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Draft Preliminary Report

CONSIDERATION OF SOME SOCIO-ECONOMIC AND ECONOMIC ISSUES REGARDING THE CONSTRUCTION OF IMPROVED DOMESTIC WATER SUPPLY SCHEMES IN RUKWA AND KIGOMA REGIONS, TANZANIA

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The Government of Tanzania has decided to give high priority to water supply development, and set the ambitious goal that every household in Tanzania should have access to clear drinking water within a maximum distance of 400 meters, at the latest by 1991. This is in line with the goals of the UN Decade for Water and Sanitation 1981-91.

In order to obtain this goal, Tanzania has appealed to the international community for assistance, as the country cannot commit sufficient funds of its own for this purpose.

But almost regardless of the amount of funds available, it has been seen from earlier experience (to be discussed later) that no water supply scheme can succeed without the active interest and participation by the villagers (or at least some villagers) themselves. Also, the basis for this policy is, naturally, that the villagers will benefit from an improved water supply. When some problems occur, that seem to be related to lack of interest on the part of (some) villagers, it is therefore natural to start with the question: do they really need and want an improved water supply?

1. The (relative) importance of improved domestic water supply for the villagers

While practically every villager will answer when asked, that he/she is interested in an improved supply, the real importance attached to it can only be indicated by the willingness to sacrifice other activities or contribute in terms of cash, labour, carefulness, or the like. This willingness of course depends on a number of other factors:

a) Seeing that practically only women (and children) are drawers of water, and these same women also do most of the agricultural work in addition to other time-consuming chores such as collecting firewood, cooking, looking

after the small children, etc., time becomes a limiting factor throughout most of the year. If less time has to be spent on drawing water, more time can be spent on other activities, or even on some leisure. The general pattern seems to be (references?):

If the distance to the water point is reduced from (much) more than 1 km or so, to around 1 km (?), water consumption dos not increase significantly, but time spent on collecting water is reduced.

If the distance to the water point is further reduced to around 800 meters, water consumption increases to a somewhat higher level.

A further reduction of distance to around 50-100 meters does not seem to affect significantly the consumption rate, but time spent is reduced.

Only when distance is less than around 50 meters does water consumption again increase significantly.

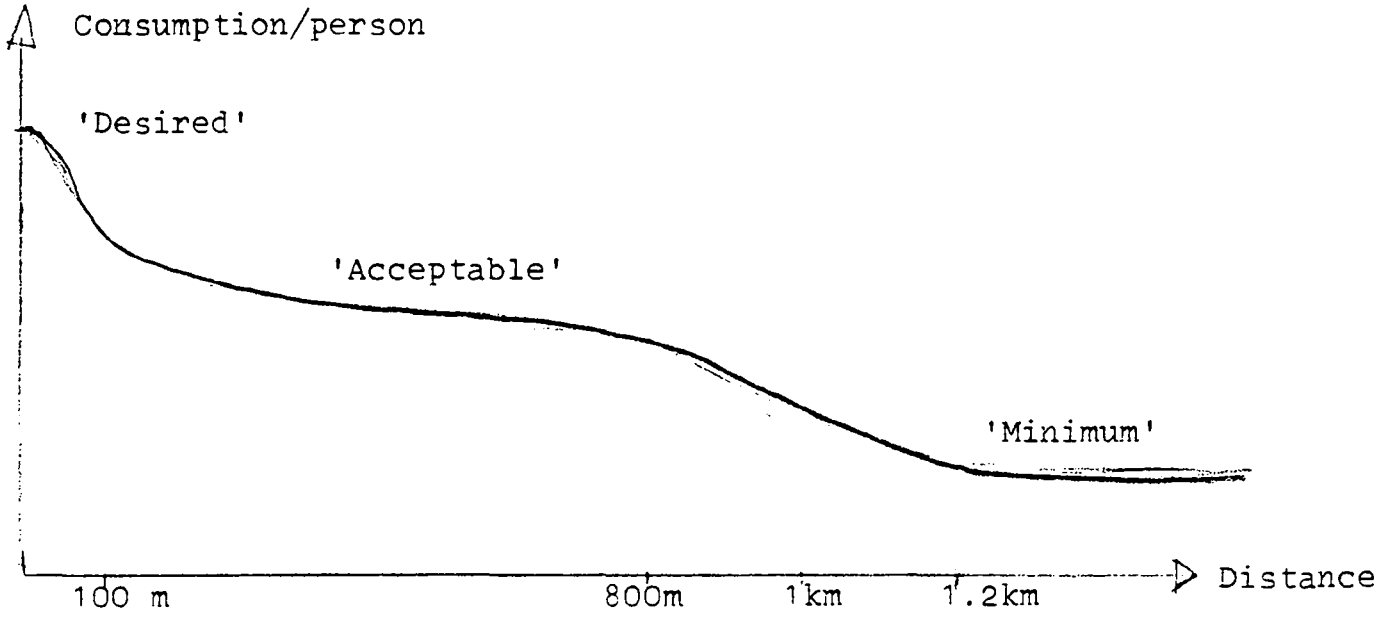
I take this to imply that only when the water source is very close, do the villagers consume the desired amounts of water. If distance becomes larger, at first consumption is reduced in order not to spend more than the "acceptable" (maximum desired ?) time on water collection. When consumption has been reduced to an "acceptable" rate, the villagers will try to aquire this amount, and then rather increase the time spent. Only when time becomes a real limiting factor, is water consumption again reduced to the absolute minimum necessary for survival. At this point, severe problems occur because the villagers (women) will not be able to spend sufficient time on agriculture and other necesarry activities.

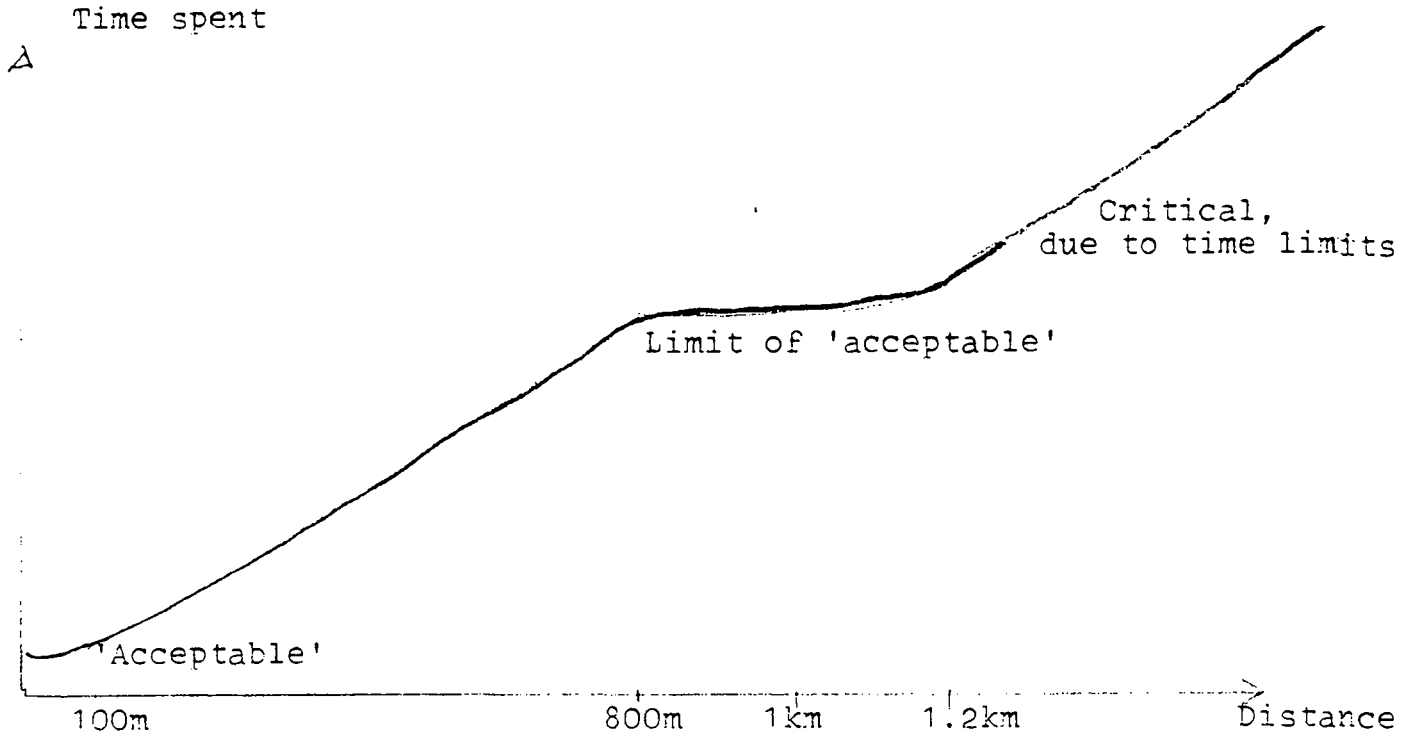
b) What is the 'revealed priority' given to improved water supply by the villagers (particularly the men)?

Up to now, it has mostly been the men that have been requested to contribute labour (sometimes paid, low-paid, or un-paid) to the construction of new water schemes.

It has been claimed (references) that the men are not willing to contribute such labour, but would rather work on the fields, or even give higher priorities to other communal work (build roads, schools, dams, communal buildings, etc.). In this connection it is also claimed that one reason for this is that the Government has promised improved water supply "for free".

Distance to water source, time spent on water collection, and consumption rate. (Approximate illustration.)





It seems, however (reference?) that this is not generally the case. Rather, the reason for poor performance in contributing labour for construction is more often bad experiences with earlier water projects, or poor explanation from the water authorities.

There has been cases, though, where labour has been a constraint in the village, and water scheme construction is then given lower priority than agriculture (during land clearing, or harvesting?), and some other communal activities.

If these two conditions are met; that the water project is well organised and explained by the water authorities (technicians), and that there is no acute labour constraints at the moment, then generally the men (villagers) are willing and interested in contributing labour to the construction of a water project. (The question of payments for labour will be dealt with later.)

c) As opposed to the above conclusions, the priority given to maintaining and protecting an improved water supply system seems to be generally (but not always) low.

The motivation of water attendents, even when paid, often seems to be low, and there is little social control (references?). Most water attendents also suffer from inadequate training, and inadequate backup from district/regional water authorities.

There are many reports of thefts and even vandalism to water schemes. Though most cases seems to occur before the scheme is completed (pipes etc. stolen during transport, etc.), or whenever a scheme is not working for other reasons (lack of fuel, etc.), there are also cases of deliberate destructions to running schemes. This may indicate several aspects;

- That there are contradictions within the village, f.inst. between those with easier access to water and those without.
- That some villagers find it more important to water their cattle, and therefore break open the pipes at some other place.
- That there are some asocial individuals in a village.

- That the villagers are not willing or able to exercise a suffient social or physical control to protect their water scheme.
- That some villagers find it more important to use the nuts (or other parts) for their ploughs than for the water pumps.
- That some villagers find it more important to use the water pump handle for firewood than for the pump.

(Though a report from Iringa (Therkildsen) told of villagers who severely punished a person who was found destroying a water scheme.)

Several of the reasons given above only indicate the difficult general situation prevailing in the villages in Tanzania, and that improvement is desperately needed in many sectors; agriculture, fuel (energy), animal husbandry, etc., etc., - and not only in domestic water supply. There is consequently, under present economic conditions, a limit to the priority given to improved domestic water supply by the villagers themselves.

d) What are the direct benefits to be derived from an improved domestic water supply?

Two kinds of results are often used as arguments for an improved domestic water supply: Better health (from more and cleaner water) and higher production (from time saved on water collection, and better health). Both results seem questionable to result from improved domestic water supply only (reference?).

Though an improved water supply often is a necessary condition for improving the health situation, it is generally not a sufficient condition. The health also depends on the general hygienic situation, including sanitation, contamination of foodstuffs, the nutritional contents and amount of food (and therefore the economic conditions), availability of health care, and perhaps on the knowledge and awareness of the people.

If an improved domestic water supply is meant to improve the health conditions in the village, it is therefore necessary to combine this with other measures, such as improved sanitation (latrines), health education,

health care service (which already exist in many cases), but the results will probably only be significant with improved nutrition and general economic development.

It has been mentioned (references?) that an improved water supply scheme that breaks down ever so often may even create worse health conditions than before, because the villagers will then not be so well accustomed to the contaminated un-improved water source.

It seems difficult to assess whether an improved water supply leads to more time spent on economic activities, and thereby to higher production. Reduced distance to the water point (and/or improved health) may also lead to:

- Higher consumption of water,
- More time to spend on other activities, including child care and leisure,
- Reduced heavy work for women and children.

All these effects are positive benefits by themselves, and probably the most important direct positive effects, particularly in those cases where the traditional water supply is far away. There is no doubt that these positive aspects are understood and appreciated by the women (and children) directly involved, while they are probably less understood or appreciated by the men.

The direct effects of improved domestic water supply on production are therefore probably small. Other measures will be more effective in improcing production.

Some (most?) villagers seem to expect, however, that an improved water supply will be providing sufficient water also for other purposes, such as:

- watering cattle, cattle dips
- (small-scale) irrigation
- plant and forest nurseries
- brick-making for house construction
- clay and ceramic utensils

- beer-brewing, etc., etc.

While the planned construction is for domestic water supply only, and for several reasons (to be discussed later) it is not recommended to combine this directly with other water uses, in some cases villagers will nevertheless use some water for some of these purposes when it becomes more easily available. If such uses do not exhaust the amount of available water, do not contaminate it, and does not lead to a very uneven distribution of water among the villagers, there is no reason why such uses should be discouraged.

In particular, it has been seen that water for easier brick making means improved houses which is also a benefit and improvement of the general welfare of the villagers.

e) For all the above points, the attitudes of the villagers are not static, but may be changed by awareness of what is happening in cities and nearby villages, by changes in economic conditions and expectations, by government education and awareness campaigns, etc. It is generally expected (references ?) that these factors will lead to an increased demand for clean water near to the homes in the future, but it is difficult to say how quickly this demand will increase.

f) Conclusions: Improved domestic water supply is important for the villagers, mainly to reduce the burden of work for the women and children, but it may also reduce some health hazards, and be useful for improved house construction, and some small vegetable garden watering. It is also an important basis for improving the health standard in the future.

The benefits of improved domestic water supply are appreciated (and to some extent understood) by the villagers themselves, and they are willing to contribute labour and possibly cash in order to construct and maintain such schemes, provided they believe it is worthwhile, and that normal productive activities do not suffer.

However, improvement of economic production is often considered more important, and this sets a clear limit on the villagers' willingness to contribute and care for an improved water supply system. (It will be important

to discuss and understand this limit in each village whenever the construction of a water supply scheme is considered.)

In order to answer to the villagers' expectations that an improved water supply will have direct health and economic effects as well, it is recommended to consider complementary programmes in health and nutrition, as well as economic development projects.

2. Can an improved domestic water supply be combined with water for other uses, preferably economic uses, in order to increase the benefits for the villages?

According to the BRALUP reports, the villagers seem to expect that an improved water supply will provide them with sufficient water for several other purposes than domestic supplies.

While the Water Master Plan is expected to assess the availability of water for such other purposes (and proposes development plans for this ?), here are some general considerations:

a) Drinking water for livestock: The BRALUP Report recommends that special livestock watering points are constructed, in order to avoid contamination when villagers get water from the same source as livestock. This might, however, create other types of problems, and is therefore not recommended except in special cases, and after careful consideration of these other problems:

First, construction of a water supply system with a sufficient capacity also for livestock water, will be very much more expensive than only domestic water supply. This is particularly so, if the watering points have to be constructed at a long distance from the water source.

It will probably not be accepted by the villagers if all have to contribute equally (or from common funds) for livestock watering, as the distribution of livestock is very uneven among the villagers. It will therefore be necessary with a system of payments from the livestock owners, more-or-less based on the number of livestock, which again is difficult to assess.

The construction of watering points may lead to a larger concentration of livestock near such points, which again may cause ecological problems from over-grazing.

I would therefore recommend that support for the livestock sector through construction of watering points or other means, should be considered an important task, but separate from the programme for domestic water supply, except in those few cases where it is clear that cattle will nevertheless be watered from the same source as people.

b) Irrigation for agricultural development: Also small-scale irrigation (except hand-watering of small vegetable gardens) requires funds much beyond the funds for domestic supply, - and should be paid for by those benefitting from the irrigation project. For a communal irrigation project there is no such problem of distribution of benefits, but also this requires funds on a very different scale than a domestic water supply scheme.

Also, there is no need to treat water for irrigation in the same way as water for domestic purposes, and this is therefore another argument for keeping the projects seperate.

I would therefore recommend that irrigation projects are considered separate from domestic water supply, but as one of many possible alternatives for the important task of assisting economic development.

c) Hydro-electric power genereation: Lack of fuel for diesel pumps has been a major problem for many water shemes already constructed. Construction of small-scale hydro-electic power stations is already under construction in the two regions, - and this may (will probably) have important economic benefits. It is rightly considered as a project separate from domestic water supply, - but a future electrification of the countryside (the villages) may make it possible and economical to install electic power pumps for the domestic water supply.

It is recommended that this possibility is considered for future developments.

d) Tree-nurseries, for forest development. Nurseries for cotton or tobacco plants. Such projects, and others that may have positive economic and ecological benefits (without negative nutritional effects) are important, but I do not know the water requirements (check!). If requirements are small, they may be considered positive bi-products of a domestic water supply. However, the question of promoting cash-crops such as tobacco may have negative effects which must be considered seriously before accepted.

e) Industrial development: Water supply is not an important bottleneck for industrial development in the rural areas. There are many other more important reasons.

f) Fishery development, construction of fish ponds: This and other projects may be "good ideas", and should be considered whenever constructing dams for hydropower stations, flood control, etc. It is not easily seen as important for increasing the economic benefits of domestic water supply.

g) In general, the development of water resources for economic purposes may be even more important than an improved domestic water supply. Such projects should be considered on their own merit, and not necessarily connected with domestic water supply. It is my impression that under present circumstances in Tanzania multi-purpose projects which demands coordination of many activities, have small chances of success (refer Kigoma RIDEP). It is, of course, important to identify bottlenecks and causes of problems of one project, and whenever necessary add supporting projects. But it is probably not possible to design and implement successfully a plan for developing many interconnected projects simultaneously.

3. What are the economic and other resources available at the regional and district levels, and how do they see their priorities?

It is common knowledge that many water schemes are not constructed or maintained due to a severe shortage of spare parts and material, and of fuel. These shortages may affect all activities of the water authorities; Shortage of spare parts for vehicles, or of fuel, which implies shortage of transportation. Shortage of fuel for diesel pumps (in Kigoma Region there is only 25% of required diesel for existing pumps), shortage of spare parts for pumps, shortage of cement, pipes, fittings, etc. for construction, shortage of spare parts

for drilling rigs, etc., etc. At times some of these items are available at the private market (outside Government stores), but then often at prices 3-4 times higher. There are long delays (more than a year) in deliveries from central government sources, and for imported items, and there is no guarantee that when arriving the items will be delivered to the project from where they were ordered originally.

These shortages are caused not only by lack of funds or lack of foreign exchange, but also by poor organization and direct misuse. To some extent these factors are reinforcing each other; There seems to be widened misuse of vehicles (which adds to the shortage of fuel), thefts of material and parts, and negligence of government property.

When there is a shortage of fuel, fuel is wasted on driving around looking for wherever fuel is available. Also it is not possible to travel far from regional or district headquarters, which again means many schemes are not monitored, and break down more quickly, etc., etc.

I was given the impression that lack of fuel to transport was the most important bottleneck at present. This is not surprising considering the general shortage and rationing of fuel in Tanzania at present, - and the fact that Tanzania imported no more fuel in 1981 than they did in 1974.

However, the situation will only be partly relieved by large-scale deliveries of spare parts, material and fuel to the regions/districts. (The question of direct import for such items will be discussed later.)

One reason is that it will probably be impossible to avoid certain losses from misuse and thefts. (One such example was given in Iringa Region, where sufficient amounts of cement was delivered from the donor agency. Some was nevertheless stolen or sold off, and the resulting concrete constructions became too weak and cracked easily.) Another is that the district and regional authorities (DC, DDD, RC, RDD) may rightly feel that there are other activities in the region that are just as important as the water projects, and therefore want to transfer some of the then available vehicles, fuel, or material to other high priority activities. It is difficult to imagine how the water sector should be allowed to function 'perfect', as an island of successful projects with no problems due to the general shortage in the country and the regions, while all other activities suffer badly from such shortages.

Another reason is that there is also a shortage of trained manpower, and there might sooner or later be a lack of funds for maintenance whenever deliveries from a donor agency come to an end. The Rukwa RDD himself expressed his opinion that construction of new water schemes should be kept at a reasonable level, otherwise they will not be maintained. (This depends, of course, also on the type of schemes to be constructed.) The rate of construction should therefore be kept parallel to availability of funds and foreign exchange for maintenance, and of trained manpower. In short, the RWE also needs to be strengthened parallel to new construction schemes. (In fact, this is already being done by NORAD, by the posting of so far three experts to the RWE in Rukwa, and to the RWE in Kegoma).

a) Manpower and training; The BRALUP reports list the manpower situation in the two regions and their districts, and it is expected that the WMP will make a further assessment of the manpower situation and future needs.

Generally speaking, there is a lack of trained (and experienced) personnel at almost all levels; for engineers, technicians, mechanics, even masons and carpenters, etc. For regions such as Rukwa and Kigoma which are considered 'outposts' (with the exception of Kigoma town), this is particularly so.

In the regions there is some on-the-job training and a few short cources for low-level technicians and craftsmen, but altogether very little training is given. In Rukwa they say that due to the shortage of staff that may serve as instructors, the training programme is rather decided by the availability of instructors, than by the actual need for trained personnel.

The Water Research Institute in Dar es Salaam offers a three-year course, and graduates approximarely 120 technicians a year. The University graduates some 20 (?) civil engineers for construction a year, but these are distributed among a number of ministries.

There is also a tendency among trained personnel (at most levels) to leave government jobs in the regions, for better-paid jobs in the private sector and closer to the bigger cities. (This implies a general problem for all training programmes, though one may argue that the training nevertheless benefits the country even when it does not benefit the parti-

cular government agency.) This problem may only be reduced by reducing the wage differences between the private and government sector, or by a real massive training programme.

Another part of the solution may be in more often hiring private contractors for construction or maintenance of water schemes and thereby also encouraging (small-scale) private enterpreneurs. Government policies on this is somewhat uncertain, but no absolute negative position have been taken.

b) Operation and maintenance budget:

For several reasons it is difficult to obtain a clear and complete picture of funds available for the water sector in the regions. One is that I did not have a chance to go through the state budget (it is not available in NORAD office), but am relying on secondary sources. One may also note that the fourth five-year development plan for 1982-86 which was approved in November 1981, is so far only printed in Kiswahili and not available for anybody outside the government.

The budget for the central Ministries is discussed from a macro perspective later.

The development budget for Ministry of Water and Energy (MAJI) for 1981/82 is 593 mill. T Shs, or approcimately 10% of the total Central Government development budget. 437 mill. T Shs or approx. 75% is expected to come from foreign sources. This budget is for both water and energy development, and for both urban and rural water supply. How much is for rural water supply, I do not know (calculate from budget speech?). The part for rural water is spent on a number of 'national' projects which may be implemneted in one or several regions. Some of these national projects are; The Finnish-supported rural water programmes in the southern regions, The Morogoro Shallow Wells Programme, The Bamboo and Wooden Pipes programme, etc. These projects may be implemented through the District Water Engineer (DWE), or the Regional Water Engineer (RWE). Once completed, they will be the responsibility of the DWE/RWE for maintenance.

The recurrent budget of the central Ministry MAJI, for 1981/82 is 63 mill. T Shs, or approx. 0.8% of total central government recurrent budget. This

mainly covers salaries and offices for the ministry itself, and does not support the maintenance costs of the projects.

While the total budget (recurrent and development) for each region is decided by the central government (?), its allocation on budget chapters is very much decided at the regional level, and therefore varies considerably among the regions.

The development budget for all regions for all projects for 1981/82 is 6,622 mill. T Shs, but I do not know how much of this is for water (and energy) projects.

The recurrent budget for rural water supply for all regions for 1981/82 is 150 mill. T Shs, or approx. 5.7% of the total recurrent budget for all regions. The allocation for water and energy varies from around 3% to around 12% of the total, in the various regions.

In Kigoma Region the recurrent budget for rural water supply for 1981/82 is 5,768,800 T Shs, or 5.4% of total recurrent budget.

In Rukwa Region the same figure is 6,551,500 T Shs, or 6.4% of total recurrent budget. In Rukwa the present growth is as follows;

Recurrent budget for rural water supply, Rukwa Region:

1980/81	5.1 mill T Shs	of which for maintenance:	3.1 mill. T Shs
1981/82	6.5 "		3.7 "
1982/83 proposals	7.6 "		4.6 "

While this implies an annual growth rate of 20-25% in current prices, it probably means a reduction in real terms due to the high rate of inflation. (Check with available inflation figures)

On the other hand, it is difficult to say how 'real' these budget figures are, as there seems to be fairly wide variations in actual expenditures, as compared to budget figures. Both over- and under-expenditures on individual budget posts may be very big, and it may even seem to be a coincidence if the actual total expenditures are near to the budger figures

The regional authorities (RDD) on Rukwa did not believe that the Tanzanian contribution to construction or maintenance of rural water supply would increase substantially unless there is a substantial real growth in the total (regional) economy. The RDD therefore emphasized the importance of (foreign) support to the economic sectors in the region.

(A similar point was raised to the Finnish-supported projects in Mtwara and Lindi Regions; They were requested by the Tanzanians also to finance the local costs of their projects, because Tanzania had to give higher priority to directly economic projects. While of course the same priorities should apply to foreign finance, it indicates the priorities of the Tanzanians under present economic circumstances.)

I have not been able to assess the budgets at the District level, nor do I know whether these funds are included in the regional budgets (to be checked).

c) Conclusions:

It can be seen that also at the regional level, resources are limited, and have to be allocated among several high-priority objectives. Present economic, organizational and political circumstances also imply that a concentrated heavy programme of support to one sector (rural water supply) will meet many kinds of difficulties.

The regional authorities in Rukwa have also presented to NORAD a request for support for a more integrated development programme, including hydro-electic power, roads, health, agriculture and livestock, forestry, small-scale industries, etc. Even if NORAD (alone) cannot support all these activities, it is important to consider the support to the water supply sector in relation to the development of other economic sectors.

In any case a programme for increased construction of new water schemes will have to be supported by direct support to the regional (and district) water engineer, in technical assistance and training.

4. Macro-economic aspects (See separate paper by Havnevik)

5. Choice of technology and some implications

A detailed assessment of available technological alternatives, their costs

The Morogoro Shallow Wells Project use imported Dutch handpumps or footpumps ("kangaroo" pumps) that they keep improving and testing. Hopefully these pumps may be produced (assembled) in Tanzania in the future. Apparently they have not yet found the 'best' pump.

The Finwater project in Mtwara and Lindi use imported Finnish NIRA pumps, and claim they have very few problems with these. They are also meant to be produced in Tanzania in the future.

Tanzania will take part in a World Bank financed handpump testing programme, under which a number of pumps will be tested. I got the impression that Tanzania will not decide on any standardization programme for handpumps until the results of the World Bank programme are available, at least three or four years from now.

d) Windmills. There is a windmill testing programme in Singida Region, and the Australian donors claim they can provide enough water for 8 months in the year. The engineers for Rukwa and Kigoma seem to say that there is too little wind in these two regions for windmills to be economical. They would require very high capital costs for overdimensioning of the storeage tanks and the mills themselves. But is it not possible to let them reduce the fuel requirements for at least part of the year? I am not convinced that some kind of combination with manual pumps or motor pumps cannot be economical.

e) Animal-powered pumps. There is apparently no experience of this in Tanzania so far.

f) Electric pumps. This is not a viable option, as there is no electricity in any village, except where provided by a diesel generator. However, if the small hydropower plants are constructed or another rural electrification programme is implemented, the installation of electric pumps may become an advisable solution in several cases.

g) Solar energy. In Morogoro there is an electric water pump connected to a solar cell powered generator which has been running continuously without maintenance costs for approximately 2½ years! The capital costs for the solar panels are still considered prohibitive, but as technological

development of solar energy applications is very quick, it might become economical in the not so distant future.

h) Hydraulic Ram (Hydram). This is a pump powered by a small stream, that requires practically no maintenance. Experiences in Tanzania seem to be very good, and it will now be tested in one village in Rukwa Region. Where conditions are suitable, this seems to be a very recommendable solution.

i) Shallow Wells: The Morogoro Shallow Wells Project claims that perhaps 75% of Tanzania's rural population can be served with drinking water from shallow wells, basically hand-dug. (Add more information on this.) In Mtwara and Lindi Regions, however, most shallow wells dried up in 1981, which indeed was a dry year. Van der Laak believes this may be due to incorrect digging techniques (which 'closed up' the sidewalls), or not digging deep enough. The Norconsult engineers believe that only a few villages in Rukwa and Kigoma can be served by shallow wells, due to insufficient water. Considering that the shallow wells programmes have been able to expand their activities to many areas originally considered unsuitable for shallow wells, it may well be worthwhile trying to pursue these possibilities even further also in Rukwa and Kigoma.

j) Deep boreholes. These are very costly to drill, often require motor powered pumps, and should therefore be avoided. Norconsult claims that non-motor pumps on deep boreholes will be very uneconomical, but this might need further studies.

k) Concrete tanks, intakes, well rings, etc. Even cement is short in Tanzania today, as several cement factories are producing only half or so of full capacity, and cement is therefore imported. Also the Tanzanian cement factories are dependent on imported raw materials. One might therefore also have to consider a limited use of cement, but this is not the most important bottelbeck. It can be hoped that in the not so distant future Tanzania will again increase its own cement production markedly.

l) Wood stave tanks: This might be considered in areas where trees are more abundant than in Kigoma and Rukwa.

m) Bamboo and wood pipes: A Bamboo and Wood Project under the Ministry of Water and Energy (and with some SIDA funds) has strong political backing, and is claiming success, particularly for irrigation purposes. In areas where bamboo or some tropical trees are growing this method of pipe-making might be considered. However, the preparation of the pipes is itself a somewhat complicated process, and the durability still not so good. The pipes have to be soaked in water for quite some time, then prepared with some termite-resistant chemicals (that may enter the water and thereby make it unsuitable for drinking), and also strengthened by the use of steel wire. The fittings represent another problem, the pipes can only take very low pressures, and one must ascertain that there is always water in the pipes otherwise they will dry and crack. These problems mean that there are rather limited uses for bamboo and wood pipes.

n) Steel and PVC pipes and fittings. Though these are partly or fully imported to Tanzania, most seem to agree that they are preferred due to the high life expectancy. One should encourage a higher production of such pipes inside Tanzania.

o) Rain water. One is surprised to see how little rain water is collected in the villages. Though rain cannot be collected on thatched roofs, it is found that more villages with corrugated iron roofs do collect water, and this habit should be stimulated.

p) Purification. While water from wells and springs normally does not need any purification, surface water from lakes and rivers is normally very contaminated. One must consider that it may be difficult to ensure a stable supply to villages of aluminium sulphate or chlorine or any other chemical purifier. Therefore whenever possible a filtering or other non-chemical process should be given first choice.

Conclusions: Complex projects that require competent technical expertise and much imported materials and parts for operation and maintenance should be avoided or at least postponed until the general economic situation in Tanzania improves.

Production in Tanzania of all inputs should be encouraged, though first priority should be given to rehabilitation of present industrial enterprises, before

new ones are established.

Simple schemes such as shallow wells with handpumps may probably be encouraged quickly on a large scale (whenever water is sufficient) based on experiences from other regions.

Further research and experiments should be encouraged for alternative energy sources to diesel for motor-pumps.

6. Village participation

As discussed earlier (chapter 4) the central government is not in a position to increase substantially its allocation of funds to maintenance of rural water supply schemes (unless heavily subsidized by foreign aid, which again also will most likely be channelled to other high priority areas). The situation is very parallel at the regional level, as discussed in chapter 3.

Many have therefore suggested that the villagers themselves will have to contribute more to the construction as well as the maintenance of their domestic water supply. As we have discussed in chapter 1 (and 2) the villagers will be willing and interested in doing so, on certain conditions.

What is then possible in this direction, how can it be organized, and what are the government policies and practices?

a) Government policies. It is well in line with the pronounced general policies of the Tanzanian government to promote and encourage self-help and selfreliance among villagers, one may even say that it is a cornerstone of the present regime's socialist ideology. On the other hand, it is also the policies of the government to provide certain basic social services, such as basic health care and primary schooling, for free to every citizen. This is meant to include water for domestic purposes, from communal taps or wells. During the villagization programme (in 1973-75) the peasants were given to understand that such domestic water would be supplied to all villages for free. The practical implication of these policies have therefore given rise to some uncertainty among government/regional officials as well as among donors.

There should be no doubt, however, that even though domestic water should be supplied for free to the individual consumer from the communal taps (while a person must pay for an individual house connection), the community is expected, and have always been expected, to contribute towards the installation or running costs.

The most common form of such contribution is "self-help" labour for construction and trench digging. The Minister and other government officials do complain, however, that self-labour is not forthcoming as planned. (Reference)
Some reasons for this are discussed in chapter 1, where lack of organization and follow-up from the water authorities, bad previous experiences with the

government, and conflicts with other uses for labour, were cited among other reasons. There are also cases where water supply schemes are constructed practically without any self help, and this makes it complicated to insist on a self-help contribution in other villages.

The World Bank-supported Rural Integrated Development Programme (RIDEP) in Kigoma insisted on a cash contribution of 1000 TShs from the villages for the construction of a water scheme. This apparently prevented many villages from requesting a scheme. (Loft Hanaak). In no other places has a financial contribution been required for construction purposes.

The financial situation in the villages vary considerably. While some (most?) villages have practically no funds at their disposal, others have up to 100,000 TShs (References). According to the Village Act the village council may levy a tax on the village members, and control the surplus from communal economic activities. This implies that better-off villages should be able to construct a water supply scheme by using its own funds and hiring a local contractor but this has hardly been done by any village.

There is even greater uncertainty as to what kind and amount of contribution can be expected/or required from the villagers for operation, maintenance, and repair of water schemes:

-Fuel is normally paid for by the village itself.

-Salary for a water scheme attendant is sometimes paid by the district water engineer, sometimes paid by the village, and often not paid at all.

-Most other expenses are fully paid by the district/regional government.

The central government authorities may want to require some cash contribution from the villages for maintenance and repairs, but there are still no clear guidelines on this. The regional authorities seem reluctant to demand payment from the villages, and the central government are also hesitant to make a public anouncement requiring such payments. The result is that the villages do not want to pay, and the water authorities have no policies of refusing to assist schemes which are not paid for.

I got the impression that these policies will be made clearer in the not-so-distant future, and that the villages then will be made to pay for certain services from the district/regional water authorities. Whenever this is fully implemented, some villages may even choose to employ private contrators for maintenance and repairs.

Connected to this, is the question of actual ownership and responsibility for the water schemes. The policies today are that the 'Government', i.e. the regional water authorities actually own the schemes, and therefore bear the final responsibility. The central government leaders do, however, talk about creating a 'sense of ownership' among the villagers, and thereby encouraging their 'feeling of responsibility'. I am afraid that this 'sense' or 'feeling' may be hard to create many places, and therefore recommend that an actual transfer of ownership takes place, f.inst. by some sort of handing-over ceremony. This apparently does take place in Shinyanga region for their shallow wells projects. My impression is also that the government will introduce this as their general policy, for the more simple schemes normally serving one village only. For more complicated schemes the regional authorities will retain ownership and responsibility.

Some have suggested that even smaller 'user groups' should be given this ownership, though this policy has not been tried in Tanzania, nor accepted at any political level.

In many cases the government policies of self-reliance has been reduced to a question of self-help labour and other kinds of contribution from the villagers. There are many reasons for this, and they relate to the general political practices in Tanzania.

In official political statements, however, self-reliance is given a broader meaning, and should involve the promotion of political awareness, general education and knowledge, mobilization of collective action, and promotion of local initiative. On the other hand, it is not so clear how this is meant to come about in the water sector. According to some statements, it is the responsibility of the Party (CCM) to mobilize the people and promote self-reliance. Most seem to agree, however, that it is the task of the Prime Minister's Office and their representatives at the local level to coordinate and initiate such mobilization. Within the Prime Minister's Office there was established in 1981 a Community Development Division, that seems to be the most natural government agency to undertake these tasks, but in November 1981 this new

division had not yet established itself and its working programme. (References to recent conferences?)

b) The village participation programme in Iringa, Mbeya and Ruvuma regions:

In connection with the work on the Water Master Plan for these three regions, a socio-economic group has been set up consisting of three field researchers (one in each region) and two senior researchers, one from Centre for Development Research (CDR) in Denmark, and the other from BRALUP. One of the tasks of this group is to act as a 'water extension unit' in order to initiate and assist a village participation component in a number of villages where an improved water supply system is under construction. The experiences won so far are limited, both in terms of number of villages involved (only some 6-8 in each region) and duration of the project (1-2 years), and the fact that in no cases did the group arrive before the decision to construct a water scheme in the village had been taken. It is nevertheless very useful to briefly summarize the main aspects of this programme:

In each region there is a Regional Steering Committee for the Water Master Plan, with the RWE and RPO as members, besides representatives of the donor agency (DANIDA Steering Unit),the consultant for the WMP, and the socio-economic researcher. This Steering Unit supports the village participation programme.

The socio-economic researcher acts more-or-less as a water extension unit, and coordinates this with the activities of the RWE. It is hoped that in the future the new Community Development Division within the PMO will take over this function.

The water extension worker will contact the village chairman, and have him establish a Village Water Committee. This Committee may be elected by the Village Council (or appointed by the Chairman?), and may function as a 'sub-committee' under the Village Committee for Social Affairs. The Water Committee should consist of 5-6 persons, of which minimum 2 should be women.

The Chairman and/or the Water Committee will inform the rest of the villagers about the proposed water scheme. The water committee will also be given the following tasks:

- To appoint two water attendants (one of these should be a woman) to be trained during the construction period. It is up to the village to pay these attendants a salary.

- To decide on the location of domestic points (water taps) given the basic criteria for even distribution among villagers.

- To mobilize and organize the unpaid self-help labour for construction.

- To keep the area around the domestic points clean and tidy.

- To suggest the organization of washing facilities.

- To decide on the location of cattle troughs, where this is included in the scheme.

With the possible exception of the task to keep the area around the taps tidy, this programme has so far been considered very successful. One should perhaps note in this connection, that all schemes in this programme so far are gravity fed. In particular, these preconditions are underlined:

- The villagers/the water committee are being fully informed about the proposed water scheme, they are taking active part in at least part of the decision-making process, and they are given adequate time to respond to the proposals.

- There is full backing from the water authorities, and,for instance, all materials must be available and placed in the village before self-help labour is started, in order to convince the villagers that their efforts will not be made in vain.

Some problems have occurred, such as contradictions within the village regarding the location of water points. Such contradictions can probably not be completely avoided, and objectively evaluated the decisions of the

water committee seem well founded.

The problems regarding poor drainage around the water points may be reduced by some health education/sanitation campaign, the use of posters, or similar complementary activities that were not undertaken in these three regions due to lack of time and capacity of the extension workers. They would like to include such a campaign by involving teachers or health workers. They fear, however, that most health workers will not be interested in visiting the villages for this purpose.

As stated initially, this extension work only covers some 6-8 villages in each region. The socio-economic group reckons that in the future, if this task is taken over by the PMO's Community Development Division, it might be able to reach perhaps around 30 villages per region annually. However, this is a very preliminary figure.

More reports on this programme will appear in the near future, and it is strongly recommended that full use is made of these experiences, for similar activities in Kigoma and Rukwa.

c) The proposed project for the development of a community participation component in the Tanzanian rural water supply programme, by the WHO International Reference Centre (Rijswijk, Netherlands)

- leave open until their draft interim report is received -

d) Other experiences in village participation. There are hardly any other experiences in Tanzania of a comprehensive village participation in the whole process of planning and decision-making through implementation, of similar projects. There are, however, many examples and experiences with self-help labour contribution. This has been discussed above.

In some cases, unskilled labour for construction is being paid, on an hourly or a work performed bases. The latter method is said to be the most effective. In some cases a payment is not given to the actual labourers, but to the village treasury. This could be a reasonable solution in well-organized villages.

e) The BRALUP proposals for community participation in Rukwa (and Kigoma)

Regions:

These proposals were not yet drafted during my visit to Tanzania, but the preliminary ideas seemed to be:

- That the extension work (and water supply development) should start where the motivation is highest, probably in villages where the present situation is most difficult, and the villages that is most 'developed' in other sectors.

- That the model used in Iringa, Mbeya and Ravuma might not be suitable, but this will be discussed with the regional and local authorities, and depend on local conditions. This model will nevertheless be an important reference.

- That one has to regard also community participation and involvement as a long-term development process, part of the whole social and economic transition that forms the general development process.

- That adult education and the schools will most likely be involved in the programme.

- That the most important aspect is that people must mobilize themselves, and this cannot be done from outside, neither from Tanzanian nor expatriate social scientists, nor by political slogans from central politicians. If the villagers learn to take their own initiatives, they will find that they are given strong powers within the Tanzanian political system.

- With these ideas in mind, BRALUP would like to start working in some 4-5 villages to begin with.

7. The development effects of a separate implementation unit

Several donors have set up a separate 'implementation unit' for the construction of whatever water schemes they are financing, and allowed this implementation unit to impact directly whatever material is needed, without relying on regular Tanzanian official procurement procedures. Then normally a private contractor from the donor country is hired to set up and run this implementation unit. This is often considered a professional and effective method for undertaking the specific construction work required.

The positive results may be that the construction is actually undertaken as planned, and that the villagers will receive an improved water supply. This is of course very important.

Some may even argue that it is positive to reduce the control and the power, and the income opportunities for the central government agencies.

However, the learning process for the Tanzanians who sooner or later will have to take over these activities will be very limited.

Also it might be even more difficult to establish certain standardizations of materials and equipment to be used, and therefore further complicate the maintenance.

It is somehow surprising to see that the Tanzanian Ministries of Finance and Economic Development and Planning, and Bank of Tanzania have accepted this type of arrangement, but this probably indicates that they themselves are aware of their own inadequate procurement system, and that they give high priority to the expected results in terms of water schemes.

In order to improve the development effects of an implementation unit, it is recommended that this implementation unit must work in close cooperation with (preferably under the control of) the RWE, and through a training scheme and other means prepare the RWE to take over the activities of the implementation unit within a prearranged period.

It is further recommended that assistance should be given to strengthen

Tanzania's own procurement and importing capability, and that all procurement should be made this way after a certain prearranged date. Apparently, SIDA is offering assistance in this field.

8. A brief summary of some experiences by other donor agencies

a) SIDA recently completed the Water Master Plans for the three 'lake regions': Kagera, Mara and Mwanza (total population in 1978: approx. 3.2 mill.). They have not yet started the implementation of these regional WMP. However, in 1980/81 some 2 mill. TShs was spent in each of 7 regions. For 1981/82 the budget for each of the three lake regions is 3.1 mill. TShs, and for Dodoma Region 2.3 mill. TShs.

SIDA also supports a number of 'National projects', including training (at regional level, in the Water Research Institute, and abroad) that is not supported by any other donor. (There is also a Norway/UNESCO multi-bi project for the WRI.) Other national projects are 'expansion of MAJI facilities', personnel/consultants to various activities, purchase of vehicles, and the bamboo project. SIDA will continue support for national programmes, even when they become more heavily involved in the implementation of the WMP in the three lake regions. It is crucial for the donor support to individual regions that SIDA (or some other donor) continues support to the national training programme, and to some of the other national programmes.

SIDA's total budget for assistance in the rural water sector in 1980/81 was approx. 35 mill. SEK (56 mill. TShs). For 1980/82 the total budget (including carry-over from 1980/81) is approx. 38 mill. SEK (66 mill. TShs) allocated as follows:

Budget rural water supply programme 1981/82
C = Cash payment to Treasury
D = Direct payment from SIDA
CO = Carry over from 80/81

1 Sw kr = 1,8 TShs

	M TShs		M Sw kr
Expansion of MAJI facilities	4,3	C	2,4
Borehole drilling	1,9	C	1,1
Dam construction	2,1	C	1,2
Unallocated stores and pumps	0,7	C	0,3
Training abroad	5,7	D	3,2

	M Tshs		M Sw kr
Regional Training	1,1	C	0,6
WMPCU	0,4	C	0,2
Personnel/Consultants *	10,0	D	5,6
Mwambashimba WS	2,0	C	1,1
Kanga Group	2,0	C	1,1
Mara Trunk Main II	2,0	C	1,1
Bulenga-Nanga	3,0	C	1,7
WRI	2,6	C(CO)	1,6
Purchase of vehicles	11,2	D(CO)	7,0
Regional concentration	0,3	D(CO)	0,2
Bamboo project Tentatively	5,0	C(CO)	3,1
Regional Projects			
Dodoma	2,3	C	1,3
Mara	3,1	C	1,7
Mwanza	3,1	C	1,7
Kagera	3,1	C	1,7
T O T A L	66,8		37,9

(Please note that in votes that include a carry over the rate of exchange has been calculated at 1 Sw kr = 1,6 TShs).

* On the 20th of Juyly, 1981 a total of 10 contract employees and 18 volunteers were working in the rural water sector. 11 volunteers and 2 contract employees were posted in the regions outside Dar es Salaam.

(Source: SIDA Office, DSM)

It is expected that the total assistance for rural water supply will remain at approximately the same level in the future years. But even if the allocation directly to the regions is increased within the total budget, it will fall far short of the estimed requirements for implementing the WMP in the three lake regions.

According to the VLAK Implementation Plan for the five-year period 1981/82 to 1985/86, Tanzania will themselves contribute around 30-35 mill. TShs annually for rural water supply in the three regions. (While according to the SIDA Office their present contribution is around 6 mill. TShs.) The Plan foresees a contribution from the World Bank of around 7-8 mill. Tshs annually, but it is rather uncertain whether these funds will be forthcoming. Then the Plan estimates a SIDA contribution of around 50-80 mill. TShs annually. However, this contribution will hardly be above 20 mill. Tshs yearly. The total availability of funds for rural water supply for the three regions in the coming five-year periode will therefore be <u>less than half</u> of the amount expected in the Implementation Plan, and perhaps

only 25% of that amount. The SIDA Office could offer no immediate relief to this apparent shortfall.

SIDA has also promised continued assistance to rural water supply in the Dodoma region (population approx. 1 mill.)

SIDA support for the bamboo and wood pipes programme will also continue, until more results are obtained in a few years time. The preliminary results have not yet demonstrated that these pipes will be less expensive than PVC or steel pipes.

SIDA argues strongly that all assistance should be channelled through the Tanzanian authorities, including all imports. They therefore oppose the establishment of separate 'implementation units' (see chapter 7).

b) DANIDA expects to complete their Water Master Plans for the three south-western regions Iringa, Mbeya and Ruvuma in early 1982 (Total population in 1978 approx. 2.6 mill.). A rehabilitation project is ongoing. (See chapter 6 on Village Participation Component.) A DANIDA Steering Committee is established to coordinate the work of the consultants contracted for the WMP, and liaise with DANIDA and the Tanzanian central government. This Steering Committee also acts as an 'import agent' for the necessary materials and equipment to the project work.

The rural water supply plans will probably propose extensive use of gravity schemes in these three regions.

DANIDA may also assist in the establishment of a workshop and training centre (school) in Makumbuka in Iringa region, for maintenance and repairs of pumps. This workshop will probably only be able to serve these three regions. Most pumps will probably be imported from Denmark (Grundfos).

DANIDA expects to implement the rural water supply plans in the WMP for these three regions. They may contribute around 15 mill. DKK (26 mill. TShs) annually for this purpose (others claim that this figure is 50 mill. DKK or 87,5 mill. TShs annually). They do not expect to complete their programme, nor reach the official target by 1991.

c) FINIDA completed the WMP for the two southern regions Mtwara and Lindi

in 1978. (Total population in 1978 approx. 1.3 mill.) They are already entering the third phase of their implementation. This third phase is expected to continue until 1986, and by then practically all villages will have an improved water supply.

Most of the villages are supplied from shallow wells with handpumps. Until end-1980 more than 1000 shallow wells have been constructed, 12 deep boreholes drilled, and 11 piped systems constructed (1 of these for the whole Makonde plateau serving approx. 200 000 persons).

The whole implementation is contracted to a Finnish private consultancy company, Fin Water. This acts as a completely independent Implementation Unit, which imports directly all necessary materials and equipment.

The implementation programmes in these two regions are designed 'national projects' and the agreements are made with the central Ministry of Water and Energy, and not with the regional authorities.

The coordination and relation with the Regional Water Engineers are therefore not the best. FINIDA now feels it would have been preferable to implement the projects as regional projects, and cooperate much more closely with the RWE. This is particularly so as the RWE will have to take responsibility for operating the schemes after they are completed. FINIDA may also consider offering more direct assistance to strengthen the RWEs, and increasing the training component during this coming third phase.

As mentioned in chapter 5, FINIDA/Fin Water found the Tanzanian-made Shinyanga handpumps too heavy, too weak, and requiring too much maintenance and therefore too expensive in the longer run. They therefore decided to import the Finnish-made NIRA handpumps, which are found to be very reliable.

The villagers are providing manual 'self-help' labour for construction. This labour is paid at a rate of 1 TShs/meter of ditches dug (or similar rates for other work), but the money is paid to the village fund. FINIDA finds this to be a very good and efficient system.

One major problem has been that during the dry season in 1981 more than half of the shallow wells did not provide sufficient amounts of water, and

many of them (around 20% according to Loak) dried up completely. Though 1981 was a drought year, this situation is very serious, and have lead to a reconsideration of some of the project solutions.

The implementation so far has not been connected to any other programmes. FINIDA is now, however, discussing with UNICEF the possibilities of combining the water supply programme with a health and hygiene education programme, or with a sanitation (latrine) programme.

The Finnish financial contribution to this programme in the two regions in 1981 was around 13 mill. TShs. The budget for 1982 is around 16 mill. TShs, and a probable budget for 1983 is around 20 mill. TShs.

The total costs of the second phase (March 1980 to December 1981) of the implementation programme for the two regions, was around 75 mill. TShs. This was financed by FINIDA (26 mill. TShs), UK (25 mill. TShs), UNICEF (16 mill. TShs), and Tanzania (6 mill. TShs for local costs).

Tanzania has now requested FINIDA to finance also the local costs of the programme, saying that Tanzania may have to concentrate their financial resources on higher priority sectors, i.e. the economic sectors. This is an indication of Tanzanian priorities at present, but it is hard to understand why foreign donors should be requested to increase their contribution to low-priority sectors.

d) Federal Republic of Germany (FRG) has not been directly involved in any particular region, nor do they contribute to the production of WMPs. They are contributing to several national projects, including the urban water supply to the cities of Dar es Salaam, Arusha, Tabora and Tanga. They also contribute to one 'national' rural sypply scheme in Tanga Region. Their total financial contribution to the water sector for the period 1962-78 has been approx. 87 mill. DM (330 mill. TShs).

e) Netherlands assisted the Shinyanga pumps/shallow wells programme until 1978, but is now only supporting Morogoro Shallow Wells Programme. They have so far declined to finance a WMP Study, but may have to do so in the near future. (Population of Shinyanga in 1978 approx. 1.3 mill., in Morogoro approx. 0.9 mill.).

The Shinyanga project is continuing under a very dynamic Tanzanian leadership. However, many of the handpumps originally installed have to be replaced, and Netherlands are prepared to finance the replacement of some 250 pumps, and other materials.

The Morogoro Shallow Wells Project (MSWP) is a 'national' project which acts as an independent implementation unit. The Dutch would in the future prefer a closer cooperation with the Regional Water Engineer.

MSWP also runs a small assembly & repair workshop, but does not produce any pumps itself. It is hoped to be able to do this in the future. It has also established a supply unit which receives foreign funds from Netherlands, and imports pumps and some other items for the region, and also supplies (sells to) other regions. The turnover of its sales to other regions in 1981 was above 5 mill. TShs.

It is expected that more than half of the rural population in Morogoro will be supplied with water from shallow wells by 1991.

It has recently been agreed to establish a maintenance organization, that also will receive foreign currency from the Dutch, while Tanzania will finance the manpower costs.

The total Dutch contribution to the water sector is approx. 3.5 mill. USD (30 mill. TShs) annually, and it is expected that the future contribution will continue on that level.

f) Other bilateral donors: Canada completed the WMP for Dar es Salaam and Coast Regions in 1981 (total population in 1978, 1.4 mill.). Australia is supporting the windmill project in Singida region. I do not have a complete information about these and other donors' contributions.

g) UNDP has only been involved with a contribution from the UN Capital Development Fund of 1.2 mill. USD (10 mill TShs) for the health and water sector of a World Bank project in Kigoma (and other regions) implemented in 1976-81. Only half of the schemes are reportedly functioning at the moment.

h) UNICEF has a budget of 4 mill. USD (34 mill. TShs)for all its activities