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**VILLAGERS' EXPECTATIONS AND
ATTITUDES TOWARDS TRADITIONAL
AND IMPROVED WATER SUPPLIES**

**RESEARCH REPORT No. 50
(NEW SERIES)**

by

A. S. KAUZENI

JUNE 1981

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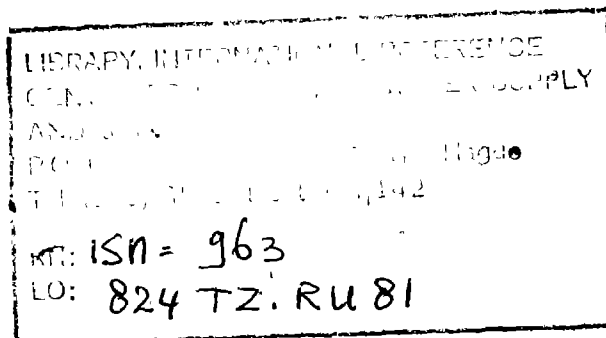
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BUREAU OF RESOURCE ASSESSMENT AND LAND USE PLANNING

UNIVERSITY OF DAR ES SALAAM



VILLAGERS' EXPECTATIONS AND ATTITUDES TOWARDS TRADITIONAL AND
IMPROVED WATER SUPPLIES AND PRE-CONDITIONS FOR SUCCESSFUL RURAL
WATER DEVELOPMENT PROGRAMMES: THE CASE STUDY OF RUKWA REGION.

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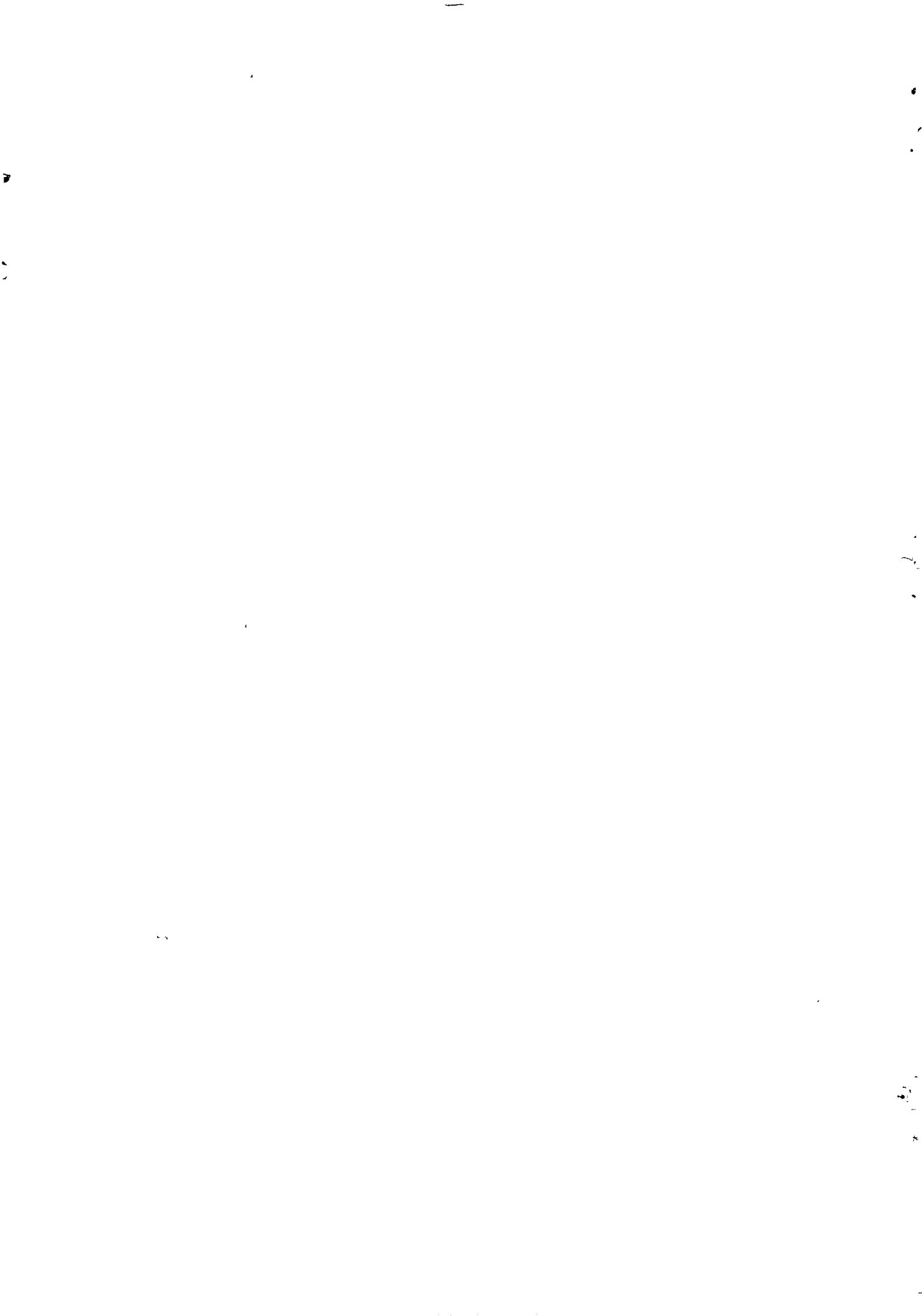


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VILLAGERS' EXPECTATIONS AND ATTITUDES TOWARDS TRADITIONAL AND IMPROVED WATER SUPPLIES AND PRECONDITIONS FOR SUCCESSFUL RURAL WATER DEVELOPMENT PROGRAMMES: THE CASE OF RUKWA REGION.

1. INTRODUCTION

The policy and objectives of the Government is to provide potable and dependable water within a reasonable distance, not exceeding a walking distance (4 km) of every village by the end of 1981 as a free basic service. Also to provide piped water to the rural villages by the end of 1991 so that all people will have easy access (less than 400-500m) to a public domestic water supply. One of the aims of providing potable and dependable water is that water will not only reduce the incidences of diseases and make the life of the beneficiaries more comfortable, but also increase the productive capacity of the people and consequently their contribution to the national economy. It is also the intention of the Government to foster among the villagers a feeling of ownership and responsibility towards the rural water supply schemes.

The success of water policy and objectives will not only depend on Government's degree of commitment on improved water supply programmes, but will largely depend on villagers' perception of the value of improved water supply, their expectations, the nature and degree of their participation in the programmes and will finally depend on the involvement of other relevant institutions such as health, education, UWT and small scale industries.

This paper which is based on the socio-economic study of the Water Master Plan for Rukwa Region attempts to make an investigation on villagers' perception, interpretation, expectations and attitudes towards improved water supply. It also tries to establish prerequisites for successful rural water supply programmes and the ways in which the direct benefits of improved water supply, coupled with other development efforts, can produce indirect socio-economic benefits. This information may assist in making effective and successful rural water supply programmes.

2. REGIONAL INFORMATION

a. Location of Rukwa Region.

Rukwa Region was established in 1974, on the extreme south-west of Tanzania. It lies between latitude 3° and 9° south of the equator and

between longitudes 30° and $32^{\circ} 31'$ E. The region is bordered by Zambia to the south west, Lake Tanganyika to the West and Mbeya region lies to the south. Tabora and Kigoma regions lie to the North-East and North-West respectively (figure 1).

The region occupies approximately $69,720 \text{ km}^2$, that is about 7.9% of the total mainland area. It is made up of three districts namely Sumbawanga, Mpanda and Nkansi districts.

b. Physical Features, Climate and Ecology

The topography of the region falls under four broad categories of land features namely:-

(i) Mountain ranges: There are two ranges of mountains formed by the two arms of the rift valley running in north-west to south-east direction. The south-east ranges along Lake Rukwa (attitude 810m) includes Mbizi mountains which rises to a maximum height of 1600m. The North-West ranges along Lake Tanganyika extend to the border with Kigoma region and they rise to a maximum height of 1936m.

(ii) Ufipa plateau: The Ufipa plateau is located between the two mountains ranges described above and rises to a maximum height of 2461m. at Malonje. The plateau is separated from the lakes by steep escarpments and a continuous mostly narrow lacustrine plain along lake Rukwa but only small isolated lacustrine terraces along lake Tanganyika. In the northern part of Sumbawanga district the slopes descend gently down to lake Tanganyika. The plateau itself comprises a very undulating plain surrounded, except in the north-west by upland ridges.

(iii) Lake Rukwa Valley: The lake Rukwa plain extends in a north-westerly direction. Half of the area of the plain was originally covered by the lake, and it is swampy especially during rainy season, and therefore unsuitable for agricultural development.

(iv) Lake Tanganyika shore: Being a rift valley lake, it is characterized by a very narrow coastal strip, with almost a continuous chain of steep hills. The coastal strip is also interrupted by narrow river valleys formed by numerous streams draining the region into the lake. These rivers include:- Kalambo, Ifume, Mfwizi, Rungwa, Ugalla and Rugufu river.

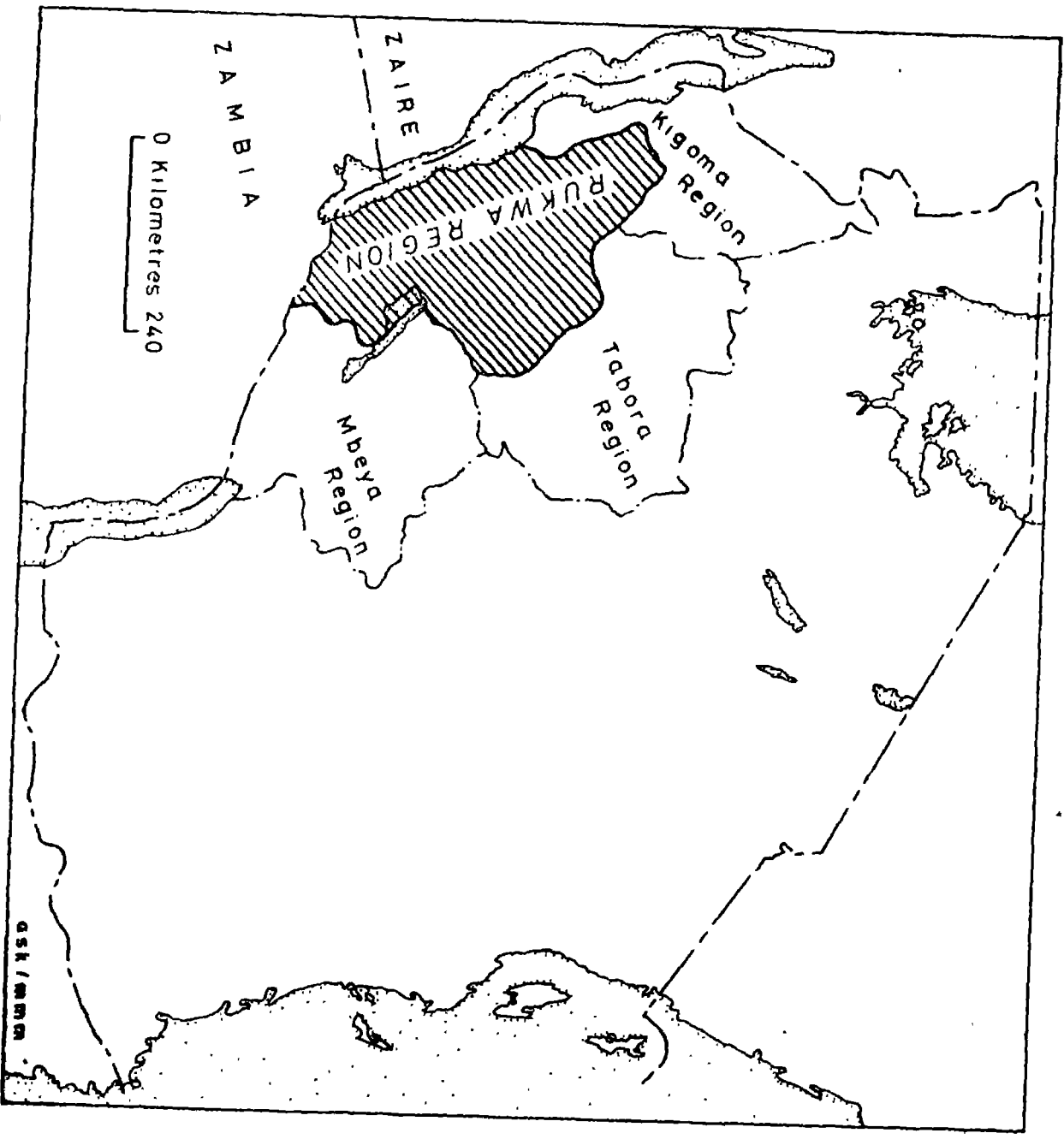


Fig. 1. Geographical location of Rukwa Region



It is however difficult to exhaustively discuss the climate of the region due to the inadequacy of a well established weather recording station. On the whole, the region has a generally favourable climate for both agriculture and animal husbandry. Throughout the region the probability of the annual rainfall reaching or exceeding the minimal value for rain-fed agriculture (750mm) ranges between 62 and 97.5%. Most of the region has more than 4 months moisture surplus and consequently for most of the region crops should not lack water. The rainy season lasts for six months from November to May. The heaviest rains fall between December and April.

Areas recording the highest levels (1000-1300mm) are those around Kala in Nkansi district and south to Kasanga, in Sumbawanga district. Similar areas are to be found around Mpanda, Kabungu, and Mweze highlands. Areas receiving moderate rainfall of between (900-1000mm) are those around Ulumi, Mwazyee, Malonje, Mamba, Kapapa and Inyonga. The area on the plateau stretching from Chala down to Kaengesa and the coastal strip of Lake Rukwa running from around Mkulwa-Usevya receive the lowest rainfall of between 800-900 mm. The mean annual rainfall value for the region is 996 mm.

Most of the plateau from Namanyere in Nkansi District to Sumbawanga and southwards to Ulumi in Sumbawanga district has a mean annual maximum temperature of 24-27°C. Mpanda district, Lake Tanganyika shore and Rukwa valley have a mean annual temperature of 27-29°C. The mean annual minimum temperature of Mpanda district, Lake Tanganyika shore and Rukwa valley ranges between 16-19°C while that for the plateau is between 13-16°C. Potential evaporation for Lake Tanganyika shore and Western portion of the plateau running north-west is approximately 1800-1000mm per annum. Elsewhere in the region the value is 2000 mm per annum. Roughly Rukwa region can be divided into three ecological zones:

- (i) Woodland
- (ii) Grassland
- (iii) Montane and riverine forest and bushland escarpment vegetation swamps and highland vegetation.

(i) The woodlands are mainly of miombo type and they approximately occupy 80% of the region. This zone covers most of Mpanda district, the Rukwa valley and the sloping areas which separate the Ufipa plateau from Lake Tanganyika. A large part of the woodlands, especially Mpanda District is tsetse infested and it is virtually uninhabited.

(ii) Grasslands account for nearly 12% of the region and cover most of the Ufipa plateau, parts of Lake Rukwa valley and Mweze highlands. This zone is densely populated due to its suitability as far as agriculture and livestock development is concerned. Nearly $\frac{1}{2}$ of the region's population lives on the Ufipa plateau. Thus, the natural vegetation has been modified by man's activity through cultivation and grazing.

(iii) The montane forest covers only small areas about 0.1% of the region particularly parts of Mbizi mountain Mweze and Ipunda hills. The riverine forests are confined to the big river banks particularly along the Ugalla, Malagarasi, Mtambo and Kalambo. This zone accounts for 1% of the region. The bushland, escarpment, highland vegetation and swamps cover nearly 7% of the total regional area.

C. Hydrology and Drainage

The region consists of two major lakes. Lake Tanganyika lies on the west along the western arm of the rift valley while lake Rukwa lies on the eastern arm of the rift valley. Apart from these two major lakes, several small lakes are to be found especially in the southern part of the region. These includes lake Kwera, the biggest, Lake Sundu, Twelele, Mongali, Kura, Wachumi, Kalomo, Nununya, Mninga, Katazi, Ifena and Kirundi.

There are two important rivers and stream systems that drain the region.

(i) In most of the eastern, south-east and north-east part of the region, the rivers belong to the drainage system of the interior lake i.e. Lake Rukwa. These rivers are: Rungwa, Mfwisi, Sakalilo, Msadya, and Kirida.

(ii) Those draining the rest of the region into Lake Tanganyika thus belongs to the drainage area of the Atlantic Ocean. They include ~~Ugalla river~~ which forms the boundary between Mpanda and Tabora region; hence drain the north-eastern part of Mpanda district into Lake Tanganyika. Others include Rugufu river, Magese, Kalambo and Ifume. Several small rivers and streams coming from Lake Tanganyika ranges and running into the two lakes are seasonal.

d. Regional Government and Administration

Rukwa region was formed in 1974 by the joining of Mpanda and Sumbawanga formerly of Tabora and Mbeya region respectively. However in 1979, Sumbawanga district was sub-divided into two districts i.e. ~~Mkansi and~~ Sumbawanga thus bringing the total number of districts to three.

Administratively the regional breakdown is as follows: The districts are divided into divisions, divisions into wards and finally wards are sub-divided into villages. The number of divisions, wards and villages in the respective districts is based on the population size rather than area.

The chief political head of the region is the Regional Commissioner who is appointed by the President while the districts are headed by the Area Commissioners. The divisions and wards are administered by the Division and Ward Secretaries respectively.

The major aim of the decentralization policy has been to promote more effective rural development. Thus a Regional Development Director (RDD) also appointed by the President who reports directly to the Regional Commissioner who is the head of the Regional Functional Departments which correspond to the National Ministries at the regional level.

At district level each district has functional departments parallel to that of the region, thus the District Development Director is the head of the District Functional Departments and reports to the Area Commissioner.

In this way the central ministries now perform advisory and supportive duties only. At divisional and ward level, there is a merger between government and party. Due to shortage of manpower there is no fixed system of arrangements for functional ministerial representation at these levels.

Thus, much more than in the past, the local level political structure from the ten-family cell basic C.C.M. unit through village level, ward, division, district and ultimately regional level inter-acts with the civil service in programme identification, preparation and implementation. During the 1975 villagization programme both the rural settlement pattern and the administrative structure were considerably changed. To date each registered village is headed by a Chairman, a Secretary and a Village Council consisting of five (5) committees. A programme is also at hand to introduce village managers in each registered village.

e. Settlement Pattern

Like most other Regions in Tanzania mainland the 1972/1974 villagization programme was also implemented in Rukwa Region. However the new settlement pattern was mainly confined to local movement of people from their scattered homesteads into new villages rather than movement over long distance. Thus most of the new villages were concentrated along the main roads or in areas where at least there is an access road.

In some cases the movement was very unnecessary, especially where people were moved from one side of the road to the other, on a similar physical condition. Strictly speaking, Rukwa Region had an advantage over the other regions in Tanzania as far as the implementation of the villagization programme is concerned. This is due to the fact that originally the tribes in the region lived in the villages with many households close together. Thus a number of villages were formed either by amalgamating two or three villages into one or by splitting big villages into two. The official family size as stipulated in the 1975 village act is between a minimum of 250 and a maximum of 600 families. Up to the time when the survey was conducted, there were a total number of 289 registered villages in Rukwa Region.

However the new villages have occupied an extensive area, due to the new system of allocating one acre of land to each household around the house (Plots). This means that a distant farm land has to be acquired thus increasing the walking distance from the households. On the other hand the new system has complicated the distribution (location) of social services such as water supplies.

The number of divisions, wards, villages and their respective population figures for the year 1967 and 1979 are Summarized in Table (1).

Table 1

Administrative Units and Population of Districts

District	Number of Divisions	Number of Wards	Number of registered villages	Total Population 1979	Total Population 1979
Sumbawanga	6	30	160		213,144
Nkanshi	3	10	58	215,288	90,987
Mpanda	7	27	71	60,803	140,914
T O T A L	16	67	289	276,091	445,045

Source: Survey results.

As it can be seen from the above table there has been a remarkable increase in population from 1967 census to 1979 census. A striking growth rate of 4.4% has been observed in Mpanda District. This is mainly attributed to immigration of refugees from Rwanda and Burundi and partly by the pastoral Wasukuma into the District. Sumbawanga District has also experienced a net gain in population from immigration of Wasukuma into the district. The combined annual growth rate for Sumbawanga and Nkanshi district is 2.3%, however the annual population growth rate in the whole region including Sumbawanga town is 2.9%.

Nearly 50% of the total population of the region lived on the Ufipa Plateau with density approaching 13 people per km². Other densely populated areas include Lake Tanganyika shore and part of Rukwa valley. Huge tsetse infested Miombo woodland in Mpanda District remain virtually uninhabited. There is also variation as regards the distribution of population in the villages. In order to have a basis for assessing or estimating the magnitude of the social or economic infrastructure to be established in various districts and finally in the villages, the following grouping of villages according to the population size has been adopted (table 2).

Table 2

Village Population Grouping by District 1979

Category of village by Population	Sumbawanga	Nkansi	Mpanda
Less than 1000	53	19	13
1001 - 2000	84	35	36
2001 - 3000	15	8	16
3001 - 4000	4	1	9
4001 - 5000	1	1	2
Above 5000	1	-	3

Source: Survey results.

3. SERVICES AND INFRASTRUCTURE

There has been an outstanding achievement of the "Operation Vijiji" as far as provision of basic services are concerned. However there is considerable variation as regards their distribution both at district and village level (table 3). These services fall under four groups:

1. Agriculture infrastructure i.e. storage facilities, cattle dips etc.
2. Transport infrastructure i.e. roads and vehicles.
3. Water Supply.
4. Social service infrastructure i.e. health and education facilities.

Table 3:

Physical and Service Infrastructure District wise 1979

INFRASTRUCTURE	D I S T R I C T S		
	Sumbawanga	Nkansi	Mpanda
1. Schools	94	86	91
2. Dispensaries	21	27	29
3. Shops	32	95	80
4. Churches	33	94	88
5. Mosques	5	7	32
6. CCM offices	57	66	57
7. Markets	4	10	29
8. Bus services	25	33	22
9. Railway services	0	0	34
10. Boat services	1	11	3
11. Tap water	19	16	20
12. Distance-more than 100km to district headquarter	46	18	31

Source: Survey results.

As observed, too much emphasis has been put on the development of the social service infrastructure, consequently, unbalanced growth in the different sectors has been observed throughout the region. In most cases the transport infrastructure is poorly developed, resulting in poor economic performance by nearly all the established villages.

4. RURAL WATER SUPPLY SITUATION

Availability of water in the region

There are three major potential sources of water in the region. These are surface water, ground water and rain water. On the basis of these sources the region can be divided into five distinctive areas in relation to physical structures.

(i) The Ufipa Plateau

This area consists of four administrative divisions: Itwelele, Kate, Matai and Chala. The area is of undulating and partly swampy grassland, interspersed with hilly ranges. Water availability is generally fair. The ground water table is mostly high in many areas. However, the means to make river and ground water available for human consumption, for economic development purposes and hydro-electric production are often inadequate.

(ii) The Hilly Areas

These areas are found along the eastern and western sides of the plateau. They also cover the south-eastern part of the plateau which includes two administrative divisions: Mwimbi and Mpui which are densely populated. Due to the nature of terrain, ground water availability is much more localized and there is a real seasonal water shortage in some villages particularly during the dry season.

(iii) The Lake Shores

These areas include three administrative divisions: Karema, Kirando and Kasanga along Lake Tanganyika and one administrative division Mtowisa, along Lake Rukwa. In these areas water is supplied by numerous small streams from Lyambalyanfipa escarpment. Apart from the numerous small streams, Lake Tanganyika itself is used as the primary water source by some villages along the lake shore.

(iv) The Miombo Woodland

Most of Mpanda District is covered with miombo woodland and is sparsely populated. The more densely settled areas such as Katumba settlement complex, Mishamo camp and other tobacco complexes are provided with water from boreholes and shallow wells which are less successful than in Sumbawanga and Nkansi Districts.

(v) Inyonga Division

Inyonga Division forms the eastern part of Mpanda District. This is the area with the most serious water problem in the region. All attempts to construct wells or boreholes have failed because the ground water table is too low. The area has several temporary streams which cannot be relied upon.

Rural water supply situation in the region leaves much to be desired. The degree to which government rural water policy has been implemented is far below expectations.

Water supply in the region can be divided into two categories: (i) traditional water supplies and (ii) improved or modern water supplies. The traditional water supplies which are the most important and most common water sources for the greater part of the year and for the greater majority of villages in Rukwa Region include rivers, streams, springs, lakes, ponds and traditional wells (tables 4 and 5). Improved water supplies which are least common include tap water, boreholes and improved wells (shallow or deep wells).

Table 4

Most Important Sources of Domestic Water Supply During the Rainy Season

Source	Number of villages using various sources water supply by district		
	Sumbawanga	Nkansi	Mpanda
Tap water	20	9	4
Modern wells	4	1	13
Traditional wells	52	12	19
Lake	3	24	2
Spring	9	1	1
River (stream)	72	23	26
Rain	2	1	0

Source: Survey results.

Table 5

Most Important Sources of Domestic Water Supply During
The Dry Season

Source	Number of villages using various sources of water supply by district		
	Sumbawanga n=166	Nkansi n=73	Mpanda n=65
Tap water	20	11	3
Modern wells	4	1	13
Traditional wells	55	14	20
Lake	3	29	2
Spring	11	3	1
River (stream)	69	13	26
Rain	0	0	0

Source: Survey results

On average about 87% of the total number of villages get water from traditional water sources for the entire region. This is about 85% of the total rural population. However, the situation differs insignificantly from one district to another. Nearly 82% of the total number of village in Sumbawanga and Nkansi Districts and 75% in Mpanda District, reported using traditional water sources.

5. CURRENT WATER UTILIZATION IN VILLAGES

In the second Five Year Development Plan the importance of improved water supply was stressed on both social and economic grounds. It was clearly stated that the supply of potable and dependable water would not only reduce the incidence of diseases and make the life of the beneficiaries more comfortable, but also increase the productive capacity of the people and consequently their contribution to the national economy. Currently, water from both improved and traditional water supplies is used for various purposes. Water is used for both domestic and non-domestic purposes. Major purposes for which water is used include drinking, cooking, washing of utensils, local construction of houses, irrigation and farming, gardening, watering and dipping of livestock, pottery, processing of palm oil and watering of trees and tobacco nurseries.

Villagers use particular water sources for definite water uses when they have the alternatives. In the process of selecting water sources for various uses and in the way villagers utilize the different water sources they reveal their perception and values or their attitude towards water. There appears to be an inter play between the nature of water supply situation (traditional or modern) on one hand and the social factors on the other hand. Division of labour in the households, clothes washing habits, bathing habits, people's ideas about water quality, selection of water sources for various uses etc..... create a pattern of water use in a community.

a. Water Sources and Their Uses

Almost all villages have more than two sources of water. The number of sources decreases as the dry season progresses because some sources dry up. Generally, water from modern or improved water supplies is perceived by villagers to be of better quality than water from other sources. Even the improved water supplies are ranked according to water quality. Tap water is regarded to be of the highest quality and next water from modern wells or boreholes. The ranking in respect of traditional water sources is such that water from springs and rivers is perceived to be of the highest quality, then followed by water from lakes and lastly water from ponds and ~~traditional wells~~. Depending on the type of water supply available and the degree of convenience, normally drinking and cooking water is drawn from the highest water quality supply. Water from low or poor quality supply is used for other purposes such as washing, washing of clothes, cleaning of utensils, building of houses, irrigation and for livestock watering. It appears that the preference of tap water for drinking seems to be not only for health reasons but also for prestige.

Selectivity in the use of various water supplies operates only when there are alternatives and when it is equally convenient to use any available water supply. This is a point at which health education should be emphasized in order to influence the choice of villagers on the type of water supply to be used for various purposes. There are generally five major factors that influence villagers' decision as to the water supply he chooses.

(i) Distance to the Water Point

The distance to the water supply from the village or residential area increased or decreased the number of households using that particular water supply regardless of the quality of that water supply. The nearest water supply will be used as distance seemed to be the most decisive factor in choosing between water supplies. This implies that distance is a critical factor in selecting the sites for water supply installation in villages.

(ii) Water Quality

Water quality seems to be the second most important factor in determining one's choice of water supply. When there is a wide choice of water supplies within equal distances, most households fetch water (particularly drinking water) from supplies perceived to contain better quality water.

(iii) Suitability of Water Supplies for Various Purposes

Good quality water from the tap and modern wells in respect of improved water supply and springs or river water in respect of traditional water supplies are used mostly for drinking. If there are choices among water supplies within equal distances and with different water qualities, most households will choose to fetch drinking water from sources perceived to contain good quality water and will fetch water from any other sources for bathing, washing of clothes and utensils. This situation suggests another reason for retaining traditional water supplies after the installation of improved water supplies because water from them will still be required for other purposes.

(iv) Convenience of the Water Supplies

Sometimes it so happens that both traditional and improved water supplies are located in the same geographical area. This is a common phenomena when modern wells or boreholes are fitted with either foot-pumps or handpumps, most households find it more convenient to go to the river with their vessels to get water than to pump the water from the well which is both time consuming and tiresome. This is a situation where health education programme is most required.

(v) Prestige

There are few incidences encountered whereby tap water was used for the sake of prestige or as a sign of sophistication coupled with health reasons. To the households concerned, tap water symbolized a certain degree of development for the village.

b. Pattern of Water Use at Home or At Source

Water sources in villages in Rukwa Region are located at varying distances from villages or households. For the sake of convenience and depending on circumstances, water from these supplies is used at the water source or supply or is fetched and used at home for various domestic and other non-domestic purposes (table 6).

Table 6

Sources and Uses of Water by District

SUMBAWANGA DISTRICT			
Purpose for water use	Percentage of households using water		
	At home only	At source only	At both places
Drinking	98.80	00.00	1.20
Cooking	100.00	00.00	0.00
Cleaning of utensils	89.40	00.00	10.60
Washing (hands, face, etc..)	95.90	1.20	2.90
Bathing	61.20	0.60	38.20
Washing of clothes	25.90	35.30	38.80
NKASI DISTRICT			
Drinking	99.40	00.00	00.60
Cooking	100.00	00.00	00.00
Cleaning of utensils	87.10	00.00	12.90
Washing	78.80	00.00	21.20
Bathing	58.20	00.00	41.80
Washing of clothes	14.70	27.60	57.70
MPANDA DISTRICT			
Drinking	100.00	00.00	00.00
Cooking	100.00	00.00	00.00
Cleaning of utensils	100.00	00.00	00.00
Washing	92.90	0.60	6.50
Bathing	87.60	1.80	10.60
Washing of clothes	64.10	17.60	18.30

Source: Survey results.

There are minor differences in water use pattern between districts, mainly due to the differences in geographical location of villages within districts in relation to the water sources. There is however a clear indication that bathing and washing of clothes are the two activities most often done at water sources or water supplies taking into account that there is an appreciable number of households which perform both these activities at home and at water source. Water for drinking and cooking is fetched and almost exclusively used at home. Cleaning of tensils and washing of hands, feet and face is largely done at home. This is due to the relatively small amounts of water required to perform these activities. Bathing and washing of clothes are done at source due to the fact that relatively large amounts or volume of water is required to perform these two activities and less effort is required to carry clothes and to walk to the water supply than to carry large volumes of water back home for bathing and washing of clothes.

The use of water at home or at source seem to depend on:

(i) the purpose for the water (ii) the distance to the water supply and (iii) the regulations imposed by the village government on the use of water from various water supplies. In most villages in Rukwa Region the village government forbids the bathing and washing of clothes at water sources in order to minimize health hazards through water pollution.

The water use pattern should assist planners of water supply programmes in deciding upon the distribution of water points in the villages and in the provision of facilities for clothes washing and bathing, in order to minimize water contamination.

c. Use of Rain Water

Rain water represents a potential additional source of water to villages. Due to lack of reservoirs and large water containers the use of this potential source is limited only to the days with rain within the rainy season. Therefore only a limited number of villagers use rain water for various domestic purposes when it is available. Out of 512 households interviewed only 75 (14.6%) said they used rain water as an additional water source. There are three major reasons for the low figure of households making use of rain water:-

(i) There is only a small number of households having containers large enough for storing rain water (ii) Rain water collected from house roofs is perceived to be of poor quality because it contains particles of grass, has unbecoming taste, small and yellowish brown colour from smoked grass roofs and therefore not fit for any domestic use. (iii) During the rainy season there is plenty of water all over the place and so there is no need for making any extra effort in trying to collect rain water. Only about 12.1% of the households having corrugated iron roofs used rain water as an additional source of water (table 7). The distance from water sources or supplies to the village did not affect the amount of rain water used. The few households with grass roofed houses using rain water obtained this water from holes in the ground and used it for purposes for which quality does not matter.

Table 7

Use of Rain Water in Relation to Roofing Materials
of Houses District Wise

Roofing materials	Percentage of household using rain water by districts.		
	Sumbawanga	Nkansi	Mpenda
Corrugated iron sheets	40.00 n=5	63.00 n=16	97.60 n=41
Grass	2.40 n=165	4.70 n=149	8.80 n=136

Source: Survey results

There is great potential for use of rain water in villages if reservoirs could be constructed to collect draining water from the catchment areas around the village. Due to traditional houses with grass roofs there is very little hope for convincing people to use rain water collected from these roofs for domestic purposes.

6. VILLAGERS' PERCEPTIONS ON WATER AND ITS PROBLEMS

Understanding villagers' attitudes or perceptions on water is a step forward towards the establishment of realistic and effective water supply programmes which will try to meet their requirements and solve most of their problems.

Villagers accept water as an important element and is considered to be one of the fundamental building blocks of nature and that it is an essential ingredient for survival and that it is also essential for both social and economic development of mankind. They also realize that traditional sources of water in their natural states seldom and clean water to satisfy their needs. Some villagers also have had provide adequate some experience with improved or modern water supplies and do know what their problems are.

a. Water Problems in Villages

The large majority of people in the rural areas of Rukwa Region have no access to an adequate supply of clean and potable water. This situation is clearly known by both villagers as well as the government. Water problems in villages in Rukwa can be divided into two major groups:- (i) Problems pertaining to both traditional and improved water supplies and (ii) Those pertaining to only improved water supplies.

b. Problems Associated with Traditional and Improved Water Supplies

The nature and severity of these problems differ from one season to another, ~~on~~ types of water supplies and from one village to another (table 8). These problems are mainly related to the location, type and use of the water supplies. These problems include:-

- Water scarcity
- Water contamination
- Distance to water points or supplies
- Queueing up for water

These problems are more pronounced with traditional water supplies than with improved water supplies.

Table 8

Problems Mentioned with Respect to Traditional Water Supplies

Problems	Total number of villages which stated these as most important problems		Total number of villages that mentioned these as general problems	
	Rainy season	Dry season	Rainy season	Dry season
Scarcity of water	17	39	40	113
Contamination	196	94	111	13
Distance	48	66	4	25
Queueing	4	5	0	33

Source: Survey results

(i) Scarcity of Water

Water scarcity is perceived by villagers as one of the two most important problems associated with the two types of water supplies. This problem is regarded to be most serious during the dry season because the amount and level of water in rivers, streams and wells decreases. Sometimes some of these water supplies dry up completely. Reduction in the volume of water is caused by water table moving further down, lack of rain water that feeds the rivers or streams and finally through evaporation.

(ii) Contamination of Water

Water contamination is typically a problem during the rainy season and is the most important problem associated with traditional water supplies because these are not protected. Water contamination is caused mainly by rain water carrying mud, faecal materials, animal and plant debris and draining them into open traditional water sources. Water contamination is also caused by the dirty habit of villagers who take baths and wash clothes close to the water supplies because used water drains back into the water source. Water contamination is also experienced in some villages during the dry season because live-stock and human beings get water directly from the same sources. This situation calls for special consideration with regard to providing facilities for bathing, clothe washing and for watering of livestock when implementing water supply programmes.

(iii) Distances to Water Supplies

Villagers view long distances to water supplies as the second most important water problem particularly during the dry season. Villagers have to travel long distances to fetch water because some water sources closer to the villages dry up. This problem is closely related to scarcity of water. The other reason why villagers have to travel long distances to water supplies is that they choose the type of water supply from which to collect water depending on the use for that water, whether for drinking, bathing, clothe washing or for building and construction. Average distance to water source was measured from a central point for each 10-cell and pacing it to the water supply. Table 9 gives the range of distance for each of the three districts.

Table 9

Distance to Water Source

Distance	Percentage of households covering the distance to water source		
	Sumbawanga	Nkansi	Mlanda
0 - 200	38.65	54.76	23.72
300 - 400	19.02	17.86	32.05
500 - 600	15.34	10.12	25.64
700 - 800	3.68	3.57	11.54
900 - 1 km	15.34	1.78	6.41
1.1 - 1.2 km	-	5.95	-
1.3 - 1.4 km	0.61	-	-
1.5 - 1.6 km	1.84	0.60	0.64
1.7 - 1.8 km	0.61	4.78	-
1.9 - 2km and above	4.91	0.60	-

Source: Survey results

(iv) Queueing up for Water

After the completion of the villagization programme some villages grew up to twice or three times their original sizes. So, the population in these villages out grew the water facilities already available before the programme. This situation resulted in the crowding of people around

the few water points available in the villages and which were originally designed for a few households. In turn this situation resulted in people queueing up for water.

Table 10

Problems Experienced by Villagers with Traditional and Improved Water Supplies in Different Seasons District wise

Problem	Percentage of households experiencing problems during different seasons.			
	Tradition water supplies		Improved water supplies	
	Rainy season	Dry season	Rainy season	Dry season
<u>SUMBAWANGA DISTRICT</u>				
Scarcity	1.96	37.84	54.38	78.46
Contamination	81.05	31.76	29.83	1.54
Distance	14.38	16.89	8.77	9.23
Queueing	2.61	13.51	7.02	10.77
<u>NKANSI DISTRICT</u>				
Scarcity	4.07	44.90	-	40.00
Contamination	91.30	50.34	100.00	30.91
Distance	0.73	2.72	-	1.82
Queueing	2.90	2.04	-	27.27
<u>MPANDA DISTRICT</u>				
Scarcity	4.46	24.63	32.63	44.08
Contamination	70.06	44.78	15.79	13.98
Distance	24.84	29.10	39.79	25.81
Queueing	0.64	1.49	15.79	16.13

Source: Survey results.

C. Problems Associated only with Improved Water Supplies

Till the beginning of 1980 there were about 60 villages with water schemes or improved water supplies in the region (table 11) of which 56 were from water taps leading from either pump or gravity operated schemes. Most of these water schemes were constructed during and immediately after the villagization programme in order to ease the acute shortage of water resulting from the concentration of people in

the newly planned villages. Most of the water schemes especially those in Sumbawanga District are gravity operated while the majority of the remaining schemes are pump operated. There were few modern wells fitted with hand pumps. During the time of the visit the majority were out of order. For most schemes water is taken from rivers or streams. There are also few water springs used as sources of water. Villages along Lake Tanganyika use water from the lake.

Table 11

Distribution of Water Schemes and Total Population Served District Wise

<u>District</u>	<u>Total number of schemes</u>	<u>Total number of people served</u>
Sumbawanga	31	51,062
Nkansi	13	22,367
Mpanda	16	24,744

Source: Survey results.

People who wish to have a water scheme do not see their requirements in terms of water scheme criteria. These people experience certain problems with their unimproved water supplies and expect the new scheme to eliminate or at least reduce these problems. It is generally expected that villages with improved water schemes should at least experience less water problems compared to those with only traditional water sources. However it has been observed that most problems associated with traditional water supplies are also common to improved water supplies (table 12). Table 12 summarizes water problems associated with improved water supplies this time observed at village level and which as already noted are also associated with traditional water supplies. These problems were found to be caused by similar circumstances as those for traditional water sources and have similar effects on the communities concerned. In addition to problems common to both traditional and improved water supplies, there are problems that are peculiar only to improved water supplies.

Table 12

Problems Associated Also with Improved Water Supplies

Problems	Percentage of village experiencing problems District Wise		
	Sumbawanga	Nkansi	Mpanda
Scarcity	26%	8%	0%
Contamination	13%	15%	8%
Distance	58%	31%	0%
Queueing	16%	23%	0%

Source: Survey results.

Problems associated mostly with improved water supplies have a variety of causes and therefore require different solutions. These problems are perceived by villagers as the root causes of the unreliability particularly of pump operated water supplies. During the visit to the region most improved water schemes were not functioning for one reason or another. Villagers claimed that gravity operated schemes appeared to be generally more reliable than pump operated schemes. Pump operated schemes were said to cost less in operating and maintaining, and also required less organizational ability to operate and maintain. Modern wells where they existed, were said to be the cheapest in operation and maintenance.

Villagers perceive the following problems as the cause of the unreliability of improved water supplies:-

(i) Frequent and long-term Breakdown of Water Schemes

Respondents reported frequent and long-term breakdown of water schemes particularly pump operated schemes. Sometimes the breakdown of the schemes took place within a few months or even weeks of its construction. It was reported that repairs took several months even up to six months before they could be done. Reflecting on the promises of government of improved water supplies given during "Operation Vijiji", and the expectations raised by physical water scheme construction, villagers get frustrated and angry when the new water schemes breakdown after a few months or weeks of their construction and take so much time for repair. Villagers loose confidence in new water schemes and become reluctant to participate in water supply programmes. The major cause for frequent and long-term breakdown of water schemes is lack of

or poor operation and maintenance of the schemes. This is due to inexperienced water pump attendants or operators of the schemes who had no training at all in the operation of the water schemes. It is also due to lack of trained personnel to detect the faults and carry out some repair works. This situation is made even more complicated by lack of spare parts and transport facilities. In some villages malicious destruction of schemes by envious people who did not enjoy the facilities were reported.

The above situation emphasizes the great need for the training component of some villagers in the water supply programmes.

(iii) Lack of Enthusiasm, Motivation and Supervision

Closely related to frequent breakdown of water scheme is a general lack of enthusiasm, motivation and supervision on the part of the water pump attendants or operators. It appears that most water pump attendants apart from being unskilled in their work, also take little interest in their work and do not take their work seriously. This is probably due to lack of motivation because most of them are not paid for the work they do. Moreover, water pump attendants or operators are not adequately supervised by village leaders because there is no organ (committee) in the villages responsible for water. Due to inadequate staffing and transport facilities there is no supervision from the District Water Offices. This situation leads to slackness and negligence in the performance of their duties which in turn leads to breakdown of water schemes. Under such conditions, signs of or the actual breakdown of schemes are not promptly reported to the authorities for quick repair and remedy.

(iv) Lack of Fuel to run the Pumps

There have been irregular supply of fuel (diesel) to the water scheme. Three reasons were given by villagers for this situation: (i) lack of fuel from the regional or district headquarters (ii) when fuel was available villages did not have adequate funds to buy fuel (iii) when fuel was available and there were sufficient funds to buy it, there was no transport to take fuel to the schemes in villages.

(v) Lack of Spare Parts

Due to government red tape or bureaucratic procedures in procurement and issue of spare parts, it is very difficult and time consuming

to get spare parts for the village water schemes. This situation is made even more complicated when spare parts are ordered outside the country involving foreign exchange, and when the main store for these spares is located in a central place in Dar es Salaam. This situation means that requisitions for spares is initiated from the village through the district, region and finally lands in the central store in Dar es-Salaam after it has been cleared from the National Water Headquarters Office. It has been known for some villages to have to wait for these spares for 6-8 months.

(vi) Water Intake Points Drying up

Sometimes water intake points were reported by villagers to have dried up. This is a technical problem which is attributed to poor selection of water sources or design errors of the scheme.

(vii) Low water Pressure from the Taps

This is another technical problem reported by villagers and which contributed to long queues for water.

7. IMPLICATIONS OF IMPROVED AND TRADITIONAL WATER SUPPLY PROBLEMS

The above mentioned water supply problems imply that for certain periods of the year villagers suffer considerably from either complete lack of water or from water scarcity. What do people do when there is no water from the water scheme?

a. Use of Traditional Water Schemes

In villages where both traditional and modern water supplies exist, the obvious consequence is that when modern or improved water supply fail to supply water, villagers resort to traditional water supplies as their source of water. Such retrogressive action reduces the impact of improved water supply programmes both socially (health) and economically (productivity). Where improved water schemes do not exist and whereby close traditional water sources or supplies have dried up villagers have to walk considerably long distances hunting for water, thereby increasing the drudgery of water drawers.

b. Water Collection and its Consequences

Water collection is mainly women's work in Rukwa Region as it is in other parts of the country. Women account for more than half of the visits at the observed water sources and this is equally true for other

sources. Men account for less than one fifth of the visits (table 13). Men mainly collect water when it is in very short supply or when it is required for non-domestic uses particularly house construction. Unmarried men also collect water for their own personal use. Children particularly young girls rank second to women in number in respect of water collection. Water is normally fetched in the morning and late in the afternoon, that is before going to and after coming back from the fields, but when water is in short supply and people have to travel long distances, then a whole day or two days of the week may be spent or set aside just for water collection. Normally children have their peak water collection in the latter part of the mornings. There is a surprisingly large number of children collecting water during school hours.

The above situation involves women and men sacrificing several hours and a lot of energy for water collection which would have been spent usefully on more productive activities such as farming and handicraft or for promoting functional and non-functional literacy programme. As regards children, attendance in school would improve. More time for leisure would be available for all.

Table 13

Sex of Persons Collecting Water for Domestic Purposes
by District During Various Seasons

Sex of water drawer	Rainy season	Dry season
<u>SUMBAWANGA DISTRICT</u>		
Women	71.5	71.9
Children	27.2	26.8
Men	1.3	1.3
<u>NKANSI DISTRICT</u>		
Women	71.40	71.8
Children	28.20	27.8
Men	0.40	0.4
<u>MPANDA DISTRICT</u>		
Women	71.30	71.30
Children	26.50	26.50
Men	2.20	2.00

Source: Survey results.

o. Amount of Water Used

The average amount of water used is about 51 litres per household of about 5 members, this is about 10.2 litres per capita per day. There are large variations between households. These variations are probably due to the size, composition as well as the distance of the household from the water sources. Per capita per day water consumption rate is also affected by the distance between water points and the place to where water is carried for various uses. The amount of water drawn is determined by time, distance and the number of people drawing water per household. When water is drawn mainly by women only early in the morning and late in the afternoon and when the distance is great, water drawers can only manage to draw a limited amount of water and consequently use a limited amount of it too. Some of the expected benefits from water schemes are associated with increased water consumption rates resulting from shorter distance from the house to the water point. These benefits are foregone due to long distances. The longer the distance to water points or sources, the smaller the amount of water fetched and consumed. Reduction in distance to water sources or water points will lead to reduction in time and energy spent on water collection.

8. VILLAGERS' EXPECTATIONS OF IMPROVED WATER SUPPLIES

Effectiveness of the water supply programmes in bringing decisive improvement in the lives of the villagers should not only be assessed in terms of the physical impact of the schemes such as improved water availability and water use but also in terms of villagers satisfaction of their non-tangible expectations of these schemes such as prestige. Sometimes villagers' expectations of improved water supply go beyond what the scheme can offer or afford. This is an impression that most villagers gave in almost all surveyed villages. Most of these expectations are realistic and few of them are not. Before discussing these expectations it is worth while to give a brief account of issues overlooked by most researchers and the results which consequently lead them to contend that the anticipated or expected benefits from improved water supply sometimes never materialize.

During the last few years water studies have been conducted both in East African countries and elsewhere. Most of these studies have shown quite clearly that the expected social and economic benefits

from improved water supply for-domestic use (drinking, bathing, clothes washing etc.....) and for non-domestic use (irrigation, livestock dipping, livestock watering, hydro-power production, fish production etc.....) have not been realized. Some studies have even shown that improved water supply has actually created more problems in some areas. There is some truth in these statements but this largely depends on the situation or circumstances under which the water scheme was prepared and the contributions made by various disciplines before the actual installation of the water scheme.

Issues overlooked by water researchers that results in their assuming that the expected social and economic benefits of improved water supply have not been realized are:

(i) The difficulties involved in measuring the benefits from improved water supply systems. This situation arises because it is not easy to separate the effects of improved water supply on the life of the people from the effects of, for instance, improved hygienic conditions or health facilities in the area which might be taking place simultaneously.

With respect to labour and time saved, released labour is always absorbed in the pattern of daily life and activities in a diffused way, so that it becomes difficult to measure how much time and energy was saved from the tedious job of carrying water for long distances and how much of that time and energy was actually spent on alternative productive activities.

(ii) The failure to realize that poor water supply is only one of the causes of water-borne, water-washed, water-related insect vector and water-based diseases, and that the improvement of water supply without the improvement of other conditions that lead to ill-health such as hygienic conditions, may not result in any substantial, measurable positive changes in the health status of the villagers. For the improved water supply to have an impact on the health of the people it must be accompanied by health education programmes in the community.

(iii) The provision of water supplies has always been the duty of the water engineers and hydrologists. Inputs from social scientists such as sociologists, economists, psychologists and anthropologists have always been neglected or not sought for. The end result has been

a failure to make provision or take into account the economic and social aspects of improved water supplies which are assessed after the water scheme has been in operation for some time. This means that there is no yardstick by which the impact of improved water supply could be measured.

(iv) It takes many years for some economic and social benefits to be visibly realized from improved water supply. Any assessment of the impact of improved water supply will not come up with the expected benefits if the improved water supply has not been given enough time to operate for the benefits to accumulate.

(v) Lack of participation of the local people in the planning designing, construction, operation and maintenance of the water schemes. This means that the planning and siting of water supplies is done from above and the local people had no say whatever. Under such conditions little thought goes into finding out what people wanted to have or into rudimentary education programmes on water use, hygiene or simple training programmes for pump attendants or water installation repair men. These are important issues that need to be considered for the proper functioning of the water schemes which would enable the water scheme itself to have an impact on the life of the people.

(vi) For the improved water supply to have a positive economic impact on the community in view of saved time and energy, opportunities for utilization of released time and energy must be created.

Often times only tangible benefits are assessed in trying to measure the impact of improved water supplies. Despite the contention of some researchers as to whether or not improved water supply has a positive impact on the socio-economic position of the people concerned villagers had the following expectations from improved water supply.

a. Economic expectations

(i) Reduction of Distance and Effort used to Fetch Water

The reduction in distance travelled and energy used to fetch water was the most frequently mentioned benefit by villagers from improved water supply. As already noted water collection is mainly the task of women. It is also known that women play a dominant role in smallholder agricultural production. Villagers and mostly women expressed their strong feeling that given the opportunity to invest time and energy

spent in fetching water by improving water supply situation, they would then be able to contribute even more in agricultural production and in other various economic activities such as mat-making, pottery, sewing, basket-making, weaving and knitting, the activities which would earn them substantial income as shown in table 14 below.

Table 14

Average and Total Production of Some Craftsmen in the Region

Type of craftsmen	Average value of production per craftsmen per annum(shs.)	Total value of production in Region per annum (shs.)
Potters	4,655	22,797,493
Basket makers	1,367	1,004,377
Mat makers	967	5,046,388
Weavers	1,142	107,329

Source: BRALUP Baseline Report for Integrated Development of Rukwa Region.

(ii) Water for Irrigation farming

The economy of Rukwa Region is based on agriculture. It is estimated that over 90% of the population are engaged in crop and livestock production. One of the major advantages of Rukwa Region is its suitability for food production. The region is self-reliant in food production and is capable of producing an even greater surplus particularly if farming using natural rain is supplemented by irrigation farming. Villagers assume that water supply development includes also provision of adequate amount of water for irrigation farming. So they expect increased agricultural production particularly from gardening using irrigation water when improved water supply programme is completed. There is potential for irrigation farming in the region using river, dam and lake water. Currently irrigation farming is done on a very small scale(table 15). Villagers emphasized that provision of water for irrigation would assist, in implementing Iringa

Table 15

The Magnitude of Irrigation Schemes in Rukwa Region 1978/79

District	Number of ha. under irrigation	Number of irrigation schemes
Sumbawanga	70	6
Nkansi	21	2
Mpanda	441	2

Source: Survey results.

Resolution on KILIMO CHA UMWAGILIAJI (Irrigation farming) whose implementation is lagging behind in the region. With adequate amount of water and its proper management they think they could grow crops all-year round. They said that this practice would not only improve their economic position through sales of surplus crops produced but would also improve the nutritional position of villagers as well as their health.

(iii) Water for Livestock

Next to crop production livestock forms a critical part of the economy of the region. Villagers complain that major constraints in livestock production, particularly cattle are diseases and scarcity of drinking water for livestock in some potential areas during the dry season. Important diseases include (a) East coast fever, which is a protozoa disease like malaria and is tick-borne. It is estimated that 30% of calves die per annum of East coast fever, (b) Live flukes. This disease is contracted by animals through drinking dirty water contaminated by liver flukes. It is also estimated that 100% of the animals in the region are attacked.

c. Trypanosomiasis. Animals contract this disease after being bitten by tsetse flies. This disease is most serious during the period June to October when grass is burnt and water is in short supply and livestock are driven long distances in search of food and water from swampy areas. This is the time they come into contact with tsetse in some uncleared areas. Villagers believe very strongly that improved water supply in villages will definitely increase livestock production because it will not only make possible the opening of new areas for livestock

production but will also reduce the number of animals that die annually due to lack of water and tick-borne diseases that are controlled by dipping. Availability of water will enable the construction of dips for controlling East coast fever. It will enable livestock to get clean water free from Liver flukes and finally animals will not have to travel long distances through tsetse infested areas in search of water thus controlling Trypanosomiasis.

(iv) Water for Hydro-electric Power Production

The few enlightened villagers think that improved water supply which includes proper water resource management would lead to the production of economic source of energy in the region. Availability of cheap sources of energy would foster the initiation of various economic activities in villages such as saw milling and metal works. Moreover major repairs of vehicles and machinery could be done rather easily. In short, small scale industrial activities would be promoted, and more social services in the region could be initiated.

There are several rivers which could be considered for hydroelectric power production, some of these rivers include Rungwa, Msadya/Mfwizi, Kalambo, Iwiche and Muze.

(v) Water for Trees and Tobacco Nurseries

Presently large tracks of land in the region have been cleared of vegetation for fuel (mainly charcoal), residential areas and cultivation and curing tobacco. This situation may lead to desertification of the region with its attendant consequences. There is a national call for tree planting in all regions and moreover tobacco is one of the main cash crops in the region. Villagers have strong feelings that improved water supply will provide them with adequate water to grow trees and initiate tobacco nurseries in the region.

(vi) Water for Fish Production

The potential for fish production from artificial or ~~man~~ - made ponds is high if better water resources management could be introduced in the region. Villagers expect to introduce fish production in man-made ponds in order to improve the protein content of their diets and have surplus fish for sale after the completion of the water programme.

b. Social Expectations

Social benefits of improved water supply are the most difficult to assess, but are the most important aspects of improved water supply.

(i) Better Quality Water

All villagers interviewed agreed that the water that they use from traditional sources is of poor quality. According to their standards good quality water is that which has no colour, smell or visible water suspensions. They expect that improved water supply will definitely improve water quality. Of course they do not know that water quality depends on many things such as the source of water intake, the type of the water scheme etc.... Open sources of water or intake will always contain poor quality water even if that water is supplied to the village by gravity or pump operated scheme.

(ii) More Water for Bathing and Washing of Clothes

On average respondents in survey villages said they take a bath three times a week during the dry season and slightly more often during the rainy season because more water is available. They said they wash clothes once a week during the dry season and more often during the rainy season. Improved water supply is expected to increase the amount of water supply and consequently they expect to take baths and wash clothes more often per week. Respondents said improved water supplies are more reliable and expected to provide water all-year round than traditional water supplies.

(iii) More Water for Building houses

The present policy of the government on shelter as one of the basic needs of every human being, encourages and assists villagers whenever possible to build themselves better houses. In Rukwa Region particularly on the plateau villagers find it very difficult to implement this policy for two major reasons. First, lack of building materials (wood). Forest fires, site clearing for residential purposes and for farming, charcoal burning and cattle grazing have completely changed the natural vegetation of the plateau and turned it more or less into a grassland. Moreover there are very few forest plantations in villages. So, house building using wooden materials is not easy at all. Second, the same areas with serious shortage of wooden building materials are also affected by water shortage. This means that house building using mud is

also a problem because it requires a lot of water. Most respondents expect that improved water supply will lead to the provision of adequate amount of water in villages all-year round and which will enable them build better houses out of burnt or baked bricks.

(iv) Reduction in Intestinal Disease incidences

The health of the community everywhere depends greatly on the ample supply of wholesome water. Diseases of very varied character and nature are transmitted to man by water. The causal agents conveyed by the water may be chemical poisons, pathogenic micro-organisms and higher forms of life, like worms. However certain diseases have also been ascribed to either deficiency or even abundance of certain chemical substances in water supply.

Most villagers interviewed strongly believe that the majority of intestinal diseases and ailments including worms are connected with drinking dirty water. When asked as to whether they thought members of their families had fallen sick due to drinking dirty water, all respondents without exception answered in the affirmative. Due to lack of knowledge of the nature of diseases, their symptoms and diagnostic techniques, respondents were not able to mention specific diseases. Nevertheless, they strongly believe that improved water supply, which to them means better water quality, would reduce intestinal disease incidences.

Some investigations were conducted to find out common diseases that are connected with drinking dirty water. The following diseases were found:-

- Water-borne Diseases:

Typhoid, hepatitis, cholera and diarrhoea were reported as common diseases along lake Tanganyika shore particularly in Mpanda and Nkansi Districts. Diarrhoea and typhoid are also common on the Ufipa plateau and in the Rukwa Valley.

- Water-washed Diseases

Water-washed diseases found to be common in the region include gastro-enteritis and shigella dysentery (intestinal diseases), scabies (cutaneous diseases), skin sepsis, eye infections such as trachoma and infections transmitted by fleas, lice, ticks and mites.

The faecoal-oral infections mentioned above are also classified as water-washed. Strictly speaking, water-washed diseases are infections caused by lack of water for personal hygiene.

- Water-based Diseases

Water-based diseases reported as common in the region are schistosomiasis (percutaneous diseases) and worms (ingested disease). Schistosomiasis was reported to be endemic in many parts of the region and most severe in Rukwa Valley. Isolated cases were also reported along Lake Tanganyika Shore.

- Water-related Insect Vector

The common water-related insect vectors in the region are Malaria and Elephantiasis (Water breeding) which are transmitted to man by mosquitoes breeding in water ponds, and the tsetse causing sleeping sickness. Malaria was reported as the most serious disease along Lake Tanganyika and the swampy shores of Lake Rukwa.

- Water-mineral Deficiency

Exceptionally high rate of incidences of goitre was reported in villages around Kilangala Dispensary on the road from Sumbawanga to Mpanda in Nkansi District.

Despite the expectations of respondents, improved water supply in itself cannot reduce the rate of disease incidences if there is a general low standard of hygiene prevailing in villages. Improved water supply alone, if not accompanied by health education campaign will not change the hygienic practice of villagers. Therefore replacing dirty water by clean water in the absence of other inputs will often have little or no effect on health. Similarly the supply of adequate amount of water alone will not automatically lead to an economic improvement of the people in the area concerned unless villagers are taught proper economic water utilization and management, and also provided with opportunities to utilize the energy and time saved.

9. TYPES OF WATER SCHEMES PREFERRED BY VILLAGE

Water scheme installation within the village is already one visible sign of development. The objective of development is to increase individual and community welfare or well-being. Community welfare or well-being is a priority of the people concerned. Therefore if the

development project is to achieve any significant impact and increase individual and community well-being, it must satisfy preferences of the people concerned. This satisfaction will not only motivate them to actively participate in the running of the current projects but also in the initiation of future development projects. Successful development project planning therefore, requires thorough understanding of community values, preferences, expectation needs, goals and its socio-economic background.

There are three main types of improved water schemes found in Rukwa Region:-

- (a) Gravity operated water schemes
- (b) Pump operated water schemes
- (c) Modern wells and boreholes.

When asked to rank these water schemes according to preference starting with the most preferred water scheme which they would have liked to have in their villages and ending with the least preferred one, villagers ranked them in the following order: Gravity operated water schemes were ranked first, modern water wells were second and pump operated water schemes were ranked last. When asked as to why they ranked them in the order given above, they said that although health wise modern wells should have ranked last, but their primary need was a reliable water scheme which provides adequate amount of water all year round and water quality was a secondary issue. Reasons given for preferential ranking of water schemes as shown above were:-

(a) Reliability of Gravity Operated Water Schemes

Gravity Operated water schemes were regarded to be the most reliable of improved water schemes and often provide water all-year round. They have less problems in terms of spare parts and repair works compared to pump operated water schemes. They require less technical know-how for their operation and maintenance. More over they are free from fuel problems.

(b) Unreliability of Pump Operated Water Schemes

For various reasons and through experience pump operated water schemes are regarded by villagers in survey villages to be the most unreliable of water schemes out of the three types mentioned earlier.

To prove this statement an investigation of present water schemes was made in respect of their functional status (table 16,17 and 18). It was found that for different reasons (lack of fuel, spare parts, technicians, transport) out of 28 pump operated water schemes there were only 11 functioning and this is 39.29%. Out of 22 gravity operated water schemes there were 17 operating and this is 77.27%. ~~Almost~~ all modern wells were working. On average there were three wells functioning per village and this was in a dry season when water was most scarce.

Table 16

Pump Operated Water Schemes in Rukwa Region - November 1979

Name of the Scheme/ Village	District	Condition of the Scheme
Ugala	Mpanda	In working condition
Karema	"	"
Mpanda town	"	"
Msaginya	"	"
Majalila	"	"
Igaluhenge	"	"
Namanyere town	Nkansi	"
Kirando	"	"
Sintali	"	"
Kasanga	Sumbawanga	"
Chanji	"	"
Mawenzi	Mpanda	Not in working condition
Nsimbo	"	"
Kibo	"	"
Ifukutwa	Nkansi	"
Sintali	"	"
Swaila	"	"
Kasokola	"	"
Inyonga	Mpanda	"
Nsenkwa	"	"
Katumba	"	"
Mwese	"	"
Msanda	Sumbawanga	"

(table 16 contd.)

Ngorotwa	Sumbawanga	Not in working condition
Uzia	"	"
Laela	"	"
Kipili	"	"
Kasesya	"	"

Source: Research Results.

Table 17

Gravity Operated Water Schemes in Rukwa Region November, 1979

Name of the scheme/ Village	District	Condition of the scheme
Matanga	Sumbawanga	In Working condition
Mtowisa	"	"
Matai	"	"
Molo Prison	"	"
Msangi	"	"
Kizwite	"	"
Kaengesa	"	"
Pito	"	"
Malangano	"	"
Tamasenga	"	"
Ketumba Azimio	"	"
Zimba	"	"
Kipande	Nkansi	"
Kantawa	"	"
Chala	"	"
Kate	"	"
Misangaluwa	Sumbawanga	Not in working condition
Muze	"	"
Kisungamile	"	"
Mwimbi	"	"
Nkundi	Nkansi	"

Source: Survey results.

Table 18

Modern Wells and Boreholes in Rukwa Region - November, 1979

Name of the Scheme/Village	District	Condition of the Scheme
Inyonga	Mpenda	In working condition
Msemulwa	"	"
Nsonkwa	"	"
Ilembo	"	"
Kawajense	"	"
Kapalamsenga	Sumbawanga	"
Kasimba	"	"
Laëla	"	"
Ntatumbila	"	"
Katazi	"	"
Tunko	"	"
Fyengelezya	"	"
Luwa	"	"
Ntendo	"	"
Mpui	"	"
Ikozi	"	"
Mikula	"	"
Kavifuti	"	"

Source: Survey results

c. Suitability of Modern Wells

Modern water wells are regarded by villagers as suitable and reasonably reliable water schemes. Although water from modern wells is not considered to be as clean as that from either gravity or pump operated water scheme, modern water wells were ranked second on the basis of suitability, reliability and low operation and maintenance cost.

The few complaints raised against modern water well were

- (i) Some water wells dry up completely during the dry season when water table moves further down the ground.

(ii) In most cases modern water wells are constructed some distance away from residential areas. Respondents said, although this is technically correct so as to avoid water pollution resulting from pit-latrines, it necessitated long walking distance to get to the water points. Thus the situation did not seem to reduce the drudgery of water carrying which they expected from improved water supplies.

(iii) The majority of respondents strongly believe that water from the tap is comparatively cleaner than water from modern wells. =

10. PRE-CONDITIONS FOR SUCCESSFUL RURAL WATER DEVELOPMENT PROGRAMME

Rural water development programme should be viewed as an integral part of the overall rural development policy which aims at stimulating the development of villages and improving the welfare and economic position of the people. The success of rural water development programmes will very much depend on several factors which the planning, implementing, and organization need to take into account right from the start. Some of these factors are social, economic, political or technical in nature and which are referred to here as preconditions for the success of rural water development programme. These preconditions are:

(a) Villagers' Involvement in the Programme

Villagers involvement in improved water supply programmes is a crucial factor for the success of the development of rural water supply. Villagers involvement or participation should not only be limited to sending in petitions for improved water supplies and the provision of either free or paid unskilled labour as is currently practised, but should be extended to include participation in all stages of improved water programme. (Tschannerl and Mujwahuzi, 1975). These stages include decision-making, planning, construction, operation and maintenance, sharing of the benefits of the programme and evaluation of the performance of the improved water supplies. Villagers involvement will inculcate in them a sense of ownership and responsibility for the water scheme. If there is no feeling that this "scheme is ours" and that it is important that it works for the common good, there will be no one to take the responsibility for its operation, maintenance, delivery of fuel or spare parts and repair. It is probably thought that the generally low level of education ^{of} villagers' does not facilitate effective communication with water scheme planners. Failure to appreciate and be sensitive to the villagers' participation in the

planning and construction of the water scheme is a sure guarantee of problems later on (Windstrand, 1978).

It is well understood that fetching water particularly for domestic use is the responsibility of women assisted by young girls and boys. Yet the role of women in rural water supply development planning is most often not considered. Their contribution would be very valuable because they are the ones who are most affected by water shortage.

The Rukwa study shows that villagers' participation in the water programme is limited to sending in petitions to the government during the planning stage and contributing unskilled, free or paid labour during the implementation or construction stage. The survey of the water sources, water source selection, the design of the distribution system, the decision on what type of water scheme to install, all were determined by the district water engineer.

However, villagers showed enthusiasm and willingness to participate in all stages of improved water supply programmes from the planning stage to the operation and maintenance stage (table 19).

Table 19

Willingness of Villages to Participate in Improved Water
Development Programmes

District	Number of villages willing to participate	Number of villages not willing to participate
Sumbawanga	135	5
Nkansi	55	3
Mpanda	49	3

Source: Survey results

There are various ways of participation in improved water supply programmes. Villagers said they are ready to contribute in the form of free labour, cash or both free labour and cash (table 20).

Table 20

Type of Contribution Preferred by Villages in Improved Water Supply Programmes

District	Type of contributions and number of villages ready to make them		
	Free labour	Cash	Free labour and cash
Sumbawanga	46	37	52
Nkansi	39	5	11
Mpanda	29	2	18

Source: Survey results.

Water is free in all villages with improved water supplies as one of the basic social services (Warner, 1973). Benefits to be derived from improved water supply seem to have been very clearly understood by most people in rural-areas particularly those people who have been most affected by water shortages. When 850 villagers in different survey villages were asked whether they were willing to pay for water if it were brought to the village, 667 said that they were willing to pay for water. The remaining 183 (21.5%) were not willing to make any payment because they felt it was the duty of the government to provide water free of charge to all planned villages as one of the basic social services promised when moving people to villages. Among those who were willing to pay for water, 438 (65.67%) of them preferred a flat-rate while the remaining 229 (34.33%) said that they would like to pay according to the amount of water used.

This is clear evidence that villagers are not only willing to participate in improved water supply programmes but are also ready to pay for the water.

There are several reasons why villagers' participation is a prerequisite for improved rural water supply:-

(i) It reduces the financial burden of the government in constructing, operating and maintaining the water schemes which is in line with the policy of self-reliance. Financial constraint is one of the causes for the delay in providing water in the rural areas.

(ii) It helps to instill in villagers' minds a sense of ownership and responsibility, which will in turn ensure that villagers actually use the scheme, prevent damage to it, repair it when out of order and help in achieving the benefits expected from the water scheme. This will ensure that the scheme functions all year round.

(iii) It helps in building up local capacity for operation and maintenance of the schemes. Often villagers do not know how the water scheme functions and in case of breakdown it is only the experts from district headquarters who can do the repairs. Villagers' participation in the operation and maintenance of the schemes would help in developing some maintenance skills among some villagers who could take over some repair work.

(iv) It helps in the contribution of vital information about the areas in which the water schemes are to be constructed e.g. floods, ground water table, Perennial or annual sources of water, and about the socio-economic aspects of the people who will be the beneficiaries of the schemes after their completion.

In order to secure maximum participation and awareness of villagers understanding the nature and seriousness of the problems to be solved is of extreme importance. Before villagers are requested to participate in water schemes on self-help basis an effort should be made in preparing them to accept the project, and make collective decisions and commitment to its execution. All necessary preparations for the launching of improved water supply programmes such as purchase of equipment and pipes must be made before the involvement of villagers.

b. Government Commitment

Governments degree of commitment is reflected by the size of the budget and the placing of water project in the priority list. The operation and maintenance budget of regional and district MAJI Offices must be adequately funded to cater for staff recruitment and training at all levels, for purchase of fuel, transport, spare parts and chemicals. Water supply as a basic need should be among the top in the priority list of government projects.

c. Formation of Water Committees in Village Government Councils

The 1975 Village and Ujamaa Village Act permits the formation of committees within the village council which are supposed to deal with social, economic, political, and administrative matters of the villages. (Prime Minister's Office, 1975).

Almost all villages have at least five committees namely:

- Planning and Finance
- Production and sales
- Construction and Transport
- Education and Culture
- Defence and Security.

One of the most successful projects in villages where it is initiated is a grain mill. The grain mill is closely supervised and controlled by the Planning and Finance Committee. The success of this project is attributed to this committee. For the rural water development programme to succeed each village should establish a committee of one of the existing committees. This committee or sub-committee should be charged with the responsibility of seeing to it that one trained member of the village is responsible for operating and maintaining the water scheme in the village. This person should have basic knowledge on how to detect and fix or repair minor faults of the scheme. Depending on the type of the scheme, he should be supplied with the necessary repair tools and spare parts. He or she should also be in a position to visit the district water office as often and as quickly as possible to report major faults of the water scheme, collect fuel and spare parts. In order to motivate and give them some incentives the water scheme attendant should at least receive some remuneration depending on the economic position of the village concerned. So far there are very few villages in the region which have water scheme attendants (table 21). Since the drawing of water is the task of women the water committee should have the highest number of women representatives.

Table 21

Water Scheme Attendants in the Villages

District	Number of water schemes with attendants	Number of water schemes without attendants
Sumbawanga	0	17
Nkansi	3	8
Mpanda	4	9

Source: Survey results.

d. Availability and Procurement of Materials

Most of the materials required for water supply schemes are imported and also involves foreign exchange. So, they are in short supply and often take a long time to arrive from abroad. The government bureaucratic procedures and red tape in issuing these materials to relevant sections and authorities makes the situation worse. It is known to have taken 12 months for the spare part to get to the village from the time it was ordered. To solve these problems the government should take the responsibility of producing some of these materials and encourage regional and district small-scale industries to start manufacturing some simple water scheme spare parts. The government should come up with a system that streamlines the process of issuing spare parts and other materials required for rural water supply programmes. This could be done, by decentralizing the storage of these materials to a point whereby some simple spares are stored within the village. The present situation is that spare parts are kept at the regional or district headquarters after their arrival from the central store in Dar es Salaam. (table 22).

Table 22

Availability of Spare Parts at the Village Level

District	Number of villages storing spare parts for the scheme	Number of villages which do not store spare parts
Sumbawanga	3	25
Nkansi	1	9
Mpanda	2	11

Source: Survey result

e. Foresightedness in Improved Water Supply Programme Planning

Short distance to water points and elimination of queueing for water are among the benefits expected from improved water supplies. These can only be realized if initial planning takes into consideration future population increase and physical lay-out of the village. In some villages with improved water supplies long distances to water points and queueing up for water are problems which frustrate people.

and parasitic disease continue to be transmitted by routes remain unaffected. For example old polluted water sources continue to be used for drinking purposes for reasons of preference or convenience, or water from improved supplies is contaminated between the point of delivery and the point of ingestion through carrying, storage, drinking vessels and handling. Sometimes even when water is made more accessible in adequate amounts, it is not optimally used in personal and domestic hygiene. Moreover in certain circumstances waste disposal methods and environmental sanitation are not improved. Failure to realize the benefits may also be due to other unknown or uncontrollable factors of a cultural, social, economic or environmental nature. It is true that improved water supply per se cannot effect or bring such changes. It is therefore necessary that the effort to improve water supplies be supplemented by well designed programmes which should integrate water quality improvements with improvements in water availability, sanitation and health or hygiene education for the villagers, education on proper and economic use of available water resource. Finally opportunities should be created for the investment of saved time and energy in order to realize increased productivity of the rural areas.

j. Provision of Extra Facilities to Improved Water Supply Programmes

Expected benefits from improved water supply may not be realized simply because of certain negative tradition practices of villagers. Some of these practices result from the fact that certain facilities are lacking which should go along with improved water supplies.

The case study of Rukwa Region shows that there is a substantial number of people from villages who do the washing of clothes and bathing at water sources or points. Bathing and clothe washing at water sources or points increase chances and rate of water pollution which is a threat to the health of the people. In order to minimize water pollution any completed water scheme should have facilities and regulations for clothe washing and bathing at suitable or reasonable distance from the water source or point. Similarly, there are several instances whereby in some villages human beings get water from same sources as livestock. This situation leads to water pollution. When planning for improved water supply the Ministries of livestock development and that of MAJI should make sure that separate livestock watering points are constructed.

k. Protection of Installed Water Schemes.

All water schemes must be adequately protected against any type of damage. Trenches for pipes must be deep enough to cover water pipes. Wells, boreholes and water pumps should be fenced if possible. These are necessary precautions because there have been repeated incidences of malicious destruction of some water schemes in some areas in Rukwa Region. For instance if the scheme fails to meet the needs of part of the population (near by village), there is the danger of deliberate damage by those excluded. This is what happened in Nkansi District involving Nkundi and Kipande villages and in Sumbawanga District involving villages around Pito village. Similarly, if for instance, when there are cattle needing water, but the supply is limited to human consumption; the clash of interest between cattle owners and cultivators may lead to vandalism. So, protection of water schemes is of absolute necessity.

11. CONCLUSION:

There is no doubt that the primary effect of the vast majority of improved water supplies in different countries including Tanzania have been in one way or another beneficial or have fulfilled the expectations of the beneficiaries. Equally true however, there is no doubt that some improved water supplies have had no or had little impact on the socio-economic conditions of the people in the rural areas. The case study of Rukwa Region reveals typical conditions or factors surrounding water development programmes in rural areas and possible contributions from local people towards the success of rural water development programmes if their expectations and attitudes towards water supplies are taken into consideration when preparing the programmes. The study also shows some pre-conditions for the success of the programmes.

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