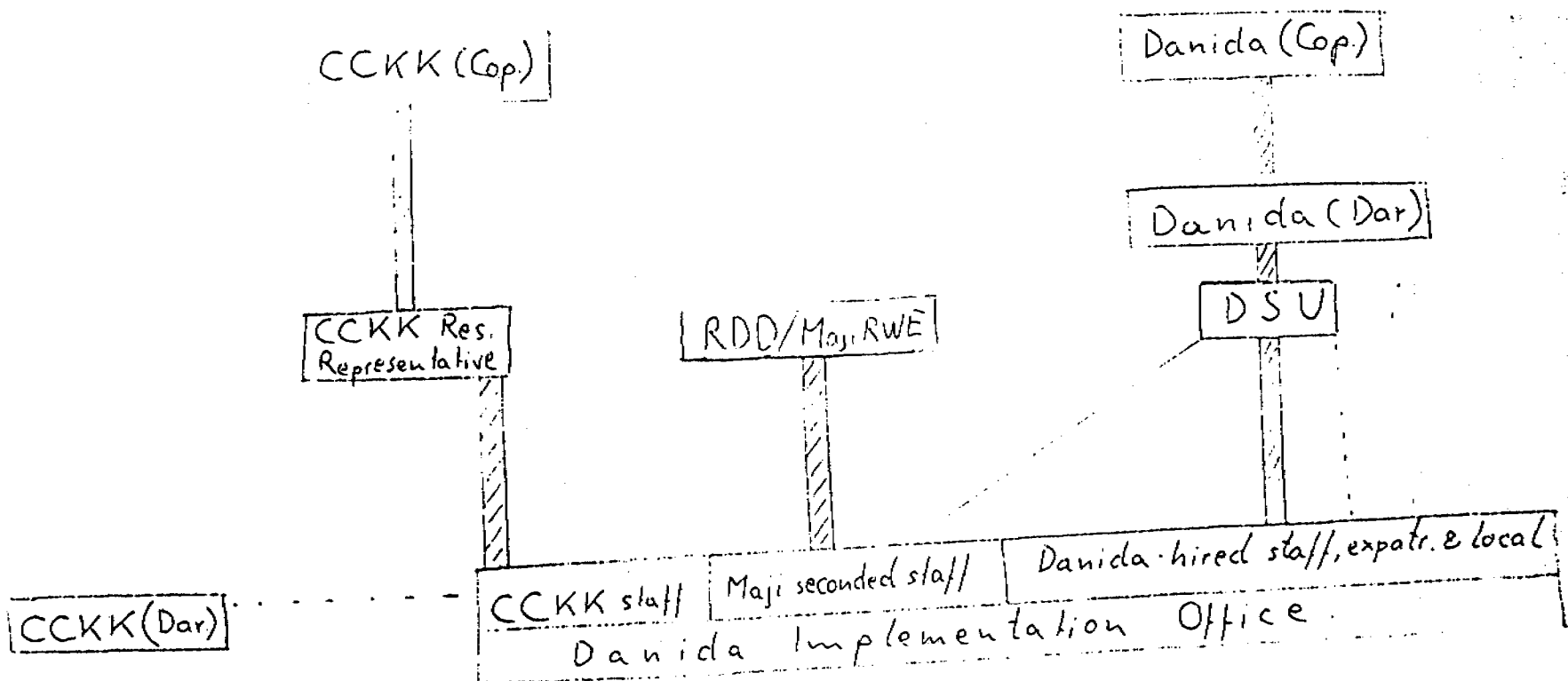


Figure 6.3 - Water Master Plan proposals - village water supply scheme types.

ORGANIGRAMS AS PRESENTED IN THE FIRST THREE YEAR  
IMPLEMENTATION PLAN (1983)



# Organisation Chart for Personnel Administration



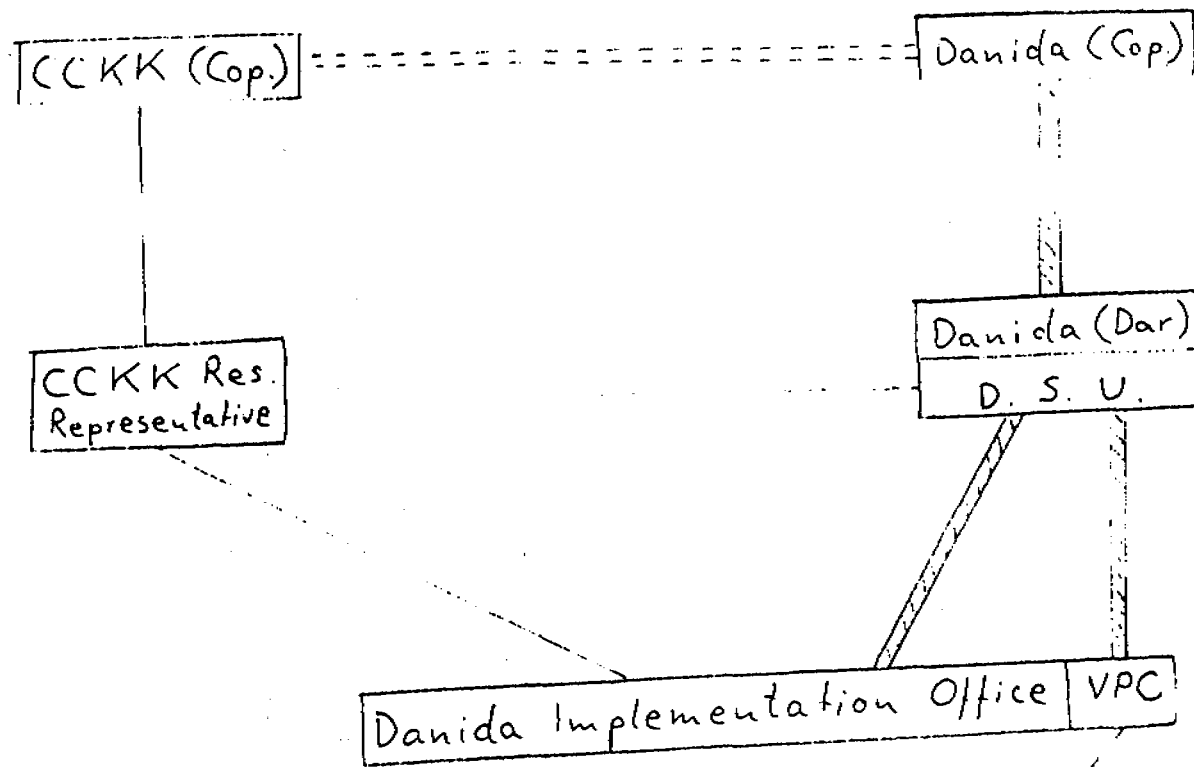
————— = direct line of command

- - - - - = allowances in addition to Maji standards

..... = logistic support in Dar-es-Salaam

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 ANNEX IV  
 p.3

# DANIDA/CCKK Organisation Chart for Project Implementation.



////// = direct line of command

———— = technical support

- - - - = village mobilisation

+ + + + = co-operation on construction,  
operation and maintenance

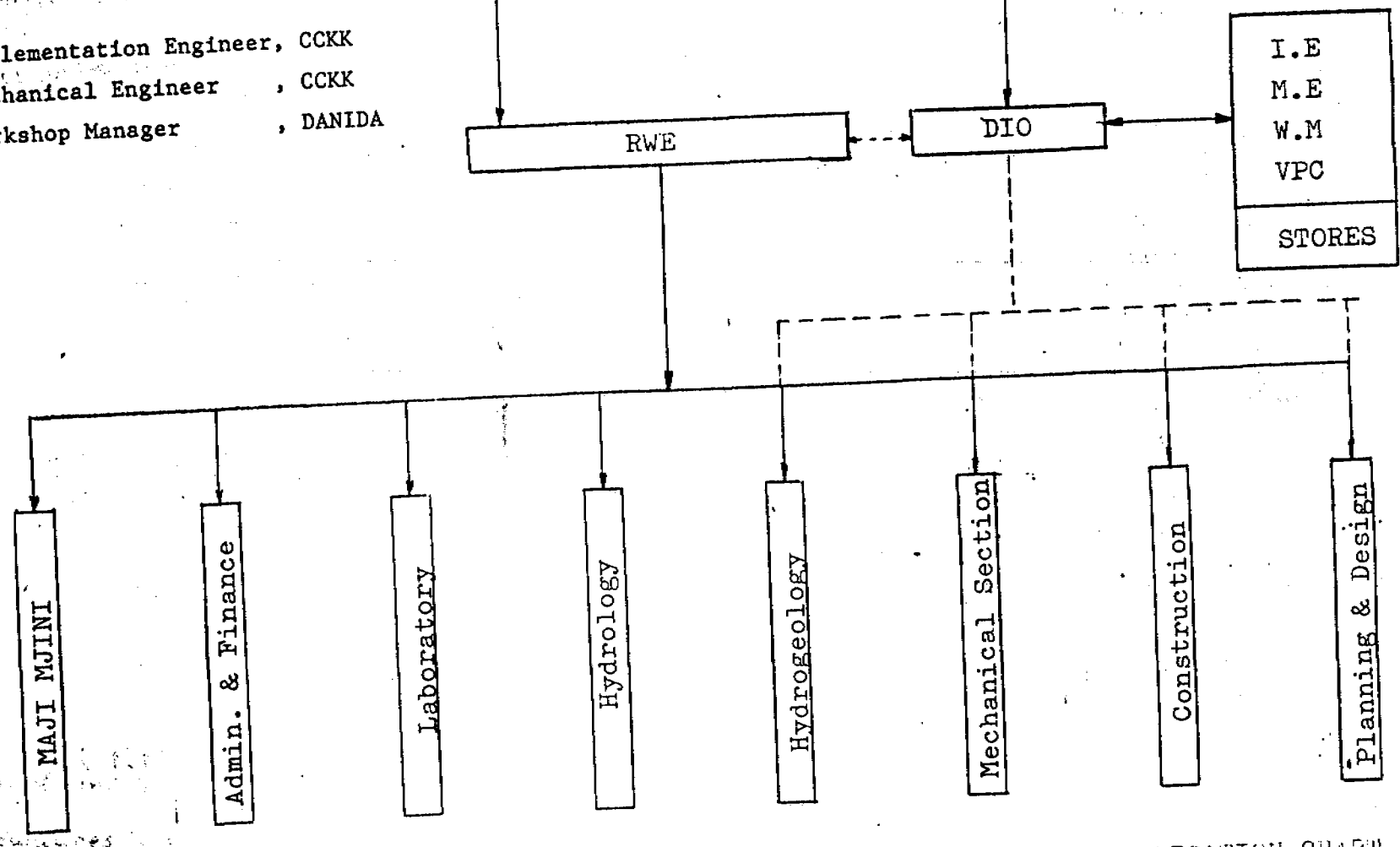
- - - - = contacts on consultancy contract

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Villages

Copy 6

IE - Implementation Engineer, CCKK  
 ME - Mechanical Engineer, CCKK  
 WM - Workshop Manager, DANIDA



———— Direct responsibility  
 - - - - - Support & advising

SONGEA ORGANISATION CHART  
 S.W/S.S April 1986

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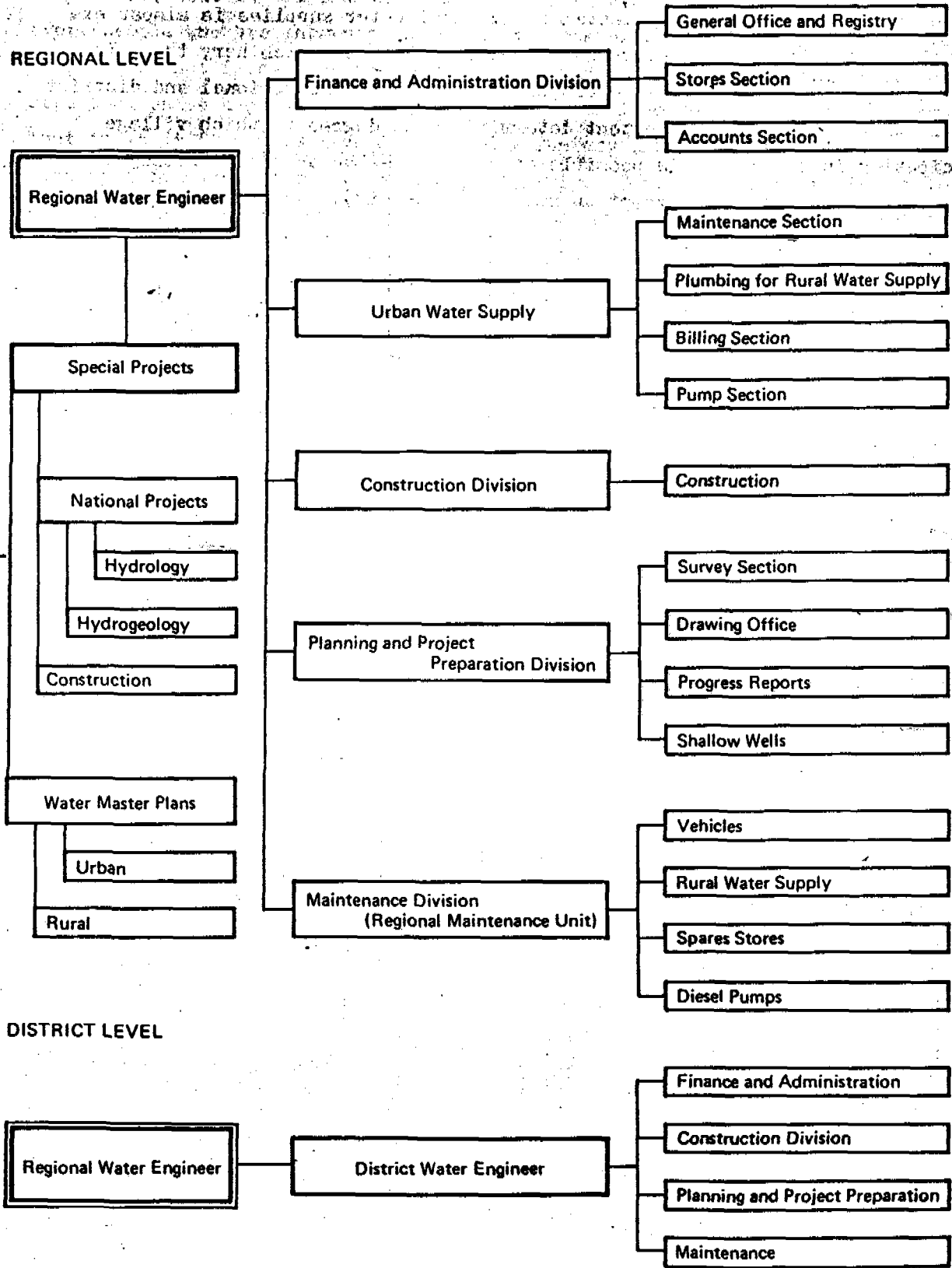


Figure 6.1 MAJI ORGANISATION CHART

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Summary of Schemes Under Construction by 31st December 1983

	No. of Villages	Present Population (1981)	Future Population (2006)
Iringa Region	8	13,426	19,316
Mbeya Region	7	11,850	25,895
Ruvuma Region	<u>6</u>	<u>9,055</u>	<u>21,094</u>
TOTAL	21	34,331	66,305
	==	=====	=====

Summary of Schemes Under Construction by 31st December 1985

	No. of Villages	Present Population (1981)	Future Population (2006)
Iringa Region	12	17,229	29,713
Mbeya Region	26	53,323	102,673
Ruvuma Region	<u>2</u>	<u>3,663</u>	<u>4,707</u>
TOTAL	40	74,215	137,093
	==	=====	=====

Summary of Phase 2 Schemes Substantially Completed by 31.12.1985

	No. of Villages	Present Population (1981)	Future Population (2006)
Iringa Region	15	27,018	37,141
Mbeya Region	26	31,506	53,784
Ruvuma Region	<u>12</u>	<u>18,655</u>	<u>34,884</u>
TOTAL	53	77,179	125,809
	==	=====	=====

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ANNEX VI

Initial Construction Costs, Average WMP-Costs (X 1000 TZS)

	IRINGA	MBEYA	RUVUMA	TOTAL
<u>Shallow Wells</u>				
. Costs	8,977	28,291	1,375	38,643
. Future Population	60,000	204,000	9,000	273,000
<u>Gravity Schemes</u>				
. Costs	338,735	333,289	223,892	895,916
. Future Population	875,000	1,031,000	679,000	2,585,000

Shallow Well, Cost per Capita : 141 TZS  
= 126 DKR (1 : 1.12)

Gravity Scheme, Cost per Capita : 346 TZS  
= 308 DKR (1 : 1.12)

Average (Weighted by Population) : 291 DKR



COPY 11

ANNEX V

Calculation of Implementation Costs for 633 High Priority Villages

Based on Water Master Plan estimates in 1st July 1981 prices, area and zone factor included.

Iringa

311 High Priority Villages : Implementation Costs TZS 322,713,000.-  
(Table 9.21 in WMP, Vol.4B, for Iringa Region)

The 311 High Priority Villages contain  
238 High Priority Villages  
and 73 High Priority Villages, delayed implementation.

Costs of 238 High Priority Villages to be implemented are assumed to be:

$$322,713,000 \times \frac{238}{311} = 246,964,000 \text{ TZS.}$$

Mbeya

302 High Priority Villages : Implementation Costs TZS 330,319,000.-  
(Table 9.21 in WMP, Vol.4B for Mbeya Region)

The 302 High Priority Villages contain  
266 High Priority Villages  
and 36 High Priority Villages, delayed implementation.

Costs of 266 High Priority Villages to be implemented are assumed to be:

$$330,319,000 \times \frac{266}{302} = 290,943,000 \text{ TZS.}$$

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Ruvuma

160 High Priority Villages : Implementation Costs TZS 200,170,000.-  
(Table 9.21 in WMP, Vol.4B for Ruvuma Region)

The 160 High Priority Villages contain

129 High Priority Villages  
and 31 High Priority Villages, delayed implementation.

Costs of 129 High Priority Villages to be implemented are assumed to be:

$$200,170,000 \times \frac{129}{160} = 161,387,000 \text{ TZS}$$

Summary

Iringa	238 villages	:	246,964,000	TZS
Mbeya	266 villages	:	290,943,000	TZS
Ruvuma	129 villages	:	<u>161,387,000</u>	TZS
Total	633 villages	:	699,294,000	TZS

Reduction due to use of imported materials instead of local materials:

$$30 - 35\% \text{ (Figure 6.10 in WMP, Vol.5A)}$$

Reduction due to village participation: 10 - 15% (Figure 6.5 in WMP, Vol.5A)

$$\text{Total Reduction: } 40 - 50\%$$

With a reduction of 40% the implementation costs for 633 villages will amount to: 419,576,000 TZS

In July 1981 1 DKr is equal to 1.12 TZS

Implementation costs for 633 high priority villages with reductions as above and expressed in D.Kroner are estimated to be 374,622,000.- rounded to 400 Mill. D.Kroner inclusive of price increases from July 1981 to September 1982

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Ruvuma

160 High Priority Villages: Implementation Costs TZS 200,170,000. (Table 9.21 in WMP, Vol.4B for Ruvuma Region)

The 160 High Priority Villages contain

129 High Priority Villages

and 31 High Priority Villages, delayed implementation.

Costs of 129 High Priority Villages to be implemented are assumed to be:

$$200,170,000 \times \frac{129}{160} = 161,387,000 \text{ TZS}$$

Summary

Iringa	238 villages	:	246,964,000	TZS
Mbeya	266 villages	:	290,943,000	TZS
Ruvuma	129 villages	:	<u>161,387,000</u>	TZS
Total	633 villages	:	699,294,000	TZS

Reduction due to use of imported materials instead of local materials:

30 - 35% (Figure 6.10 in WMP, Vol.5A)

Reduction due to village participation: 10 - 15% (Figure 6.5 in WMP, Vol.5A)

Total Reduction: 40 - 50%

With a reduction of 40% the implementation costs for 633 villages will amount to: 419,576,000 TZS

In July 1981 1 DKr is equal to 1.12 TZS

Implementation costs for 633 high priority villages with reductions as above and expressed in D.Kroner are estimated to be 374,622,000.- rounded to 400 Mill. D.Kroner inclusive of price increases from July 1981 to September 1982

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Ruvuma

160 High Priority Villages: Implementation Costs TZS 200,170,000.-  
(Table 9.21 in WMP, Vol.4B for Ruvuma Region)

The 160 High Priority Villages contain

129 High Priority Villages

and 31 High Priority Villages, delayed implementation.

Costs of 129 High Priority Villages to be implemented are assumed to be:

$$200,170,000 \times \frac{129}{160} = 161,387,000 \text{ TZS}$$

Summary

Iringa	238 villages	:	246,964,000	TZS
Mbeya	266 villages	:	290,943,000	TZS
Ruvuma	129 villages	:	<u>161,387,000</u>	TZS
Total	633 villages	:	699,294,000	TZS

Reduction due to use of imported materials instead of local materials:

$$30 - 35\% \text{ (Figure 6.10 in WMP, Vol.5A)}$$

Reduction due to village participation: 10 - 15% (Figure 6.5 in WMP, Vol.5A)

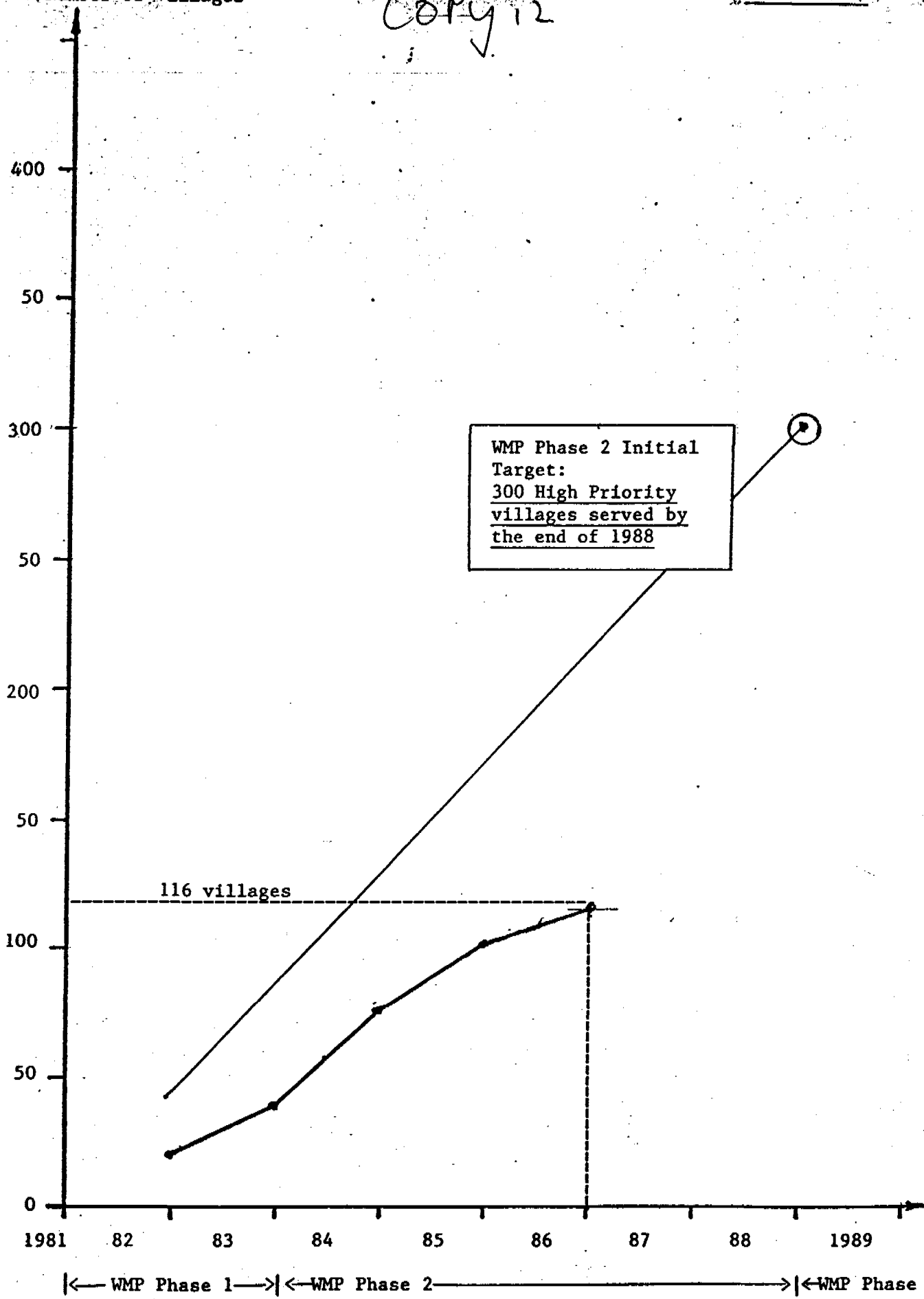
$$\text{Total Reduction: } 40 - 50\%$$

With a reduction of 40% the implementation costs for 633 villages will amount to: 419,576,000 TZS

In July 1981 1 DKr is equal to 1.12 TZS

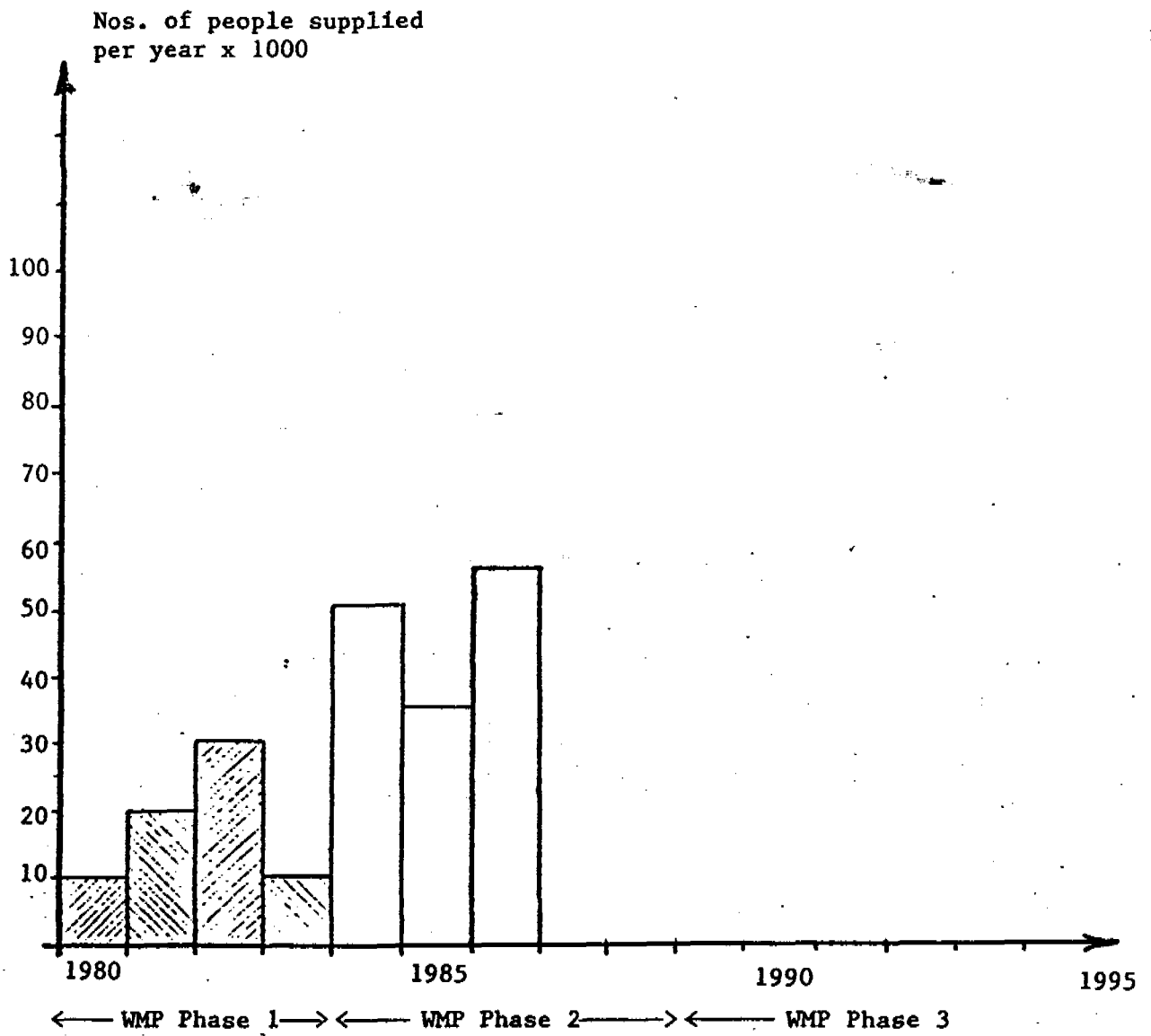
Implementation costs for 633 high priority villages with reductions as above and expressed in D.Kroner are estimated to be 374,622,000.- rounded to 400 Mill. D.Kroner inclusive of price increases from July 1981 to September 1982

COPY 12



Nos. of Villages Served with water as per the end of 2nd Quarter 1986

Copy 13



Population supplied with water in each individual year since the start of the WMP.  
 Distribution of people served during WMP Phase 1 is estimated only.

BUDGET 1986 X 1000	PROJECT ACCOUNTS (Danida Grant Components)	DISBURSEMENT 1986			
		DKK X 1000	%	%	TZS X 1000
	Pipes & Fittings	*13,677	62.4		52,644
	Other Foreign Materials	25	0.1		85
	Cement	955			3,326
	Other Local Materials	655			228
	Salaries & Allowances	2,203	10.0		7,676
	Transport Costs	4,452	20.2		15,513
	Total Piped Schemes	21,967	100.0	68.4	81,526
	Handpump Schemes	1,456		4.6	5,074
	Total Schemes	23,423		73.0	86,600
	Regional Cost Centres	4,000			13,941
	Pilot Schemes	813			2,833
	Interregional Cost Centres	3,869			13,481
	Total Overhead Expenses	8,682		27.0	30,255
	PROJECTS CONSTRUCTION COSTS	32,105		100.0	116,856
	** + Vehicle Purchases	* 6,336			32,739
	- Vehicle Depreciation	(3,169)			(11,376)
	+ Adjustments & Net Purchase reg. stores	1,635			7,639
		( 46)			
	Expenses posted 1987 in Danida	(1,517)			( 9,924)
35,390	DANIDA CONSTRUCTION COSTS	35,344			135,934
735	Operation & Maintenance	625			2,634
7,800	CCKK Consultancy	* 8,970			30,212
230	Health & Sanitation	71			388
175	Research	84			334
930	DSU Administration	724			2,119
2,000	Contingencies	0			0
0	Exch. Differences	2,080			0
47,000	TOTAL PROJECT EXPENSES	47,898			171,571
2,000	EDP MAJI	* 1,337			8,730
49,000	TOTAL EXPENSES	49,235			180,301

\* The project accounts are maintained in TZS. However, for the 6 groups marked \* all postings are made in DKK as well. All other construction costs are calculated in DKK as per 31/12/86 using an average rate of exchange for the year (3.48).

PHASE 2 (DKK X 1000)							
LINE	GRANT COMPONENT	1984	1985	1986	TOTAL 84 - 86	PROJECT GRANT	BUDGET 1987
1.	Construction Costs	24,232	48,987	35,343	108,562 <sup>5)</sup>	200,000	38,346
2.	Operation & Maint.	-	-	625	625	10,000	660
3.	CCKK Consultancy	5,534	7,364	8,970	21,868	15,000	6,760
4.	Health & Sanitation	-	-	71	71	8,000	600
5.	Research	-	-	84	84	1,000	48
6.	DSU Administration	887	801	724	2,411	7,000	586
7.	EDP MAJI	-	31	1,337	1,367	2,000	1,000
8.	Contingencies	0	0	0	0	6,000	2,000
9.	Exchange Difference	636	150	2,080	2,867	0	0
	Sub-Total (line 2 - 9)	7,057	8,346	13,892	29,294	49,000	11,654
	GRAND TOTAL	31,289	57,334	49,234 <sup>2)</sup>	137,856 <sup>2)</sup>	249,000	50,000

- 1) This breakdown is based on a Danida Statement of accounts of 31/7/85.
- 2) These amounts are in accordance with Danida Statement of 26/2/87. (However, the breakdown in the Grant Components for 1984 and 1985 have been re-arranged by DSU in this statement, using the same accounting procedures as for 1986 where possible).
- 3) These 2 amounts are carried forward to the balance sheet as assets: Completed or ongoing schemes, and
- 4) These 2 amounts are carried forward (C/F) as assets: Grants - other budget components.