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DOMESTIC WATER SUPPLIES:

A VITAL COMPONENT IN TANZANIA'S RURAL DEVELOPMENT.

A CONSUMER-ORIENTATED STUDY OF SELECTED WATER SCHEMES
IN FOUR REGIONS.

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for Community Water Supply

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SUMMARY

The objectives of the programme for the development of domestic water supplies in Tanzania's rural areas are not being fully realized. Provision of improved water supply cannot keep pace with population increases. In addition, severe problems are caused by breakdowns in existing schemes. It is evident that evaluation is urgently needed. This project undertakes consumer-orientated studies of selected water schemes in four regions: Kilimanjaro, Mwanza, Shinyanga and Singida regions. Emphasis is to be placed on the micro-perspective, i.e. on the individual households. A multi-disciplinary approach allows treatment of such potentially relevant aspects as water availability, water-use patterns, appropriate technology, health and hygiene, local participation, distribution of benefits, traditional attitudes and beliefs, traditional sources, women and children. The most important aspects for in-depth study will be selected in cooperation with the consumers in a pilot study carried out in Kilimanjaro region. Comparative studies of these aspects will then be carried out in Mwanza, Shinyanga and Singida regions. It is expected that the project will benefit the schemes studied and the rural water programme as a whole. The information gathered should have implications for the future planning and evaluation within the water sector in Tanzania. The dissemination of the results within Tanzania is considered an important aspect.

1. THE DEVELOPMENT OF RURAL DOMESTIC WATER SUPPLIES IN TANZANIA

The programme for the development of domestic water supplies in Tanzania's rural areas should be seen as an integral part of the overall rural development policy which aims to stimulate the development of these areas, improve living conditions and eliminate the imbalances existing between urban and rural areas, between different regions and thus between individuals.

1.1. Objectives of water development in Tanzania

In order to accelerate rural development and raise the standard of living for the rural population, the development of domestic water supplies is given high priority in Tanzania. In 1971 the Tanzanian government embarked on an ambitious programme to provide:

1. a source of clean, potable and dependable water within a reasonable distance of every village by 1981, as a free basic service.
2. a piped water supply to the rural areas by 1991 so that all people will have ease of access (i.e. a distance of 400 meters to a public domestic water point.)

1.2. Organization within the water sector

To facilitate the achievement of these aims, the rural water sector was, in 1972-73, decentralised and divided into regional and national areas of responsibility. The regional authorities operate independently from the Central Ministry and their budgets and development plans are co-ordinated by the Prime Minister's Office.

1.3. Development of rural domestic water supplies to date.

The development of domestic water supplies in the rural areas does not, to date, appear to live up to the objectives and goals described earlier. For example, according to statistics available, in 1970 approximately 10% of the rural population was provided with water, and the present figure is 25% (1980). However, the rate of development has actually decreased in recent years. The annual rate of development cannot keep pace with the annual population increase. At present only 200,000 of the rural

population is provided with water supplies annually, compared with the annual population increase of 360,000. 1.

This means that the present rate of development is inadequate to accommodate the huge task ahead as defined by the 1991 target. In addition, the situation is worsened by the increasing number of breakdowns in the already completed schemes. The statistics which give 25% of the rural population as being supplied with water do not allow for the ever increasing number who are without water because of these breakdowns in existing schemes.

This points to an inconsistency between the two concepts of "access to a domestic water point" and "water availability". Access to a domestic point does not necessarily mean that water is available. A rough estimate, allowing for decreasing water availability, would be that less than 12% of the rural population have reliable sources of clean water today. The seriousness of the situation can be noted in the recent discussions of Swedish aid programmes within the water sector.

With the present rate of development of water schemes and the ever increasing problem of breakdowns in existing schemes, the percentage of rural population with access to clean water will probably decrease in the coming 10 years.

The implications for future developments are obvious. Continued development of new water schemes is inadequate. Much more emphasis must be put on evaluation of existing schemes, especially from a socio-economic point of view, in order to come to terms with problems of water availability, operation and maintenance, lack of local participation, unsuitable technology, etc. Studies of a purely technical nature at the macro-level are of limited value in this context if they are not supplemented with multi-disciplinary studies at the micro-level.

1. For further discussion of this aspect see: Andersson, I. The development of domestic water supplies in Tanzania. A study of three regions: Kilimanjaro, Shinyanga and Mwanza regions, Lund, 1980, 22 p. and Tanzania Rural Water Supply Annual Joint Review, Report 1978/79, Stockholm, SIDA, 1979.

2. RESEARCH ON DOMESTIC WATER SUPPLIES

2.1. Research carried out to date

A great deal of research attention has been directed towards rural water supplies in recent years, mainly because it has become increasingly obvious that the provision of water supplies has not produced the benefits and development effects that had been anticipated. The issue is complex and knowledge and insights from a wide range of disciplines need to be incorporated, for example from technical sciences, medical sciences, anthropology, etc. Studies of water supplies must, of necessity, be multi-disciplinary if more than isolated phenomenon are to be illustrated.

Presentation of some of the research carried out:

The classical example of a multi-disciplinary study is Drawers of water. Domestic water use in East Africa (White, G.G., Bradley, D.J. & White, A., 1972). Although this work is 10 years old the content is still valid today. Two water schemes from Tanzania are included in this book. Another study with a multi-disciplinary approach is Village water supply. Economics and policy in the developing world (Saunders, Robert J. & Warford, Jeremy J., 1976).

Economical aspects and problems related to scale are taken up in Impact and economics of community water supply (Carruthers, Ian D., 1973). This book is based on experience from Kenya but is applicable to Tanzanian conditions as well. Vattenstrategi Del 2: Landsbygdens hushållsvattenförsörjning (Water strategy Part 2: Rural domestic water supplies), (Ahman, Ingvar, 1979a) is a well informed and up-to-date study of experiences from the developments within the water sector. The same author has written an article The need for a strategy for rural water supplies (Ahman, Ingvar, 1979b) in which the concept "water availability" is discussed in more detail.

Evaluation for village water supply planning (Cairncross, Sandy et al, 1980) is a practical handbook in evaluation. Fieldwork methodology is discussed in detail. The book presents various aspects for evaluation, such as technical, administrative, health impact and distribution of benefits. Planning and design of rural drinking water projects (Imboden, Nicolas, 1977) suggests a framework for analysis of water development. It includes a large number of hypotheses and indicators for testing the hypotheses.

An excellent overview of different problems concerning domestic water and sanitation can be found in Water, wastes and health in hot climates (Feachem, Richard, McGarry, M. & Mara, D., 1977). An exhaustive study Health, water and development. An interdisciplinary evaluation (Feachem, Richard, Burns, E., et al, 1978) is very useful although not carried out in Tanzania. Various aspects of sanitation are also discussed in Sanitation in developing countries (Pacey, A., 1978)

Social and ecological effects of the development of water supplies are thoroughly treated in several works, in particular Water and society. Conflicts in development. Parts 1 & 2 (Widstrand, Carl Gösta et al, ed., 1978 and 1980)

A crucial condition for the success of a water project is the involvement of the local people. Participation and education in community water supply and sanitation programmes (World Health Organization, 1979) is a literature review of public participation from various countries. Among the other interesting works on this aspect can be mentioned Self-help and popular participation in rural water systems (Miller, Duncan, 1979)

The literature available on technical aspects of water development is abundant. Small water supplies (Cairncross, Sandy & Feachem, Richard, 1978) is a practical handbook dealing with low-cost technology. Another practical manual is Shallow wells (DHV-Consulting Engineers, 1978) which is based on the construction of hundreds of shallow wells in Tanzania. Other references of value on technical aspects can be found in the annotated bibliography Economically appropriate technologies for developing countries (Carr, Marilyn, 1976).

Technical and organizational studies concerning water development in Tanzania have been mainly carried out by consultants. These are all based on aggregated data. Examples of such studies are: Tanzania rural water supply development (Olle Rimer and Associates, 1970); Inventory of rural water supply projects in Tanzania (Engström, J.E. & Wänn, J.E., 1975). A realistic study of the development of water supplies in Tanzania is Rural water supply sector study (WHO/IRBD, 1977) which presents a critical view.

Problems of an organizational nature are also discussed in a study Action programme in the rural water supply sector in Tanzania (AIB, 1980) and a new organizational set-up is proposed.

Aspects related to water quality can be found in Rural water quality programme in Tanzania (Brokonsult AB, 1979). The report is based upon extensive field investigations all over Tanzania and includes medical statistics.

Good background material at the district and regional levels can be found in the Water Master Plans which have been prepared for most regions in Tanzania. The Swedish firm Brokonsult AB was responsible for the planning in the regions around Lake Victoria, including Mwanza region (1978). A follow-up implementation study is currently being carried out by VIAK AB (1980-81). The Dutch firm NEDECO has studied Shinyanga region (1976) and a Japanese team of consultants made plans for Kilimanjaro region (1976). There is no Water Master Plan available for Singida region but SMEC, an Australian consulting company, has made a survey of Singida region water resources (1978). Apart from the Mwanza Water Master Plan, these studies are not available in Sweden.

Technical studies of individual water schemes are included in the Water Master Plans but can also be found in other reports, for example, Assessment in rural water schemes in Dodoma and Lake Regions Tanzania (TISCO, 1979). Two case studies of water projects in Mwanza region are included.

A greater part of the research carried out to date on the development of water resources in Tanzania has been undertaken through BRALUP (Bureau of Resource Assessment and Land Use Planning, University of Dar es Salaam). Most of this research has been carried out at the micro-level. Studies made in the beginning of the 70s show great optimism. Ambitious programmes were drawn up to evaluate water projects - not only the impacts of improved water supplies on health and production but also in relation to ujamaa and socialism, modernization and education. For example, A preliminary assessment of the impact of rural water supply on households and villages (Warner, Denis, 1970) and Rural water supply and development: A comparison of nine villages in Tanzania (Warner, Denis, 1969). Warner's experiences from impact studies are summarized in Evaluation of the

development impact of rural water supply projects in East African villages.
(Warner, Denis, 1973).

In these and other similar works at the micro-level, hypotheses were tested - such as: improved water supplied leads automatically to improved health; time made available will be used in other productive areas, etc. None of these studies were, however, able to produce uniform results. Many problems are involved in such evaluation of water supplies as the impacts are manifold and the changes measured are often caused by other inputs than water. Few effects are purely social or economic. Improved water supply is not enough to stimulate development - even if it is a necessary condition of development.

Proper impact studies take many years to accomplish. Such studies are underway at present in Njombe district, as described in A socio-economic study of water related problems in northern Njombe (Stahl, Michael et al, 1978). Another BRALUP report Sociological aspects of improved water supplies in Coast Region (Bantje, H. 1978) indicates that anticipated benefits are reduced because of, among other things, unreliable water availability, inadequate operation and maintenance and a larger concentration of population than the scheme was planned for.

Aspects of self-help and water development can be found in Preliminary results of an impact study on rural water supply schemes built by self-help (Tschannerl, G. & Mujwahuzi, M, 1974)

In summary, it could be said that most studies carried out to date on the development of domestic water supplies have tended to treat the subject as purely technical and have tackled the problems on the macro-level, i.e. planning, construction, technology, etc. Aid programmes within this sector have largely neglected the micro-perspective. Relatively little attempt has been made to make direct contact with the users to learn what their perceived needs are. No effort has been made to reach the women who traditionally have the responsibility for collecting domestic water.

The studies at the macro-level are mainly carried out by consultants, often funded by aid agencies. Their findings receive a great deal of attention and have a big impact on developments. The micro-studies are mainly undertaken by students and researchers. Their resources are limited and, as a result, their findings are not distributed as widely and have much

less impact.

In a report from the Swedish National Audit Bureau (SIDA, Tanzania, 1974) it was claimed that *"no studies having relevance for the whole of the water programme have ever been carried out. Such studies as have been conducted, especially by BRAIUP, have been full of discernment but limited in scope and lacking in effect."* (p.54)

2.2. Current research needs

That more research is needed on the development of rural domestic water supplies is obvious, especially now in the International Drinking Water Supply and Sanitation Decade (1981-90). It should be emphasised that while the supply of water alone will not necessarily promote development, the importance of the supply of clean water should not be underestimated.

1. Need for evaluation

The seriousness of the situation with the development of domestic water supplies in Tanzania and the inadequacy of research to date, point to the need for new approaches. Above all there is an urgent need for evaluation of existing schemes.

"This project monitoring and evaluation may be one of the most important follow-up activities to water projects. Water projects can be of a very technical nature, with a short life span. Once the system is installed, official interest can fade. It is important to realize that impact will be realized only if the outputs (i.e. the installed systems) are being used because the people have developed new water habits. Monitoring and evaluation of water projects must especially be focused on the control and assessment of this "habitualization" process." (Kaul, Inge & Mathiason, John, 1980:para 40)

The value of monitoring and evaluation, both to improve existing schemes and to gain relevant information for future planning, is widely recognized. Kaul and Mathiason even recommend that provision for monitoring and evaluation be incorporated into the design of new schemes. The notion of the dual function of evaluation is also supported by Feachem.

"...retrospective evaluation of a rural water programme can produce valuable information on how the programme may be improved...A major increase in the amount of evaluation work undertaken would be beneficial in promoting improvement in programme planning, policy and execution." (Feachem, Richard, 1978:357)

2. Suggested approach

There is much literature available on the approach to be used in studying water supply developments. The theoretical discussions on this theme include information on approaches to be used in programme planning and execution and also those to be used in monitoring and evaluating existing schemes. One of the most interesting works available today is Evaluation for village water supply planning (Cairncross, Sandy et al, 1980). This book is an invaluable resource material.

Ideally evaluation should be consumer-orientated and carried out at the micro-level. A multi-disciplinary approach is also required since the issue is so complex. Indepth studies of individual water schemes, at the village level, with special emphasis on the consumers (and especially the women) are necessary in order to study the expected impact of water supply, water use patterns, the realities of water availability and other relevant aspects.

The three main elements in the suggested approach will be treated separately below.

micro-perspective:

The need for studies at the micro-level is becoming widely recognized. As early as 1974 the Swedish National Audit Bureau, in an evaluation of SIDA's aid in the water sector in Tanzania, emphasized the relevance of studies at the micro-level for the development of the whole water programme. (SIDA, Tanzania, 1974).

Robert Chambers also points out that in order to gain the holistic approach required " *the entire rural environment, including its micro-environments , is potentially relevant.*" He recommends an approach which combines the holism of the villagers with the technical insights of outsiders.

Widstrand et al recommend that an attempt be made to combine the components of the micro-level with the data available at the macro-level. (Widstrand, Carl Gösta et al, 1978)

consumer orientated:

Ahman and Rosenhall suggest that of the three groups concerned in the development of domestic water supplies, i.e. the consumers, producers and donors, the consumers have the least influence.

" Usually the consumer represents the weakest link in a chain of events. The prime target for the whole exercise is in the worst of cases characterized as excluded from adequate information, frustrated and lacking possibilities of participating and influencing decisions concerning the water supply system to be built and is later on a victim of unreliable provision of water." (Ahman, Ingvar and Rosenhall, Leif, 1973:2)

Other authors are in agreement that it is a serious mistake to plan water resources development without due consideration of the wants, needs and capabilities of the individuals served. James points out that the success any scheme is dependent on the involvement and motivation of the consumers as these individuals will, if motivated, spend a great deal of time on and be firmly committed to any scheme they believe in.

"This kind of committment for success tends to be missing in public projects. A project creating incentives that make the users feel that their own best interest is best served by using project output and by making sure that the project continues to function will be many times more successful than one where the users feel better off by continuing in their old way or feel uncomfortable with some strange new technology. For example, villagers provided with a new water supply or sanitary system need to be made feel so much better off with the new technology that they are willing to learn how to take proper care of it when it is working and repair it when it fails." (James, L.D., 1978:387)

How do you make them feel this? By promotion?

Women are certainly the most neglected element in the whole programme. These are the very ones who have the most to do with water in the villages. Contact with them is therefore essential. *"One of the most glaring weaknesses in the rural water technology thus far, has been that women have not been encouraged to participate in the dialogue."* (Henry, Dean, 1978:365). Ahman and Rosenhall are in agreement and state that the one who carries the water for the household has less to say than the pump attendant, who is always a man, and who has probably never carried water in his life. (Ahman, Ingvar & Rosenhall, Leif, 1973:2).

Chambers too suspects that research is far too often generated by the preoccupations of the researchers and not, as it should be, by the real situation of the rural people. He stresses the value in working with and

learning from rural people.

"Rural people know what their life is like and what they do. They know when water is available from what sources. They know how they transport it, how they repair their receptacles, how they manage their irrigation, and how they use water domestically. They know the problems they experience and where it hurts. The housewife in her hut or the farmer in his field may lack the specialized technical knowledge but their non-disciplinary under-view is more balanced in the range of its insights than the disciplinary overview of the visiting scientist. A first step then, is to learn how to learn from rural people. A second step is to understand their daily life and needs and to identify problems and opportunities. And a third step is, with them, to develop ways of overcoming those problems and exploiting the opportunities." (Chambers, Robert, 1978:393)

Chambers concludes that the knowledge and insights of the consumers, coupled with imaginative and open-minded research by those from the outside, provide the best means of ensuring that gaps are filled, problems solved and opportunities exploited. (Chambers, Robert, 1978:397)

White and Seviour also point to a growing awareness of the need for people in rural areas to be able to determine for themselves what constitutes an "improvement" in their lives and to work towards achieving it.

"...people being served are the ones most capable, with assistance, of choosing what levels of improvement they can best use. Systems involving choices by the users themselves and an analysis of the risks they are willing to take, weighed against the benefits they feel they will receive, are more likely to bring them lasting benefits." (White, Ann. & Seviour, Chris, 1974:6)

In their discussion of evaluation studies Cairncross et al make the criticism that such studies are far too often negative, only reporting failures. They call for a more sensitive approach and stress the need to be objective and constructive. They recommend attempts be made to learn the consumers' own evaluation of the schemes studied.

"The most balanced view will often come from the consumer who is generally very appreciative of the improvement in water service, who understands all too well that defects still exist but who would not in any way classify the present efforts as ineffective." (Cairncross, Sandy et al, 1980:1.7)

It is thus obvious that the orientation towards the consumer is of vital importance if the research approach is to succeed.

multi-disciplinary approach

The emphasis on the consumers and the micro-perspective calls for a multi-disciplinary approach. Water is a complex issue. It is a social phenomenon in developing countries and has its own political economy and a wide range of social effects. (Widstrand, Carl Gösta et al, 1973:172) As Chambers clearly points out only a multi-disciplinary approach makes it possible to:

"follow water through its flows, allocations, appropriations, transformations and uses, including stages and aspects which do not fall neatly into the lap of any specialist. The linkage between the physical and the human behavioural aspects may need special attention." (Chambers, Robert, 1978:393)

There are many relevant aspects and problems in the development of domestic water supplies which can only be examined through inter-disciplinary research. For example:

- the expected benefits of improved water supply
- access to water points, water availability and water use patterns
- local participation
- appropriate technology
- traditional sources
- traditional social attitudes and beliefs concerning water
- health and hygiene
- perceived needs and problems of the consumers - especially the women
- distribution aspect and especially equality of access
- operation and maintenance

The lack of inter-disciplinary research in the planning stages is criticized by Biswas. Inadequacies at the planning level have consequences for the success of the schemes. (Biswas, A.K., 1978:295) A multi-disciplinary approach is equally important in evaluations of existing schemes.

The term "multi-disciplinary approach" here does not imply the need for a large team of experts in many disciplines. It involves rather the acceptance of the fact that there are many aspects to be considered which cannot be covered adequately by any single discipline and it allows for the possibility to call on expertise in many fields as necessary. It also

involves the acceptance of the need to place the development of rural domestic water supplies in the context of total development. As White and Seviour point out, there should be:

"...increasing emphasis on the examination of the results of changing one part of a system on all its other parts, so that changes in water supply and sanitation come to be regarded as only one part of the total picture of the quality of life for people in rural areas." (White, Anne & Seviour, Chris, 1974:7)

Only the approach as outlined above - multi-disciplinary, consumer-orientated and with emphasis on the micro-perspective - applied in the evaluation of existing schemes, either through large scale investigations, random sampling or study of selected water schemes, can give the insights necessary to develop rural domestic water supplies in accordance with the social, cultural, economic and organizational customs and traditions of the people concerned and in accordance with their stated needs. That this is necessary is clearly stated by Kaul and Mathiason:

"...development studies have consistently shown that socio-economic change will be more organic and self-sustaining if it is indigenous to the social system, which for water supply, would be the village or community." (Kaul, Inge & Mathiason, John, 1980:para 13)

3. Aspects for study

The literature available on water supply development, both with regard to Tanzania and developing countries in general, treats many different aspects which should be incorporated into a study of rural water supply schemes.

Kaul and Mathiason (1980:para 8) recommend the study of the impact of improved water supply in terms of:

a) improved well-being of the population

Reference is made here to the aspects commonly stated as objectives of the development of rural water supplies, i.e. improved public health, ease of access and improved convenience, lessening of labour burdens especially for the women and increased productivity and income.

b) socio-structural change

These include the impacts on the socio-structural environment, i.e. the norm and value system, patterns of social interaction and the distribution of socio-economic power or social status. The aspects mentioned are traditional water-use patterns, traditional social beliefs and attitudes, community structures, organization and decision-making and differentiation of sex roles.

The assessment of the social impacts of rural drinking water supply necessitates the gathering of information on three sets of variables:

" a) the existing levels of people's well-being including such components as food and nutrition, health, income, and employment;

b) the locally prevailing social attitudes and patterns of behaviour relating to water;

c) the socio-structural characteristics of the community ...including the distribution of socio-economic power and prestige, local-level organization and decision-making processes." (Kaul, Inge & Mathiason, John, 1980:para 30)

Some of the more important aspects will be discussed in more detail below.

Improvements to public health

Feachem points out that there are still wide areas of ignorance about the relationships between water supplies, sanitation and health.(1980:21). Many of the hypotheses upon which much planning of water schemes was based in the past, have yet to be proven correct - for example that increase in quantity of water supplied would automatically lead to an increase in consumption. It is more and more evident that the provision of clean water supplies is not, in itself, sufficient to promote improved public health.

" The hypothesized linkage between quality and quantity of water and disease rates have been the subject of theoretical discussion and empirical analysis in numerous studies. Most of the studies conclude that while the available empirical evidence seems to suggest a positive association between safe and convenient water supply and public health, it has not been possible to establish clear causal linkages between these two sets of variables." (Kaul, Inge & Mathiason, John, 1980:para 10).

In most studies available on the impact of water supplies on public health there is general agreement that it is difficult to claim benefits or improvements in public health as being solely caused by the provision of clean water.

"The benefits from an improved water supply...cannot be readily separated from those of complementary inputs." (Warner, Denis, 1973:165)

The changes in public health which can be observed after the introduction of improved water supplies may well be due to other "unknown or uncontrollable factors of a cultural, social, economic or environmental nature." (Saunders, Robert J. & Warford, Jeremy J., 1976:36).

Feachem has also pointed out that the results of studies on the overall relative importance of such preventative strategies concerning water supply, sanitation and health as water quality, water availability, excreta disposal, excreta treatment, personal and domestic cleanliness, drainage and sullage disposal and food hygiene, lead to the conclusion that:

"...the health impact...will not be achieved by a simplistic policy of supplying clean water. Only carefully designed programmes which integrate water quality improvements with improvements in water availability, sanitation and hygiene education will bear fruit."
(Feachem, Richard, 1980:21)

It is becoming increasingly obvious that health education programmes should form an integral part of any water supply project if improvements in public health are to be achieved.

Traditional social beliefs and attitudes concerning water

The health aspect is integrally related to the traditional social beliefs and attitudes of the people. Knowledge of local beliefs and practices with regard to water and health is essential.

"...the local people might find it difficult or even impossible to see any need for a water project and to agree to its underlying hypotheses. The link between water and health will not be obvious for the villagers, if, in accordance with their traditional health beliefs, they are convinced that certain water-related diseases are caused by physical exertion, hot or cold temperatures, God, Fate or even the working of an Evil Eye."
(Kaul, Inge & Mathiason, John, 1980: para 18)

Adaptations to local conditions

As has been pointed out earlier, the success or failure of a water scheme is often dependent on the extent to which it is indigenous to the local conditions. The supply of water often involves the introduction of innovation - in terms of new techniques, new concepts (e.g. the relationship of clean water to health), new forms for organizing the local community and often even new forms of social interaction.

Often schemes are planned without research into the local conditions, especially the social, economical and organizational arrangements.

Little attempt is made to incorporate the existing arrangements and as a result many unnecessary changes can be introduced. Where innovations are unavoidable they should be adapted to local conditions as much as possible.

"It can ...be argued that the success of rural water projects is a function, inter alia, of the extent to which it will be possible:

a) for the project to adapt itself to prevailing socio-economic conditions; and

b) for the local community to absorb the changes resulting from the project.

(Kaul, Inge & Mathiason, John, 1980:para 6)

Traditional water sources and water-use patterns

One of the most important aspects for study, and one which varies greatly from area to area, is that concerning traditional sources and water-use patterns. In evaluations of existing schemes it could be of value to try to investigate the sources used before the "improved" water supply, and to establish if the introduced scheme actually involves an improvement from the point of view of the consumer.

The study of traditional, unimproved water supply arrangements can provide important information on needs and local resources. The existing arrangements may be adequate, with minor inputs or improvements. This would be positive in a country such as Tanzania where resources are limited. If the local community is to participate with financial and labour contributions, small improvements to an existing supply may be all a poor community can afford. In other words, the scarcer the resources the more important it is to study the traditional arrangements.

It has even been suggested that it may be better to design projects which involve improving the water supply from several traditional sources than trying to introduce a single, larger alternative source. (Whyte, Anne- quoted in Kaul, Inge & Mathiason, John, 1980: para 15). This is probably especially so in cases where the new scheme involves many changes for the villagers, and even more so where they have difficulties understanding the necessity of the new scheme.

Unfortunately the reality of the situation is that, all too often, no attention at all is given to traditional sources. A standard project, proven successful in some areas, is applied indiscriminately.

Local participation

Local participation is a crucial factor in the success of the development of domestic water supplies. This fact is endorsed by many experts in this

field, who state that lack of participation during planning and construction is a big problem. (For example, Biswas, A.K, 1978:295) Projects can also fail when the villagers are not involved in the operation and maintenance of the schemes.

Project failure has frequently been associated with lack of local support.

" Even in cases where projects appeared successful from a technical viewpoint, social factors like, for example, the community's dislike for the taste of "clean" water, have been known to lead to failure, in terms of non-use or sometimes misuse of the services provided." (Kaul, Inge & Mathiason, John, 1980:para 5)

However important the objectives of an improved water supply may be - improved public health, increase of convenience, lessening of labour burdens, increased productivity and income, etc - they will only be attained if the villagers:

1. really do have access to improved water supplies
i.e. if operation and maintenance are assured
2. really do use the water supplied
i.e. are sufficiently convinced of the need for improvement and of the reasons for giving up traditional sources.

Both of these conditions are dependent on the involvement of the villagers themselves in the project - at all stages of its development, planning, construction, operation and maintenance and even evaluation. The participation of the villagers is of prime importance. All opportunities for participation in water projects need to be identified and studied.

Experience has proven that it does not matter how technically perfect designs may be and plans executed or even what important objectives the project may have, unless *" community or village enthusiasm is present...there is a much greater probability that the system will not be widely used, or that it will fall into disrepair in a short time."*
(Saunders, Robert J. & Warford, Jeremy J, 1976:100)

In this context it will be seen that it is also necessary to study the priority given to water improvements by the villagers. It may be found not to rank very high on the overall preference system and it may therefore be difficult to motivate local participation.

" For instance, the local people may perceive a need for better water, but since they feel other needs more urgently, they might not be as forthcoming with financial contributions or voluntary labour as policy makers and development planners would probably like to see them. (Kaul, Inge & Mathiason, John, 1980:para 9)

The involvement of women

The question of the role of women in rural water supplies development is fortunately receiving more and more attention. Previously great emphasis was placed on the objective to free women from the drudgery and time consuming work of fetching water, and especially from the need to carry it long distances. This in itself is positive. Unfortunately however, little attention was given to the social interaction and communication aspects of these tasks. It has been pointed out in recent years that the delivery of water to individual houses for example, while certainly improving convenience, may cause alienation by depriving women of a socially acceptable reason for being in public. This is especially so in societies where social norms restrict the women's sphere of activity to the house. Kaul and Mathiason stress that unless these aspects are given due consideration the project may be rejected by the women and the non-use of the water supplied result, since the women may be reluctant to lose " *the opportunity to congregate, a form of non-material activity which they may, for various reasons, enjoy and consider valuable and important. (1980:para 16)*

Another equally important aspect is the need to assure that the elimination of women's function as water-carrier does not lead to a deterioration of her status but that it is compensated for by other activities of similar value and prestige, and where possible, higher productivity. (Kaul, Inge & Mathiason, John, 1980:para 29)

Thus it is essential to "*modernize women's role in rural water supply, preserving the importance of their contribution while reducing the hardships.*" (United Nations:Water, Women and Development:6)

4. Method for gaining information

The most commonly recommended method for gathering of information is through structured surveys, for example using questionnaires.

"In order to assure that the information is collected systematically, it is preferable to have structured forms for each type of information collection."
(Kaul, Inge & Mathiason, John, 1980:para 39)

Innumerable examples of such questionnaires and village inventories are available. Among these can be noted those prepared by Nicolas Imboden in: Planning and design of rural drinking water projects. A research framework to analyse experiences with rural drinking water schemes (1977).

In order to formulate questionnaires certain hypotheses need to have been worked out. Cairncross et al consider it is essential to have clear hypotheses established before field surveys are commenced, and if possible to test them in a form of pilot survey. *"It is most important that the research plan should not consist simply of the declaration "Let's go find out all about water in village or region X". (Cairncross, Sandy et al, 1980:1.8)*

While the use of prepared questionnaires has obvious value, it is considered inadequate as a method of gathering information on the real situation regarding the relationship man-water at the village level. A more satisfactory method would involve periods of fieldwork in the villages studied (as opposed to brief village surveys) to allow for direct observation and real informal communication with the villagers - i.e. unstructured discussions in which the villagers could present aspects of importance to themselves.

Some aspects, such as access to water, actual use of the water supplied, operation and maintenance, etc, can be easily observed or the necessary information gained through questionnaires. However other aspects and problems, perhaps the most important ones, such as traditional attitudes and beliefs concerning water, traditional sources and water-use patterns, the role and attitude of the women, child-care and health habits, etc, can only be studied through real contact with the villagers.

Thus the real information of importance can only be gathered by giving the villagers the opportunity to present their own perceptions of the realities of their own situation. This view is supported by Chambers (as mentioned earlier) who stresses the value in working with and learning from rural people. As he points out:

"The housewife in her hut or the farmer in his field may lack the specialized technical knowledge but their non-disciplinary underview is more balanced than the disciplinary overview of the visiting scientist."
(Chambers, Robert, 1978:393)

The researcher should not presume to know more about the realities of village life than those living it. The knowledge and insights of the villagers are an asset in any project and the villagers have the right to be involved in any aspect of development concerning themselves.

Chambers recommends:

" A first step then, is to learn how to learn from rural people. A second step is to understand their daily life and needs and to identify problems and opportunities. And a third step is, with them, to develop ways of overcoming those problems and exploiting the opportunities." (Chambers, Robert, 1978:393)

In order to do this it is essential that good contact are established with the villagers. And it is also important that, while hypotheses may have been formed, the researcher approaches the problems with openness and objectivity.

3. PROJECT DESCRIPTION

The proposed research project is a consumer-orientated study of selected water supply schemes in four regions in Tanzania - namely Kilimanjaro, Mwanza, Shinyanga and Singida regions.

3.1. Objectives and expected benefits of the study

Objectives:

The objective of the study is to investigate as many aspects relevant to the development of rural domestic water supplies as possible, through studies of existing schemes. Among the aspects to be considered are included, for example:

- how well the rural water supply schemes have been adapted (if at all) to local socio-economic conditions
- the ways in which the direct benefits of improved water supply, coupled with other development efforts, can produce indirect socio-economic benefits - such as improved health, nutrition, education, etc.
- how far the water schemes have taken into account the perceived needs and traditional sources of the consumers - especially the women - and involved the consumers in active participation at all stages of development - planning, construction, operation, maintenance and evaluation
- the impact of unreliable water availability and local solutions to the problems created
- the acceptance of small scale projects and so-called appropriate or alternative technology - especially the relationship of such technology to traditional technology
- the distribution aspect and in particular the role of improved water supplies in eliminating inequalities or supporting existing imbalances and even of creating new imbalances
- the relationship between improved water supply and improved health- and especially the supplementary inputs required, eg. hygiene education
- the water-use patterns and traditional social attitudes and beliefs towards water and if these are affected by improved water supplies
- the role of women in all aspects of water development
- local participation - the potential opportunities & those actually utilized

- the ranking of improved water supplies in the village preference structure
- seasonal variations in water supply and the impact on water-use patterns and local solutions to the problems created.

The objectives of the proposed research may appear overly ambitious as presented here. It is obviously not possible to cover all these aspects in detail in the one study. It is intended that some of the most relevant aspects will be selected for in-depth studies. A pilot study in one village is planned to help ascertain which aspects are most relevant, especially from the point of view of the consumers.

Expected benefits of the study:

It is expected that the project will produce benefits for the development of rural domestic water supplies in Tanzania. The expected benefits should be seen on two levels- benefits for the schemes studied and benefits for the whole programme of domestic water supplies.

a) benefits for the schemes studied:

The information gathered should prove valuable for improving the water supply schemes and rectifying any problems experienced. The study should also lead to increased understanding and acceptance of the scheme by the consumers and to an awareness of their role in operation, maintenance and planning for future improvements. This increased participation can have value for other development efforts the consumers may be involved in.

b) benefits for the programme for rural domestic water supplies as a whole:

There are obvious implications both for future planning of new schemes and for evaluations of and planned improvements to existing schemes. The emphasis on the micro-level and the consumer should, in particular, have relevance on a wider scale since it is becoming widely recognized that local participation is a crucial element in future development. The insights gained on this issue should be of special value in efforts to establish a more adequate base for future planning and evaluation. It is hoped that the study will indicate the necessity of evaluation and especially of the need to incorporate plans for evaluation into all new project designs.

3.2. Planned approach

The planned approach, which will incorporate the aspects discussed in some detail in section 2.2. - multi-disciplinary approach, emphasis on the micro-perspective, consumer-orientation, involves several periods of fieldwork at the village level.

Contact with the consumers is considered of vital importance in the project. This implies not only the gathering of information through interviews and observer participation, but also the active involvement of the villagers in planning and realization of the project. This is considered essential if the study is to be related to the realities of the water situation as experienced by the consumers and to their perceived needs.

The multi-disciplinary approach will be facilitated by the establishment of a reference group of experts in various fields. This support group will be called upon whenever necessary in the course of the project. Expertise may be needed when dealing with aspects concerning health, agriculture, education, technology, demography, etc. (See Appendix 1)

A study in four regions

The research is to be carried out in Kilimanjaro, Mwanza, Shinyanga and Singida regions. The decision to investigate existing schemes in four different regions is based on the belief that valuable information could be obtained by a comparative study of the same aspects in different regions. The regional discrepancies within the water sector in Tanzania are well known, even if they are well concealed in the national statistics given in the presentation of the development of rural water supplies at the national level in section 1. For example, while approximately 25% of Tanzania's rural population has access to domestic points (which is not the same as water availability), the corresponding figure for Kilimanjaro region is 52% and for Mwanza region 14%. Studies at the micro-level in different regions can lead to insights in the development within the water sector.

Studies at the regional level also have implications when water development is studied in the context of the total development of the country. Regional

income redistribution has been given, alongside economic efficiency, by Biswas, as one of the traditionally accepted objectives of water resources development. (Biswas, A.K., 1978:295). Another author considers that "*water resources development in areas lagging economically provides some potential for spreading economic growth more widely over a country.*" (James, L.D., 1978:387). Thus information gathered in regional comparisons is of importance.

Since there are such variations at the regional level in Tanzania, e.g. physical, social, economic and organizational conditions, it is not expected that generalizations about the development of water supplies in Tanzania as a whole can be made. However, it is considered valuable to attempt some regional comparisons through the study of several schemes in depth in the different regions.

Schemes of varying scale will be studied -i.e. large diesel-powered projects, shallow wells with hand pumps and traditional supplies. Comparative studies of these different levels of technology can be carried out interregionally, where the basic conditions under which the schemes are to operate are varied. Opportunity also exists for the comparative aspect to be applied intraregionally, where the physical, socio-economic conditions are basically the same. In this case the impact of the different technology types can be compared within the same area.

The choice of regions for the study is motivated by several factors. An important factor was the project leader's personal experiences of water development in Kilimanjaro and Shinyanga regions at the beginning of the 70s, and the resulting good contacts in these regions and understanding of the general conditions in these regions. Good contacts at the village level in Kilimanjaro region led to the choice of Kilimanjaro region for the initiation of the project through an in-depth pilot study.

Other factors influencing the choice of areas were:

- the differing socio-economic environments
- the varied rate of development of water supplies
- varying approach to the problems of domestic water supplies
- varying scale of water projects
- differing choice of technology.

An important factor was the fact that three of the regions - Shinyanga, Mwanza and Singida, have ambitious shallow-well projects in progress. The Shinyanga shallow-well project is considered to be a success from a technical point of view. Little attention, however, has been paid to social and economic aspects of this development.

In three of the regions - Kilimanjaro, Mwanza and Shinyanga - Water Master Plans are available. A survey of water resources development in Singida region also provided good background material.

Different countries have been involved in the planning in the four regions - Sweden in Mwanza region, Holland in Shinyanga, Japan in Kilimanjaro and Australia in Singida. This has an important impact on the technology types chosen in each region.

The choice of schemes for study in each region can also be motivated. In each region one large-scale water scheme, of the type considered typical for that region, will be chosen for detailed study. In Kilimanjaro region this will be a gravity scheme, and in the other three regions pumped supplies will be chosen. The source in Mwanza region is Lake Victoria, in Shinyanga the riverbeds of "dry" rivers and in Singida deep boreholes.

The large scale projects to be studied all have or have had improved shallow-wells with handpumps in operation nearby. Some of these wells will also be included in the survey, as well as traditional sources.

All the proposed projects are operating but not supplying enough water to cover the needs of the villagers. This is often due to problems of operation and maintenance.

More details on the schemes proposed for study are given in Appendix 2.

Initiation of the project through a pilot study

The project will be initiated through a pilot study of a water scheme at the village level in Kilimanjaro region. The objective of this pilot study is to ascertain the most relevant aspects for further study and will be the basis for the research carried out in the other regions.

The water scheme selected will be studied in different seasons in order to gain as complete a picture of the water supply as possible.

The intention is to observe and listen to the villagers themselves. For this reason no structured questionnaire will be prepared for the pilot study. It is hoped that the villagers will be able to present their problems, plans etc, without being influenced by what they consider to be the expectations of the research team. Direct observation of the everyday life in the village studied should prove valuable.

As many aspects as possible will be studied in this study, and especially those taken up by the villagers. It is certainly not intended that every aspect will be treated. While the ambition is to begin the study with as much openness and objectivity as possible, naturally some hypotheses have already been formed and certain aspects appear more relevant for study than others. Aspects such as hygiene, children (and especially in relation to health and hygiene), women and small-scale technology have been stressed in the literature available and by many of the reference persons with whom the project has been discussed. The small scale technology aspect has also been mentioned by the donor agencies in Sweden, Holland and Australia. This aspect will certainly be included, even if the villagers themselves do not present it as being of relevance.

Development of the project

After analysis of the results of the pilot study and the selection of relevant aspects, further in-depth studies will be carried out in Kilimanjaro and comparative studies made in Shinyanga, Mwanza and Singida regions.

3.3. Practical realization of the project

Work phases

The project has been divided into three work phases.

Phase 1. In-depth pilot study of one water supply scheme at the village level in Kilimanjaro region.

This phase, which covers a 6 month period and includes two 1½ month-long fieldwork periods, will concentrate on a study of a water supply scheme in Mwanza District in Kilimanjaro region. Shorter visits will also be made to the other three regions to establish contacts, select schemes for study and collect basic data.

Phase 2. Study of water supply schemes in Kilimanjaro, Shinyanga, Mwanza and Singida regions.

Comparative studies will be carried out in all the regions. A follow-up study will be made of the water scheme studied in more detail in Kilimanjaro region. This phase covers a period of 12 months. Three 2 month-long fieldwork periods will be necessary.

Phase 3. Final report, presentation & distribution of results

This phase which entails a 6 month period, will be devoted to treatment of the material collected and production of a final report. A one month-long period is also planned in Tanzania to present and distribute the results, both within the Ministry and research institutions, especially the counterpart institution- BRALUP, and also in adapted form to the villagers who have participated in the research. This fieldwork period is planned before the production of the final report in order that comments and suggestions may be received from all interested parties.

Time schedule

The project was scheduled to be carried out between July 1st 1980 and July 1st 1982 - thus involving a period of 2 years. The initiation of phase one has, however, been delayed until 1-1-81 and therefore the production of the final report is not expected until the end of 1982.

The amended time schedule is as follows:

Phase 1: 6 months (1-1-81 to 1-7-81) (3 months fieldwork in Tanzania)

Phase 2: 12 months (1-7-81 to 1-7-82) (6 months fieldwork in Tanzania)

Phase 3: 6 months (1-7-82 to 1-1-83) (1 month in Tanzania)

The time schedule is more clearly illustrated in the diagram in Appendix 3.

Presentation of results

Phase 1: Report from the in-depth pilot study of one village in Kilimanjaro.
Report on the other selected water schemes in Kilimanjaro.

Phase 2: Report on the selected water schemes in Shinyanga, Mwanza and Singida regions.

Report from follow-up study in Kilimanjaro region.

Phase 3: Final report.

Emphasis is to be placed on the presentation and distribution of the results within Tanzania itself- both to the Ministry for Water Development (MAJI) and research institutions and also to the villagers themselves. Attempts will be made to adapt the material and translate it into Swahili where needed.

Budget

The budget allows for 6 field excursions to Tanzania for both team members, which involves 10 months in all. Allowance has been made for "traktamente" (extra allowances to cover increased costs during fieldwork periods). Since good knowledge of Swahili is essential for carrying out this study, application for funds for local personnel (interpreters) has been included. Transport costs are also given as a special item in the budget. This is necessary because of the difficult transport situation in Tanzania at present, due to chronic shortages of fuel. Reliable sources of transport are essential for the realization of such a project. Travel within the regions, between villages and water schemes would be facilitated by access to some means of transport - for example hired vehicle, local taxi trucks, etc. Problems with transport could lead to difficulties in carrying out the whole project as the time resources are limited.

4. PROJECT ACTIVITIES TO DATE (1-7-80 to 1-1-81)

The implementation of the project has been delayed. The difficulties in arranging the necessary research clearance and obtaining the required papers resulted in the postponement of the fieldwork in phase 1 until January 1981. In addition the Ingvar Andersson participated in a United Nations Seminar on the development of rural water supplies held in Uppsala in October 1980. He was also a member of a consultancy team from VIAK AB on a research assignment in Tanzania (on behalf of SIDA) studying rural water project development in Mwanza, Mara and Kagera regions in November/December 1980. While causing a delay in the initiation of phase 1, these two activities have nevertheless been of great value to the project. The remaining time in the 6 month period from 1-7-80 to 1-1-81 has been given to working out detailed work plans and approaches. A considerable amount of time has also been taken up with literature studies and the establishment of contacts. These activities will be treated in more detail below. A presentation of research relating to the more theoretical aspects, i.e. planning of themes to be treated and approaches to be used, has already been incorporated into the sections on current research needs (2.2.) and planned approach (3.2.).

4.1. Research clearance arrangements

Contact was established with SIDA's office in Dar es Salaam with regard to necessary procedures for obtaining clearance and essential papers for fieldwork in Tanzania. (Enclosure 1) On their advice direct contact was then taken with Tanzania's National Scientific Research Council in August 1980. (Enclosure 2) When no reply was received a second letter was sent in November (Enclosure 3) and arrangements made to visit their offices personally in December 1980. It appears that the project has the necessary clearance but that the papers required will only be available when the actual fieldwork is to be undertaken. The offices will be contacted on arrival in Dar es Salaam in January 1981.

4.2. Establishment of contacts

Contacts with the counterpart institution: BRALUP

Good contacts have been established with Professor Mascarenhas at BRALUP, both through letters (Enclosures 4,5 & 6) and personally at the United

Nations Seminar in Uppsala in October 1980. BRALUP was also visited during Ingvar Andersson's visit to Tanzania in November/December 1980. Interest is shown in the project and support promised.

Contacts with the reference group

Contact was taken with all the members of the reference group in July 1980 and copies of the project description distributed. (Enclosure 7) Further contact will be taken with the various members of this support group as the need arises - especially in connection with the fieldwork and analysis of the results. Contact has been established with other persons who have agreed to act as reference persons if needed, eg Richard Feachem from the Ross Institute of Tropical Hygiene, London School of Hygiene and Tropical Medicine; Ingvar Ahman from the Secretariat for Global Promotion & Cooperation for Water Supply and Sanitation (GWS)- WHO, Geneva; Michael Ståhl, from SIDA (former Senior Researcher at BRALUP); Gillis Herlitz, Programme Officer for water development, SIDA, Dar es Salaam. Interesting comments and advice have been received from these persons.

Contacts with other organizations and institutions

Interest and support have been shown by SIDA's office in Dar es Salaam. Contact has also been established with the BRALUP/Centre for Development Research (Copenhagen) research project: BRALUP/CDR Social-Economic Water Master Plan Study; Iringa, Mbeya, Ruvuma. (Enclosure 8)

Contacts with the donors in the regions to be studied

Mwanza region: Sweden

Contact has been made with SIDA offices in Stockholm and Dar es Salaam. Need for such an evaluation study has been made quite clear and support promised. Ingvar Andersson is currently a member of a consultancy team undertaking an implementation study of the Water Master Plan for Mwanza region.

Shinyanga: Holland

During Ingvar Andersson's visit to Dar es Salaam in December 1980 the Dutch aid agency was contacted at the Dutch Embassy. Great interest was expressed in the project and support offered. The Dutch are hopeful that even further studies can be carried out, especially studies of shallow-well schemes covering the organization of operation and maintenance.

Singida: Australia

Contact has been established with the Australian aid agency ADAB (Australian Development Assistance Bureau) through correspondence. (Enclosure 9) A copy of the project description sent to Australia was forwarded to ADAB's office in Dar es Salaam. Ingvar Andersson given the opportunity to discuss the project with ADAB's representatives in Dar es Salaam in December 1980. The urgency of the need for evaluation was pointed out by ADAB and all possible support promised in connection with the project's activities in Singida region.

Kilimanjaro: Japan

No attempt has been made to contact the Japanese since Ingvar Andersson has personal experience of this region and good contacts are still maintained with MAJI and villages in this region.

4.3. Literature studies

The inventory of material available on the development of water supplies has been continued. Relevant aspects, not always specifically related to the development of water supplies, such as public participation, hygiene, rural development, women, methodology, etc, have been studied. A provisional "working bibliography" should be produced in the spring of 1981 - primarily for the use of the research team.

4.4. Participation in the United Nations Interregional Seminar on Rural Water Supply, Uppsala, 6-16 October 1980

Ingvar Andersson represented the project at the seminar and took the opportunity to discuss the project with as many of the participants as possible, especially Richard Feachem, Ingvar Ahman, Inge Kaul (Social Affairs Officer, Department of International Economic and Social Affairs, United Nations), Carl Gösta Widstrand and Michael Ståhl. The seminar was held to mark the beginning of the International Drinking Water Supply and Sanitation Decade (1981-1990). The discussions covered many of the aspects relevant for the project. For a more detailed report see Enclosure 10.

4.5. Participation in the SIDA/VIAC Consultancy Team in Tanzania November/December 1980

Ingvar Andersson undertook to participate in the consultancy team carrying out an implementation study for the Water Master Plans in Mwanza, Mara and Kagera regions as a socio-economist. His role was to study social and economic aspects, and particularly public participation. Reports from the

study will be available in the near future. Follow-up research is to be undertaken early in 1981. During the visit to Mwanza region good opportunity was given to study the progress of the development of water supplies there and to select schemes for study in the project. A visit to AATP (Arusha Appropriate Technology Project) in Arusha was also of value to the project. For a more detailed report see Enclosure 11.

4.6. Detailed planning of the realization of the project

Time schedule

In the initial planning of the project (as set out in the project description submitted in January 1980) the duration of the project was given as two years (from 1-7-80 to 1-7-82). Due to the delay in obtaining research clearance from Dar es Salaam and the resulting need to postpone the first fieldwork trip in Phase 1, the first 6 months of activities have involved an initiation of the project through the establishment of contacts and working out of more detailed work plans etc (as already described previously). The revised time schedule is presented below:

Phase 1: 1-1-1981 to 1-7-1981

2 fieldwork periods of 1½ months in February/March & May/June 1981

Phase 2: 1-7-1981 to 1-1-1982

3 fieldwork periods of 2 months in September/October 1981, January/February 1982 and May/June 1982.

Phase 3: 1-7-1982 to 1-1-1983

One month in Tanzania for presentation of results in November 1982 before the production of the final report in January 1983.

The extension of the project (through the production of the final report after the date first planned for) does not involve any modifications to the budget. Work will continue on the final report after the contract period has been concluded, i.e. 31-6-82. (See also Appendix 3)

Fieldwork

The original division into fieldwork periods has now been modified. Phase 1 entails two 1½ month periods (instead of one 3 month period). Phase 2 entails three 2 month periods (instead of one 9 month period). Phase 3 remains unchanged. The actual number of fieldwork periods has increased from a total of 3 to 6. However since the total number of months of fieldwork has been reduced from 13 to 10 there should not be any modifications to the budget. These changes were considered more realistic.

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DETAILS OF WATER SCHEMES CHOSEN FOR STUDY1. Kilimanjaro RegionCHANJALE WATER SUPPLY Mwanga District

Distance to district H/Q 18 km

Distance to regional H/Q 52 km

Details of the project

Villages served: Lembeni, Kisangara, Mkizingo, Mangara, Bambua

Population: design figures - people: 7.700

cattle: 3.400

present figures- people: 7.000 (1979)

cattle: unknown

Scheme serves several primary schools and 2 dispensaries.

Project completed 1973.

Source: permanent streams (2) on slope of mountain

Water quality: chemically safe, no bacterial analysis

no treatment

recommended that water be boiled before drinking

Type of scheme: gravity - distribution line total length 39km

Construction cost: estimated 867.000 T shs

actual 944.000 T shs

Finances: through Swedish aid

Length of pipeline: 39 km including 66 domestic water points, 8 cattle troughs, 7 storage tanks, at least 10 private connections, dispensary connected to pipeline.

Comments: unreliable supply due to low pressure at peak hours

Traditional sources

Unprotected shallow-wells, ponds, small streams in rainy season. There is also an old pipeline to Lembeni railway station & another to Kisangara Sisal Estate.

Improved shallow-wells

There is no known shallow-well with handpump in the area although the potential for such supply is good. A project based on low-cost technology was launched in the late 60s. Simple tube wells were drilled by hand and equipped with handpumps. The project was abandoned for unknown reasons.

2. Mwanza RegionNYAGUGE WATER SUPPLY Magu District

Distance to district H/Q	20 km
Distance to regional H/Q	52 km

Details of the project

Villages served: Nyanguge, Ng'wabuyi, Muda
 Population: design figures - people: 500
 cattle: unknown
 present figures- people: 4.300
 cattle: 2.150, goats/sheep
 goats/sheep: 1.350

The scheme serves at least one school and one dispensary.

Project completed 1955.

Source: Lake Victoria

Water quality: no analysis done
 no treatment
 clorination is recommended

Type of scheme: pumped - one pump + 15HP diesel engine
 average pumping 5 hours/day

Construction cost: estimated 101.500 T shs
 actual not known

Financed: through Government budget

The scheme has 3 domestic points, 6 standpipes, no cattletrough, 21 private connections and one storagetank.

Comments: The scheme is underdesigned and some places are too high for the storage tank to give the required delivery head. A redesign is necessary.

Traditional sources

Lake Victoria, unprotected shallow-wells, ponds

Improved shallow-wells

There are wells equipped with handpumps nearby, for example at Lugeye and Ihaya Buyaga.

3. Shinyanga Region

MASENGWA WATER SUPPLY Shinyanga District

Distance to regional H/Q (= district H/Q): 25 km

Details of the project

Villages served: Masengwa

Population: design figures - people: 2.000

cattle: not known

present figures- people: 1.255 (1975)

cattle: not known

The scheme serves no schools and no dispensaries.

Project completed: 1973

Source: Manonga River (intermittant)

infiltration through the riverbed

Water quality: no analysis done, no treatment

Type of scheme: pumped - pump + diesel engine

Construction cost: estimated - 428.000 Tshs

actual - not known

Financed: through Swedish aid

Scheme contains 5 domestic points, one storage tank on ground.

Comments: The watersource dries up every year in August-September.

Traditional sources

Hand-dug ponds in riverbed, unprotected shallow-wells in depressions, small man-made dam nearby.

Improved shallow-wells

Nearby at Ibingo and Ngwamagushi.

One shallow-well built near Masengwa on self-help basis 1971.

4. Singida Region

Project to be decided in cooperation with the Australian consultants (SMEC) and Regional Water Engineer.

The scheme will be selected from among those constructed under an Australian aid programme which commenced 1978.

Details of project

Source: groundwater from boreholes 50-100 m deep
standing waterlevel 5 - 25 m.

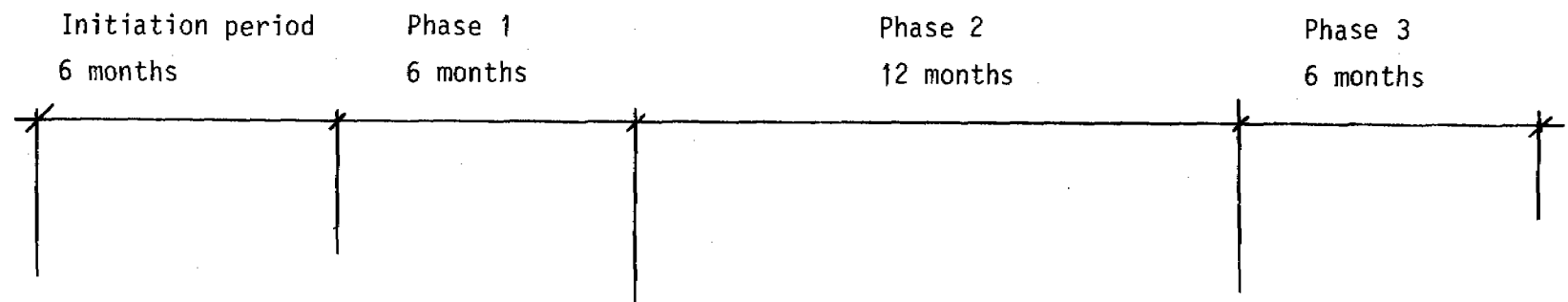
Type of scheme: Each village is provided with a small compact system consisting of a diesel-driven rotary pump and a windmill on separate boreholes in close proximity. The windmill is 12-18 m high with a fan 5-6 m in diameter. Each borehole will deliver water via a rising main to a storage tank located about 250 m from the source. Reticulation to domestic points and cattle troughs is also provided. In a later stage the storage and reticulation system can be extended.

Traditional sources

Most villages in this region obtain domestic water from unprotected shallow-wells.

Improved shallow-wells

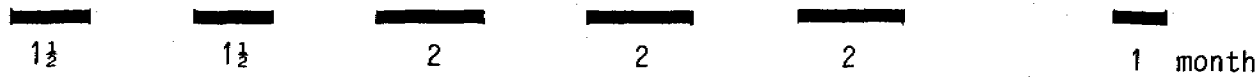
A shallow-well project has started under Australian assistance. Where technically feasible shallow-wells shall be given priority.



PRESENTATION
OF RESULTS



FIELDWORK PERIODS



DURATION OF THE PROJECT



FISCAL YEAR

