

CD/R(77)22

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77PL

EXPERIENCES IN RURAL DEVELOPMENT

Occasional Paper No. 2

**PLANNING AND DESIGN OF RURAL
DRINKING WATER PROJECTS**

**A Research Framework to Analyse Experiences
with Rural Drinking Water Schemes**

by

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September 1977

202.5-77PL-10648

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The present paper describes the research framework used in the analysis of rural drinking water projects currently under way at the Centre. A preliminary draft of the framework has been circulated and the present paper includes the remarks obtained. The author has benefitted from constructive remarks of the Development Centre staff, in particular Miss Sylviane Fresson, whose help in designing the questionnaires has been essential, and Mr. Terence Bennell, who is in charge of data collection in several countries.

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PLANNING AND DESIGN OF RURAL DRINKING WATER PROJECTS

A Research Framework to Analyze Experiences
with Rural Drinking Water Schemes

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SUMMARY

The analysis of rural drinking water projects is part of the Development Centre's research effort into rural development. In addition to being an intrinsically important subject, rural drinking water projects provide a good entry point into the study of rural development: (a) water as a basic need has certain characteristics which permit the analysis of many aspects of rural development; (b) rural water schemes are confronted with many difficulties that are characteristic of other activities in the rural area.

The paper then discusses the various types of analyses that can be executed in the field of rural water supply. Different types of impact studies are rejected. Impact studies attempt to measure all the effects of water supply and to identify causal linkages. They require complex designs and relatively long research periods. The policy results of these researches have often been relatively small. A process or implementation study is proposed for the following reasons: (a) process studies do not attempt to provide general recommendations but try to show how, and with what means, different development efforts have been executed; (b) it is believed that many relevant policy questions can be answered by analysing the ways and means used to bring water to the rural population without going into the difficult problems of impact measuring. For this reason the project will limit itself to the two following questions:

- (1) Is there clean water available and used in the village three to five years after the construction of the rural water scheme has been completed?
- (2) Why/why not is the water system working and used by the rural population?

The paper opts for a comparative analysis of rural drinking water schemes rather than for a few in-depth case studies:

- Because of the state of the knowledge we think that a comparative analysis of a larger number of rural water supplies has a greater potential to yield policy relevant information than a few in-depth case studies.
- The analytical work done so far permits the definition of an analytical framework to compare and analyse experiences with rural drinking water supply projects in a systematic way and to determine which factors have proven to be the most crucial ones for the "success" of the projects.
- It is believed that much experience is available in many organisations and agencies both at the national and international levels and that these experiences could provide valuable information that can be collected in a cost-effective way.

- Any comparative study of rural drinking water supply has to tap experiences from a variety of agencies and countries, as most agencies and countries do not have enough diversified experience in this field to undertake a valid study. The OECD should have a comparative advantage in the collection of information from various agencies and countries.

The research design is basically a hypothesis-testing design: a certain number of hypotheses are proposed and the information necessary to test the hypotheses has been identified.

The analysis requires about 30 rural drinking water projects in various less developed countries.

The information required has been divided into:

(1) The macro analysis: The macro analysis attempts to analyse the drinking water policy within the setting of national planning and problem analysis. Two questionnaires have been designed to obtain the macro information:

- socio-economic status of the country and analysis of sector priorities through expenditure analysis;
- information on rural water supply policies.

(2) The micro level analysis: The analysis of projects or programmes for supplying water to rural areas consists of two parts:

- The project level questionnaire: This questionnaire provides the necessary information for a comprehensive analysis of the project's policy and objectives.
- The village level questionnaire: This questionnaire will be filled out in several of the villages that have received an improved rural drinking water supply through the project analysed. The information in this questionnaire is divided into two categories: (i) precise information on the organisation and functioning of the hydraulic installations in each of the sample villages; (ii) more general information on the village environment.

The four questionnaires are annexed to the present report.

The plan of execution of the project foresees two phases:

- The first phase includes the elaboration of the analytical framework, its testing and revision. A trial analysis of 5-10 projects will be executed by the end of the year.

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- The second phase consists of the expansion of the analysis to a larger number of case studies. The search for more case studies is going on and several collaborative efforts are under discussion. A preliminary analysis of the projects chosen should be available by the end of 1978.

The purpose of the analytical framework described in Part II of the paper is to assure that the different analyses of past projects provide a systematic listing and measurement of variables so that (i) the variables are comparable, (ii) the proposed hypotheses can be tested, and (iii) the results can be used for guiding future policy decisions.

The proposed selection criteria for the projects to be analysed are based on practical constraints and the concern to have an overview of experiences. They are:

- The project construction was completed 3 to 5 years ago and has benefitted from no further financial assistance.
- The project is considered representative for a rural water supply project in the given country. The local or national definition for rural is accepted.
- The projects selected are representative of the various rural conditions encountered in less developed countries.
- The projects cover the various types of rural water systems that have been installed in rural areas.
- The availability of information on the origins of the project and the possibility to hire an informant who is familiar with the project concerned and who can collect the necessary field information.

The final choice and classification of projects will depend on the availability and accessibility of data and the analysis might have to be limited to a certain area or type of project.

The choice of hypotheses is based on existing analyses of rural water supply projects and programmes. The hypotheses have been ordered according to five problem areas:

- institutional problems;
 - financial problems;
 - technological problems;
 - behavioural problems;
 - training and education problems.
- } See page 24.

Thirty-nine hypotheses have been chosen. A description of these hypotheses attempts to show why the proposed hypotheses have been chosen and the considerations that have been taken into account in their formation.

The last chapter explains the choice of the variables to test the hypotheses. The choice of the hypotheses and variables has not been an easy and unambiguous task, because of the difficulty of satisfying two often irreconcilable criteria - relevance and availability. Thus many interesting variables had to be abandoned and others, intellectually less appealing, had to be introduced. The subjectivity of the selection process is recognised but we hope that the proposed indicators constitute a reasonable compromise.

PLANNING AND DESIGN OF RURAL DRINKING WATER PROJECTS

Part I Choice of Research Topic and Determination of Methodology

Chapter 1 Background Information and Origin of Project

1. Origin of the project

The project's idea is based on the experiences gained during a one-year research effort into the appraisal/evaluation of non-directly productive projects.(1) An expert meeting convened at the OECD Development Centre in October, 1975, to discuss the results of that research suggested that:

- further research should be based on case studies
- further research should concentrate on the analysis of rural development projects.

2. Research into the analysis of rural development projects

The research into the appraisal/evaluation of non-directly productive projects has shown:

(1) That the major problem in the appraisal/evaluation of non-directly productive projects is not the appraisal methodology per se, but our limited understanding of the social fabrics and their interrelationships.

(2) That the measurement problem in social fields is not due to some intrinsic factor in the social fields but to our limited understanding of the concepts.

(3) That the problem of social indicators cannot be tackled at a general level, but has to be solved differently in each concrete situation.

(4) That social services cannot be analysed in isolation, but that an integrated systematic approach has to be taken.

These tentative conclusions reached during the first phase have the following implications for research into the analysis of rural development projects:

(1) Research into appraisal methodology per se can probably contribute very little. What we need is more understanding of what is really going on in the rural areas.

(1) N. Imboden, "The Appraisal/Evaluation of Non-Directly Productive Projects", Development Centre, OECD, September 1975.

(2) Basic research into techniques of measurement is of little immediate use, as a general applicability of a technique to the large number of different situations can only be expected if the technique is so general that it provides little help for direct policy design.

(3) Without a general conceptual model for rural societies and change it is not possible to derive a generally applicable set of indicators that could be used to analyse the rural situation and to appraise/evaluate rural development projects.

(4) The analysis of one specific issue in rural development risks to be of little use, if this analysis is not seen and executed within the general framework of the rural situation.

The analysis of rural development projects implies clear options in what is considered to be beneficial and what is harmful to the society. Such an analysis also implies a search for the meaning of development, not in meaningless general terms, but in specific, down to earth, every day life situations.

Thus it becomes clear that research into the analysis of rural development projects is not an investigation into some methodologies and neutral analytical techniques, but applied research into rural development per se.

3. Rural development research

Research in rural development has come to a turning point. Exploratory and conceptual research have provided an impressive stock of knowledge. Possibilities of theory and model building have been explored. There is a general agreement that attempts at theory- and model-building are, at the present stage, premature. An impressive amount of dissemination research has been published during the last few years (Uma Lélé, H. Coombs, USAID Spring Reviews, Bradley, etc. etc.). Signs of the successful promotional activities during the last few years are the rural development policy papers edited by each major donor agency and by the emphasis given to rural development in the more recent development plans in LDCs.

Thus whether looking at rural development in general or at specific components (agricultural production, credit, extension services, health, education, housing, etc.) the following two points can be made:

- there is a general agreement on what should be done;
- there is a general confusion on how to do it.

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- (1) Uma Lele, The Design of Rural Development: Lessons from Africa, The Johns Hopkins University Press, Baltimore, 1975.
Manzoor Ahmed and Philip H. Coombs, Education for Rural Development: Case Studies for Planners, Prager Publishers, New York, 1975. Gilbert F. White, David J. Bradley, Anne U. White, Drawers of Water: Domestic Water Use in East Africa, University of Chicago Press, 1972.

This shift of concern from what to how has considerable importance for the type of research that can be undertaken. It is no longer possible to undertake general state of the art reviews or to propose general policy solutions. The problems of rural development have been clearly identified and the proposed solutions are available. The question is how to implement them in a given rural context. Thus the research on how to do it implies:

- field level research
- action related research

4. The issues in rural development and policy design

The fact that rural development has to be tackled by an integrated approach has been recognized. So called integrated rural development projects including a production component, a production support component and social services have become very fashionable. However, a simultaneous attack on all problems associated with rural development is not feasible, because of the limited resources available, nor is it probably desirable. An integrated approach to rural development does not mean to provide all the services possible and imaginable, but to provide the critical input at the time needed so as to permit the continuous development of the countryside.

Therefore, the crucial questions in rural development design are:

- What actions or set of actions is needed and when is it needed?
- How much of each action is needed and which form should it take?
- For whom is the action intended, and who can respond to it?

It is clear that the answers to these questions have to come from an analysis of the local situation and will vary in each case. Nevertheless it is plausible that certain common characteristics can be identified, not to provide standard answers, but to provide an analytical framework to analyse the rural development process.

At the current state of knowledge we lack:

- an adequate theory of the components of rural development;
- a reliable data base on the present situation in rural areas of most LDCs.

While it might be argued that we have a reasonable knowledge about what variables have to enter a theory of rural development, we know close to nothing about their relationships and the internal dynamic that sustains change and development in rural areas.

5. An analytical framework for the analysis of rural development

An analytical framework should provide the following information:

- an identification of the structural variables and their interactions;
- the participation of various groups in the development process and their interactions;
- the interactions between rural development and the general development, the linkages and leakages that exist between the various sectors;
- an identification of instrument variables and their impact on rural development;

We are still far from such an analytical framework that would permit to analyse the various rural development processes and to predict the impact of a specific manipulation of policy variables.

6. The choice of a research topic in rural development

Research into rural development has become complex and expensive for the two following reasons:

- The integrated approach to rural development requires a more comprehensive investigation than the more limited sectorial approaches taken in the past.
- The shift from what to how to do it requires a more powerful research design and extensive field research.

Thus it is necessary to delimitate the research topic in terms of scope and type of study by:

- Choosing an entry point into rural development: To assure the specificity of a research topic it is necessary to choose a specific activity as an entry point into rural development and to concentrate the analysis on the factors related to that activity. To avoid a sectoral approach it is necessary to consider the specific activity within the broader rural development context. In this research project we have chosen rural drinking water as an entry point to study rural development.

-Limiting the scope of the study: There are basically two types of analyses of rural development activities:

- (1) Impact studies: They attempt to measure the effects of rural development activities on the achievement of stated goals pursued by the society. Such studies require extensive field research, high powered measurement techniques and qualified manpower.
- (2) Process or implementation studies: Such studies are much less ambitious. Rather than attempt to show the impact of certain activities and policies they attempt to show how those activities have been executed and how they have delivered the services they are supposed to provide. While impact studies are undoubtedly more interesting, they are often not feasible. The more limited implementation studies often reveal quite a lot on the dynamic of rural development.

We have chosen this second type of study, partly because we do not have the means to execute an impact study but also because we believe that, at the present state of knowledge, process or implementation studies can provide some answers to policy questions in a cost-effective way.

Chapter 2 Rural Drinking Water as an Entry Point to Rural Development

Rural drinking water has been chosen as an entry point for various reasons:

1. The characteristics of rural drinking water

Rural drinking water has certain characteristics which permit analysis of the problems of rural development:

(1) Drinking water is a basic need: Reasonable access to safe drinking water is considered one of the basic needs; the justification of which is based on the right of the people to have reasonable access to safe water. Rural drinking water has the same definitional problems as the other basic needs: What means reasonable access and what water can be considered safe?

(2) Drinking water has strong behavioral implications: The availability of safe drinking water is not sufficient to bring about the expected health results. It is necessary that the behavior of rural populations be changed. Several studies have shown that perfectly safe drinking water at the tap is polluted at the moment of consumption (conditions of handling and of storing the water) (1). Moreover most water-related diseases are transmitted not only by polluted water but also by lack of hygienic conditions. Thus safe drinking water is only beneficial if:

-the population understands the link between health and clean water;

-the population perceives the link between hygiene and health.

(3) Attitudes toward water are defined by tradition: Because of its importance for survival the attitudes toward water are strongly anchored in tradition. Since traditions vary from region to region or, even within a region from tribe to tribe, the same action may have very different results in various settings. The need to adapt the proposed solutions to the specific setting is particularly important.

(4) Drinking water affects many aspects of rural life in a village: A change in a water supply can affect the whole village organisation. Traditional tribal allocation of water is superseded by a public water supply thus changing the power structure in the village. Women who traditionally spent much of their working day fetching water might be liberated from this task from one day to the other. New structures to operate and maintain the water system might jeopardize the traditional power balance.

(1) R. Feachem et al, "The Evaluation of Village Water Supplies in Lesotho", (forthcoming).

2. The characteristics of rural water supply projects

(1) Rural water supply as a social service: Rural water supply, like most other social services is characterised by heavy costs for recurrent expenditures and long gestation periods for the benefits to become apparent. Operation and maintenance of a rural water supply scheme is much more difficult than its construction. It is therefore necessary to analyse the financial, technical and organisational capacity of the village or the region to operate and maintain the water supply.

(2) Rural water supply schemes are characterised by a large number of relatively small and widely dispersed investments: The scattering of small investments over a large area implies organisational problems and requires efficient management. It also requires a clear definition of responsibilities between various organisational levels and a functioning communication system. Rural water supply schemes are thus ideal to study the management problems of rural development.

(3) Rural water supply schemes can provide different levels of services: Rural water supply schemes can consist of the improvement of a water point, the sinking of a well equipped by a handpump or a motor pump, or it might consist of a distributional system with a number of standpipes and house connections. It might even include the treatment of water. The benefits of each system are different and within each system there exists a relatively large choice of different technologies. The system chosen obviously should depend on the needs and the capacities of the village. This multitude of systems permits the study of which type of system is most successful for a given situation.

(4) Rural drinking water supply schemes and self-help: Very often rural water supply schemes rely on some type of local participation or self-help. There exists a wide variety of different levels of participation, from the supply of cheap labor to the decision on what level of services should be provided. The different methods of organising self-help can be studied through the analysis of rural drinking water projects.

(5) Rural drinking water schemes require a selection strategy: The large majority of developing countries are far from providing "reasonable access to safe water" to all the rural population. It is thus necessary to define criteria to identify the villages that should receive a water supply. Many different strategies exist for choosing the beneficiaries: worst first strategy, health/access criteria, cost criteria, capacity to pay, willingness to pay, growth centre strategy, etc. The analysis of rural drinking water permits analysis of these strategies.

(6) Rural drinking water schemes have to be integrated: Rural drinking water projects are supposed to have a number of social, economic and developmental benefits. However none of these benefits have statistically been proven. A number of case studies exist that prove/disprove the occurrence of those benefits in rural drinking water projects. The only tentative conclusion that can be drawn is that the expected benefits do not occur automatically or necessarily from an investment in rural water supplies. While adequate water might be a necessary condition for the occurrence of the expected benefits, it is certainly not a sufficient condition. Because of this interrelationship of rural drinking water supply with the other sectors, it should prove to be a good entry point to study rural development.

Chapter 3 The Analysis of Rural Drinking Water Schemes:
Project Rationale

Rural drinking water supply has been chosen not only because it is a good entry point to the problems of rural development but also because of its own importance.

1. The definition of the problem

(1) Rural water supply situation: According to a WHO survey only 14% of the rural world population had reasonable access to safe water in 1970(1). This means that in 1970, 1076 million people in rural areas (i.e. one-third of the total world population) did not enjoy reasonable access to safe water.

According to a WHO Mid-Decade Progress Report "there has been an increase not only in the gross numbers of people provided with water supply and excreta disposal facilities over the five year period 1971-1975, but also in the percentage of the urban and rural populations served. In other words, progress in the provision of these services has more than kept pace with population growth in the urban and rural sectors."(2) According to the same report, the rural people enjoying adequate water supply has passed from 180 million (1970) to 310 million people (1975) or from 14% (1970) to 22% (1975) of the total rural population. While these figures seem over optimistic, there is no doubt that the field of rural drinking water supply has enjoyed an increased popularity during the last five years.

(2) The investment goals: The UNDD has called for the extension of drinking water supplies to 25% of the rural population by 1980. The WHO mid-decade review has proposed new regional targets that amount to a derived global target of 36% to be achieved by 1980. "The estimated cost at 1975 price levels to achieve these rural water supply targets is estimated at around \$6,500 million or approximately \$0.82 per capita per year for the estimated 1980 rural population of the developing countries."(3)

(1) WHO, World Health Statistics Report, 1973, Vol.26, No.11, pp.720-783.

(2) WHO, report by the Director-General, Community Water Supply and Waste Water Disposal, mid-decade progress report, 6th May 1976.

(3) ibid., p.5.

(3) The justification of rural water supply projects:
The expected benefits of rural water supply projects are normally assumed to be:

- public health benefits
- productivity benefits
- slowing rural-urban migration
- income redistribution effects
- rural institution building
- motivation for problem solving
- fire protection

There is considerable disagreement about the causal relationship between those benefits and rural drinking water supply and none of the benefits has been statistically proven to occur (see above).

However, more and more often rural drinking water projects are no more justified by their impact on specific goals but simply by their assumed impact on the living conditions of the poorest and on their capacity to participate in their country's development. Rural drinking water supply is based on the right of people to have reasonable access to safe water, however this might be defined.

Thus, within the new philosophy of development putting emphasis on the satisfaction of basic needs of the rural population, it is often argued that rural drinking water projects do not need any justification. It is therefore not unreasonable to state that investments in rural drinking water schemes will be substantial and increasing over the coming years, despite the fact that the expected results of rural drinking water projects have not been scientifically verified (and probably will not be in the near future).

(4) Investment criteria: Some very good analyses of rural drinking water investments are available and the variables and parameters that have to be taken into account have been identified.⁽¹⁾ Recent policy papers in rural water supply clearly indicate what should be done and no further research is required to determine what to do. However knowing what to do is one thing, knowing how to implement the recommendations is another question. Thus while everybody agrees that local participation is essential for the success of rural drinking water, there is considerable disagreement about how to bring about this local participation. While everybody agrees that rural drinking water should be seen within an integrated framework, there is considerable disagreement of the relative role of rural drinking water compared to the other sectors. The problem in the design of rural drinking water projects thus is not what to do, but what type of institutional, financial, technological, behavioral, and educational arrangements permit implementation of the proposed recommendations.

(1) See earlier references and: Saunders, Robert J. and Warford, Jeremy, Village Water Supply: Economics and Policy in the Developing World, Johns Hopkins University Press, Baltimore, 1973. Dennis Warner, Evaluation of the Development Impact of Rural Water Supply Projects in East African Villages, Stanford University, December 1973. I.D. Carruthers, Impact and Economics of Community Water Supply: A Study of Rural Water Investment in Kenya, Wye College, University of London, 1973.

2. Research purpose and expected results

The purpose of the research project is to use the lessons that can be drawn from the analysis of the experiences of past rural drinking water projects to improve the design and appraisal of future village water supply systems.

The outcome of the research will be a set of guidelines to identify and appraise rural drinking water projects based on a number of variables that have proved to be of critical importance in the implementation of rural drinking water schemes. The rural drinking water projects will be seen within the framework of overall rural development. It will be attempted to see how drinking water relates to other basic needs and at what level of development rural drinking water supply systems respond to a perceived need, and can be sustained financially by the community of the country.

Chapter 4 Research Framework

1. Scope of the research

(1) Impact studies: The most interesting research in rural drinking water supplies is obviously the testing of whether the hypothesized benefits are actually occurring and which variables are important for the achievement of those objectives. There are basically three types of research possible to measure the impact of rural water supply schemes:

(a) Retrospective time series studies: This type of study can be profitably undertaken where reasonably accurate base data have been recorded for some years. While at the present time several projects collect information from the inception of the project, this has not been the case in the past. There are very few rural water schemes available for which time series exist on any other aspect than physical inputs and perhaps some outputs (quantity of water produced, number of people served, number of wells sunk etc.). The scope for such studies is therefore very limited in the field of rural drinking water.

(b) Cross-sectional impact studies: They attempt to collect relevant primary data from a fixed point in time, preferably over an extended period covering all seasons. This type of study attempts to show what happened to the water, and why it had (or had not) a given impact. This was the approach taken in "Drawers of Water" and by Mr. Feachem's team in Lesotho.(1) Such studies attempt not only to determine the effects of improved water supplies, but also to investigate causal links. They require extensive and delicate surveys. They are costly and time consuming, and their risk of failure is not minimal. To cite the World Bank Expert Panel on "Measurement of the Health Benefits of Investment in Water Supply," "Cross-sectional and time series retrospective studies, in addition to suffering from the transferability problems, generally cannot be expected to provide data which are of sufficient reliability to allow the isolation of any specific causal relationship between water supply and health."(2)

(c) Long-term longitudinal studies of health impact: These studies are considered as the most conclusive means of attempting to measure all the effects of water supplies and

(1) Gilbert White et al., op.cit. R. Feachem et al., op.cit.

(2) "Measurement of the Health Benefits of Investments in Water Supply", report of an Expert Panel to the IBRD, 5th-7th May, 1975, (not published).

to identify causal linkages. They have to be set up at the beginning of a rural water supply scheme and they require an experimental or quasi-experimental design and periodic surveys. To our knowledge there is at present only one major longitudinal study proposed: the Minas Gerais study in Brazil and financing has not yet been secured.

As can be seen all impact studies are very demanding in terms of time, money and skilled manpower. Their chances of success are uncertain. It is questionable whether one can single out and isolate the relationship "water-proposed benefits" and abstract or neutralize all the intervening variables that necessarily affect these relationships. In view of the length of time involved to prove these relationships, it is not desirable and probably politically not feasible to keep the control region unchanged. (A typical example is the Zaina Scheme in Kenya, where between the baseline survey and the repetition of the survey the control group also had received an improved rural drinking water supply.)(1) Moreover the theoretical link "water-benefits" (i.e. all other factors remaining unchanged) is of little interest to policy making. What a policy maker is interested in knowing is which feasible mix of variables is producing the greatest possible benefit.

(2) Process or implementation studies: This type of study is much less ambitious than the impact studies. They do not attempt to measure the impact of a rural drinking water project but limit themselves to the analysis of the problems encountered in the implementation of rural drinking water schemes. Rather than attempt to analyse the effects of an improved rural water supply these studies try to show which institutions and technical arrangements combined with a given specific human and physical environment have the greatest chance of providing continuously clean water to the rural populations.

We have opted for this type of study for the following reasons:

-It does not attempt to provide general recommendations but tries to show how and with what means different development strategies have been executed.

-The purpose of rural drinking water supply projects is obviously not the output i.e. the supply of the water. Nevertheless it is useless to discuss the question of impact as long as the output cannot be assured. This seems unfortunately to be the case in many rural water supply projects. From our own experience and from the literature research, it seems that 35% to 50% of the water taps in rural areas are out of order three to five years after their construction. It is interesting

(1) I.D. Carruthers, op.cit., p.34.

to note that the major part of the impact studies undertaken so far conclude that the water schemes studied failed to provide reasonable access to safe water that is used by the rural population. Therefore it seems to us that the following questions need to be answered before any impact studies become worthwhile:

- (1) Is there clean water available and used in the village three to five years after the construction of the rural water scheme has been completed?
- (2) Why (why not) is the water system working and used by the rural population?

These two questions can be answered by an implementation or process evaluation design.

-Information for process and implementation evaluation is much more accessible and easier to collect. Such evaluations provide policy relevant information in a relatively cost-effective way.

-Process and implementation evaluations correspond much better to the Development Centre's capacities and means as they do not require long term field investigations.

2. Type of study

The type of study most adapted to the question of how to implement a water supply scheme is the case study. Given the resources available it is necessary to choose between a very small number of in-depth case studies or a larger number of more limited studies:

(1) A few in-depth case studies: This alternative has been rejected for the following reasons:

- Since some very good case studies already exist, the benefits of one or two more would probably not contribute very much to what we already know.
- Any in-depth study requires measurements in the field over a certain period to cover seasonal differences. The Development Centre has no special comparative advantage to undertake such studies.
- Case studies always suffer from transferability problems.
- Because of the state of the knowledge we think that a comparative analysis of a larger number of rural water supplies has a greater potential to yield policy relevant information than a few in-depth case studies.

(2) A comparative analysis of rural drinking water schemes: This approach has been chosen for the following reasons:

- The analytical work done so far permits definition of an analytical framework to compare and analyse experiences with rural drinking water supply projects in a systematic way and to determine which factors have proven to be the most crucial ones for the "success" of the projects.
- It is believed that much experience is available in many organisations and agencies both at the national and international level and that this experience could provide some valuable information for future projects.
- To our knowledge, no systematic comparative analysis has been undertaken up to now.
- The data for the criterion of "success": "availability and use of the water from the improved water supply" can be easily collected in the field and are comparable from one project to another.(1)
- Any comparative study of rural drinking water supply has to tap experiences from a variety of agencies and countries, as most agencies and countries do not have enough experience in this field to undertake a valid study. The Centre should have a comparative advantage in the collection of information from various agencies and countries.
- The study is limited enough so that it should lead to some concrete policy implications within a reasonable amount of time.
- It is believed that the study can lead to some tentative answers to policy questions such as: What are the crucial pre-conditions for the success of a rural drinking water project? What other needs have to be fulfilled at the village before drinking water becomes an important factor, etc.?

3. Scope of study

The problems encountered in many rural drinking water projects are believed to be due to the sectoral approach taken: the rural drinking water schemes should be considered within a global concept of rural development of which water supply is only a part.

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- (1) It is not pretended that the "success" criterion chosen provides information on the benefit of the rural water supply. The only thing that the criterion shows is that a necessary, but not sufficient, pre-condition for the potential benefits of an improved water supply is fulfilled.

The research project identifies variables that are currently supposed to be important for the success of water supply schemes. The research design includes variables directly linked to the execution of the project (organisation, technology, financing, availability of alternative water sources) but also indicators about the environment (needs, capacities and response) at the local level, such as to determine how the water project is inserted into the larger picture of needs and aspirations at the local, regional and national level. These variables will be related to the degree of "success" of the projects analysed so as to determine the importance of the various variables.

Chapter 5 Research Design, Methodology and Plan

1. Research design and methodology

The research started with a comprehensive review of the literature to determine the variables commonly considered to be important for the success of rural drinking water projects. A desk review of reports on rural drinking water projects and a review of sector analyses were undertaken to identify the indicators to be used to test the hypothesis.

A detailed research framework including the hypothesis, the information to be gathered, the way to gather it and how to assure comparability of the data had been circulated to the collaborating agencies. The revised research framework is detailed in Part II of this paper.

The research design is basically a hypothesis testing design: a certain number of hypotheses are proposed and the information necessary to prove/disprove the hypotheses has been identified. The variables necessary to test the hypotheses then will be related to the degree of "success" of the analysed projects so as to determine the variables that are most closely related to the success of rural drinking water projects.

2. Information requirements and means of collection

The analytical framework described in Part II identifies the information required.

The analysis requires about 30 rural drinking water projects in various less-developed countries. The success criterion chosen, "Availability and use of improved rural water supply in the village 3 to 5 years after the completion of the water supply construction," requires that the projects included in the analysis have been functioning for at least three years and not longer than 5 years.

The information required has been divided into:

- the macro analysis
- the micro analysis

(1) The macro analysis: The macro analysis attempts to analyse the drinking water sector policies within the setting of national planning and problem analysis. The goals of this analysis are:

- to provide information on water sector policies and its relation to other sectors
- to compare various water policies currently implemented in the different countries and to identify possible relationships between levels of development and water policies.

- to provide the information on the macro setting of the rural water supply projects that will be analysed at the micro level.

The information required at the macro level has been divided into two questionnaires:

- socioeconomic status of the country and analysis of sector priorities through expenditure analysis (1)
- Information on rural water supply policies.

(2) The micro level analysis: The analysis of projects (or programmes) for supplying water to rural areas consists of two parts:

- the project level questionnaire: This questionnaire provides the necessary information for a comprehensive analysis of the project and in particular its organisation, its technology and the selection criteria i.e. the policy followed by the project.
- the village level questionnaire: This questionnaire will be filled out in several of the villages that have received an improved rural drinking water supply through the project analysed. The villages will be selected in terms of their representativeness with regard to all the villages in which the project (or programme) has constructed water systems. The information in this questionnaire is divided into two categories: (1) Precise information on the organisation and functioning of the hydraulic installations in each of the sample villages. (2) More general information on the village environment. This information will, by definition, be more approximate.

3. Plan of execution

The study limits itself to foreign financed projects. Despite the bias of such a project selection, the limitation to donor-financed rural drinking water projects has been accepted reluctantly for the following reasons:

- it was expected that donor countries would be interested in such a study
- that the OECD Development Centre was well placed to obtain the necessary collaboration from the donor agencies
- that foreign-financed projects are better documented than other projects
- that we would get the active support of the donor agency to execute the data collection effort.

(1) This questionnaire is currently not used, as it is not necessary to have this information for the project analysis.

(1) The initial plan of information collection: The initial plan was to obtain quite a substantial collaboration of the aid agencies for the collection of information at the project and village level. The project selection criteria had been drawn up to limit as much as possible the effort required from each agency.

The study was based on the following hypotheses:

- that relevant experiences exist in the aid agencies and that untapped information on those experiences is available or readily accessible.
- that aid agencies are willing to collect the information on their experiences and to provide this information to the Development Centre.

It was foreseen that the Development Centre would act as a catalyst for the evaluation by providing an analytical framework to analyse the experiences and by co-ordinating the information gathering. It was supposed that the Development Centre's initiative would trigger off an internal evaluation effort within the various aid agencies that are involved in rural drinking water projects.

We had several good reasons to believe that those hypotheses were reasonable:

- The Ad-Hoc Working Group on Rural Water Supply, which comprises the major donor agencies had officially stated that the review of past experiences was the first step to improve the design of future projects.
- The donor agencies are aware of the difficulties most present rural drinking water supply projects are experiencing and are eager to improve their designs of those projects.
- No individual agency has had sufficient experience in rural drinking water projects on its own to draw conclusive evidence on those experiences. It therefore seemed reasonable to pool the experiences of various agencies into one study.
- Aid agencies are eager and willing to increase their contribution in the field of rural drinking water supply.

These hypotheses proved not to be true:

-Relevant experiences do exist. However, there exists very little information on those experiences, even within the agencies that have been executing the projects. Moreover, the information that exists is not relevant to the questions that are nowadays in the forefront: technical specifications are available, but very little information exists about investment criteria, organisational aspects and the environment.

-Aid agencies were not able to collaborate to the extent required. The reasons for this situation are the following:

- Some aid agencies that were keen on the study did not have rural drinking water projects that had been in operation for 3 to 5 years.
- The scrutiny of agency files for projects in which the aid agency has not been involved for 3 to 5 years is a much more complicated and time consuming task than we had imagined. To execute that job seriously the aid agencies required additional staff that sometimes was not forthcoming.
- The scrutiny of the files yielded much less information than we hoped for. The absence of relevant information in the files forced us to expand the field level investigation which requires a greater involvement (financially and in terms of manpower) of the collaborating agencies.
- The expanded field level investigation could no longer be executed by aid agency staff available in the field. To set up a field level investigation requires an organisation and means the collaborating agencies were not able to muster within the time frame foreseen.

The results of this situation are the following:

- There are fewer case studies available than initially anticipated.
- The Centre's involvement in the specific case studies had to be greater than initially anticipated and therefore only the most promising projects could be followed.
- The time lapse between the identification of a case study and the collection of data is far beyond what we imagined.

For these reasons we will have, at the end of the year 1977, about 10 projects on which we have a response to our questionnaires. It is clear that the questionnaires will have to be checked and that certain additional information will have to be required from the field. It is thus not possible to execute a conclusive analysis on the basis of the information at hand.

(2) The revised plan of execution: In view of the experiences so far the study has been divided into two phases:-

-First phase: Elaboration and testing of the proposed framework: Our effort is concentrated on a few case studies and it is attempted to get as much information as possible. The pilot case studies have the following advantages:

- The concentration on a few case studies will permit a more efficient completion of the first phase (the presentation of a tested, methodological framework for the analysis of rural water supply programmes) than would an half-hearted analysis of a non-significant number of projects.
- The case studies, proving the feasibility of our approach, would permit us to secure the collaboration of those agencies which have doubted the feasibility of the approach.
- The execution of the study in a few pilot countries will allow improvement of the analytical framework.

The results of the first phase will be available at the beginning of 1978.

-Second phase: Expansion of the analysis to a larger number of case studies: The search for more case studies is going on and several collaborative efforts are under discussion. The search for projects that can be analysed will be more successful for the following reasons:

- The project starts with a tested and proven framework.
- Some new contacts which look promising but which could not be exploited within the present time frame will now be available, e.g. Latin America.
- Some contacts, who did not believe in the feasibility of our approach and who requested a test of the framework, will reconsider their attitude on the basis of the case studies;
- Some organisations that were willing to collaborate (e.g. UNICEF) but did not have the means to collect the information will be able to participate in the study as the level of involvement asked will be lower.
- The approach to data collection will take into account the experiences of the first phase: the Centre will take a much more direct part in the collection of the information.

The preliminary analysis of the projects should be available by the end of 1978.

PART II THE ANALYTICAL FRAMEWORK FOR REVIEWING
EXPERIENCES WITH RURAL DRINKING WATER PROJECTS

Chapter 1 Description of Framework

1. Purpose of the analytical framework

The purpose of the analytical framework is to assure that the different analyses of past projects provide a systematic listing and measurement of variables so that:

- the variables are comparable
- the proposed hypotheses can be validated or invalidated
- the results can be used for guiding future policy decisions and further research

The outcome and the validity of conclusions that can be drawn from the study depend on:

- the choice of projects analysed
- the hypotheses listed
- the means used to test the hypotheses

2. The selection of projects to be analysed

No attempt will be made to have any representative sample of past drinking water projects. Therefore it will not be possible to estimate the sample error or confidence interval for the representativeness of the projects chosen compared to total experience with water projects in rural areas of LDCs. However it will be attempted to choose projects for which we have no reason to believe that they are unrepresentative.

The final choice and classification of projects will depend on the availability and accessibility of data and the analysis might have to be limited to a certain area or type of project.

(1) Selection criteria: The criteria for the selection of projects are:

- The project construction was completed 3 to 5 years ago and has benefited from no further external assistance.
- The project is considered representative for a rural water supply project in the given country. The local or national definition of rural is accepted.

-The projects selected are representative of the various rural conditions encountered in less-developed countries.

-The projects cover the various types of rural water systems that have been installed in rural areas.

-The geographical and climatic distribution of projects will be taken into account.

-The availability of information on the origins of the project and the possibility to hire an informant who is familiar with the project concerned and who can collect the necessary field information.

(2) Classification of projects: The various hypotheses will be tested using all projects and various subgroupings such as:

- type of water scheme: -handpumps
 -public hydrants
 -piped single tap houseconnections

- type of water source: -surface
 -groundwater pumped
 -groundwater gravity
 -rain collection

- type of settlement: -dispersed: arid
 semi-arid
 humid
 -nucleated: arid
 semi-arid
 humid

(3) Number of projects to be analysed: The experiences so far have shown that the dropout rate of projects during the study is relatively high. Many projects had to be discarded for various reasons (unrepresentativeness, lack of information, impossibility to organise field level investigation, etc.). The initial list of potential projects has to be relatively high. During the execution of the study, it is attempted to group the projects. During Phase I only projects in Africa had been selected, and work in a new area is only started if we have good reason to believe that an acceptable number of projects in the region will be available. It is hoped to base the analysis on a sample of some 30 projects. If this number of projects cannot be achieved, some limitations (by geographical region or by type of project) will have to be made to assure the meaningfulness of the analysis. Any subgroup that contains less than ten projects will not be analysed separately.

3. The choice of hypotheses

The various existing analyses of rural drinking water projects permit the identification of the variables which are considered to be important for the success of rural drinking water projects. The desk review has revealed the following problems:

-Institutional problems: They include on the macro level the definition of a water supply policy, the lack of national coordinating agency and at the local level, the lack of representative institutions that can execute and maintain the water systems.

-Financial problems: The financial problems are due to the low ability to pay of the villages and to the difficulties of mobilising the local resources.

-Technological problems: The technological problems are due to the short operation life that equipment often has, the use of inappropriate technology and the difficulties of providing the spare parts necessary in maintenance work.

-Behavioural problems: The necessity of clean water is often not perceived by the local population.

-Training and education problems: Training needs do not limit themselves to the maintenance of water installations but extend to the use of the water and the disposal of waste water.

The elaboration of the research project thus proceeded in the following stages:

-Formulation of specific hypotheses based on the analyses available.

-Definition of concepts within the hypotheses: explanation of terms and selection of measures to test the hypotheses.

The hypotheses proposed are classified in the following way:

-institutional and organisational questions

-environment, alternative formats and strategies of investment

-administration and training

-technology, costs and pricing.

4. The measurement of the degree of failure/success of the projects

The reasons for choosing an output indicator as a measure of success have been given earlier. It was attempted to have success measurements that are directly observable or easily obtainable and verifiable. The following indicators are proposed:

- number of customers served
- % of water supply facilities actually working
- number of breakdowns and duration of breakdown during the last year
- nature and extent of use of the facilities.

5. Data collection

The information requirements have been divided into three parts. For each part a questionnaire has been worked out. (see annexes)

-Information on rural water supply policies: It is attempted to collect this information by a desk review. National Plans, WHO publications, water sector studies, and annual reports of the various water departments concerned are the major sources.

The questionnaire will then be verified and, if necessary, completed in the country.

-Information at the project level: The questionnaire is addressed to the people who are/have been in charge of the execution of the project. The data collection effort includes a scrutiny of the files, the progress reports and the initial request. The information will be completed by interviews of the personnel in charge of the project at the national and regional level.

-Information at the village level: This information will be collected by an informant in the villages. The data-collection effort includes:

- interviews with the leaders in the village
- collective interviews with the population
- direct observation
- interviews of the agents of the various Government services represented in the village (nurses, agricultural extension officer, teacher etc.)

Chapter 2 Description of Hypotheses

The description of the hypotheses attempts to show why the proposed hypotheses have been chosen and the considerations that have been taken into account in their formation.

1. Institutional and organisational problems

(1) Analysis of the problem: Institutional and organisational problems rank high in most assessments of constraints in construction of community water supply systems. The hypotheses proposed attempt to capture the more important institutional and organisational aspects at two levels:

(A) The national level: For the continuous functioning and expansion of a water supply system it is necessary that the programme fits into the national priorities and development planning. The integration of rural drinking water into the national plan is important:

-to assure the necessary funding of the programme and the allocation of other scarce resources such as qualified manpower, policy analysis, etc.

-to assure that rural drinking water supply is part of a general development strategy and can thus receive and provide the necessary support from other investments.

-to assure that rural drinking water investments are problem oriented and that their contribution to the solution of the problems can be demonstrated and thus allow obtaining the necessary political support for its continuation and expansion.

Analyses of past experiences with rural drinking water projects have shown that the organisational structure of the programmes influence its capacity to provide the intended services and to maintain the systems in an efficient way. The organisational structure is important for the following reasons:

-rural drinking water supply programmes consist of a large number of relatively small schemes scattered all over the country. Coordination of activities is therefore difficult and important to avoid mismanagement;

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- (10) "World Health Statistics Report," Vol. 26, No. 11, 1973, Table 11, pp. 756-759.
"Assessment of Environmental Sanitation and Rural Water Supply assisted by UNICEF and WHO" (1959-1968) p.6.
"Progress in the Rural Water Programs of Latin America" 1961-71, PAHO/WHO, January, 1973, pp. 24-27.

-the costs of the systems can be significantly influenced by standard designs and material and the economics of scale for particular services are important;

-even relatively simple rural systems require an organisational and technical backstopping that has to be organised at the local/regional and national level (supply of spare parts, technical controls, flow of funds, etc.)

(B) The local level: Past experiences with rural drinking water schemes have shown that the systems cannot rely on external (non-local) services and funds for their proper functioning and that the involvement of the local population is important for the success of the projects. The local participation is important for:

-reducing the construction cost of the systems (local labour participation and cash contributions);

-assuring proper maintenance and use of the system;

-mobilizing the local capacity to pay and for the collection of fees;

-assuring that the investment is a priority and that the level of services corresponds to the needs and capacities of the local community;

The hypotheses chosen attempt to show:

-what sort of local organisation has a relatively greater chance of success;

-what level of involvement of the local population is desirable to assure success of the project;

which factors influence the possibilities and willingness of the local people to participate in the project.

(2) Proposed institutional and organisational hypotheses

(A) Macro level:

hyp. 1: National political support and consciousness of water problems is important for the success of projects.

hyp. 2: The recognition of water-related diseases as a priority concern is important for the success of rural drinking water projects.

hyp. 3: A functioning national/regional/local organisational system facilitates the execution of water schemes.

hyp. 4: One agency in charge of all water projects influences the success rate of water schemes.

hyp. 5: Community development projects within one party systems are more successful than community development projects within multi-party systems.

(B) Micro level and local participation:

hyp. 1: A water committee and strong local authority facilitate the execution of water projects.

hyp. 2: A local water board is necessary for the maintenance and operation of the system.

hyp. 3: Projects for which the initiative has come from the village have a greater chance of success.

hyp. 4: Projects in which people decided the level of services have greater chances of success.

hyp. 5: An incremental change in water quality and supply has greater success than a radical change.

hyp. 6: Water schemes in villages with relatively homogeneous population have a greater chance of success.

hyp. 7: The value given to water by local population influences the chances of success of a project.

hyp. 8: Community involvement in water supply has greater success where direct precedences of community owned property exist.

2. Environment, alternative formats and strategies of investment

(1) Analysis of problem

(A) Economic and social environment: To assure that the rural water system is maintained and used it is necessary that the rural population has an understanding of the value and working of the system. This is only possible if the investment is adapted to the village situation and corresponds to the population's priority. Therefore, it is necessary that the system is adapted to the needs of the people (hyp. 1,2) and to the capacities of the village community (hyp. 3,4).

(B) Alternative formats for water investments: There are two basic approaches to rural water investments: as part of a national programme or as part of an integrated rural development project. The importance of these two approaches for project success are tested in hyp. 5 and 6.

Various reports on rural water supply projects stress the necessity of including sanitary education and training components into any rural water investment programme. The importance of this factor is tested in hyp. 7 and 8.

(C) Investment strategies: There exist four basic strategies to choose the villages in a rural water supply program. It is expected that these strategies have different effects on the success of the project (hyp. 8-11).

It is understood that the strategies are not chosen for efficiency reasons, but out of political and social considerations. It is nevertheless important to examine the influence of the various strategies on the operational success of the projects and to identify the possible policy implications (additional investments required, use of other instruments to achieve social and political objectives, etc.), if it is for instance shown that projects executed under a worst-first strategy have clearly less of a chance to be "successful" than projects executed under a growth-point strategy.

(2) Preliminary list of proposed hypotheses

(A) Social and economic environment

hyp. 1: Projects where alternative water sources have a high perceived opportunity cost have a better chance of success.

hyp. 2: Projects in villages where other basic needs are already satisfied have higher chances of success.

hyp. 3: The capacity of the village (resources, commercial, technical and political, institutional capacities) has a significant influence on rate of success of water projects.

(B) Alternative formats for water investments

hyp. 4: Projects that are part of a national or regional water supply development programme have a greater chance of success.

hyp. 5: Projects that are part of a multisectoral project have a greater chance of success.

hyp. 6: Sanitary education increases chances of success of a project.

hyp. 7: Programmes which include a training component have a greater chance of success.

(C) Strategies for investment

hyp. 8: Villages chosen according to a growth point strategy have greater chance of success.

hyp. 9: Villages chosen according to a worst-first strategy have no less chances of success.

hyp. 10: Villages chosen according to perceived and expressed needs have greater chance of success.

hyp. 11: Villages chosen according to a maximising strategy for a given investment have higher rates of success (clustering + costs).

3. Administration and training

(1) Analysis of the problems: The questions that seem to be the most important in this problem area relate to:

-how can technical support be administered (hyp. 1,2 and 3) including the questions of servicing at the village level, from the outside or the combination of the two.

-what are the manpower and skill requirements (hyp.4-8). It is attempted to analyse whether it is the number of staff (hyp.4), their qualifications (hyp.5), or the various combinations of skill level (hyp. 6) that influence most the operational success of the project. Hyp. 7 attempts to test the efficiency of on the job training while hyp. 8 tests whether it can be reasonably assumed that training programmes will provide the required manpower for rural water supply or whether the staff once trained will leave the rural water sector.

(2) Proposed hypotheses in training and administration

hyp. 1: Projects having organised outside technical support have a better chance of success.

hyp. 2: A bonus incentive system increases the chances of success for a project.

hyp. 3: Relatively low salaries, poor living conditions and few career opportunities reduce the chances of a project's success.

hyp. 4: A combination of self-help and technical supervision increases the chances of a project's success.

hyp. 5: Number of staff/unit cost of system influences the chances of success.

hyp. 6: Different compositions of various skill levels have significant effects upon success/failure of projects.

hyp. 7: Projects having on the job, flexible training programmes have a greater success rate.

hyp. 8: The availability of training facilities and the number of trained people/1000 popl. is positively related to professional and subprofessional staff in projects.

4. Technology, costs and pricing

(1) Analysis of the problems: The problem addressed here is to know whether the adaptation of the system to a lower technological level, and to simple and cheap systems, increases the chances of success of the project or not. In particular the question of local materials (hyp. 2) and the hand-pumped - automated systems controversy (hyp. 3 and 4) and their influence on the operational success of the projects are treated.

Hyp. 5 - 9 address the question of cost recovery and financing of the systems. Hyp. 6 to 7 concern various ways of collection of fees, while hyp. 8 and 9 treat the difficult problem of capacity to pay and possibilities of subsidies. It is evident that the fact of knowing that for example the projects that cannot collect enough charges for operation and maintenance hardly ever work has very important policy implications and practically excludes the idea of foreseeing subsidies and worst-first strategies.

(2) Proposed hypotheses concerning technology, costs and pricing

hyp. 1: Low-cost, easily maintained and operated systems have a greater chance of success.

hyp. 2: Projects using local materials and skills and which use little imported material have a greater chance of success.

hyp. 3: Labour intensive, hand operated systems are preferable to capital intensive, automatic devices.

hyp. 4: Automated systems, serviced by outsiders have a higher chance of success.

hyp. 5: The lower the construction cost/head the greater the degree of success.

hyp. 6: Schemes with houseconnections recover more of the costs than schemes with public standpoints.

hyp. 7: Charges collected by a national agency have a higher collection rate than charges collected by local authorities.

hyp. 8: Charges that exceed 5% of total estimated income are difficult to collect.

hyp. 9: Systems which do not collect enough charges to cover operation and maintenance have a lower rate of success.

Chapter 3 The Choice of Indicators to Test the Hypotheses

1. Hypothesis testing

The testing of hypotheses implies the following analytical steps:

-the expression of the hypotheses in variables that can be expressed in comparable terms and which can be measured. The choice of variables to express the hypotheses is discussed in this chapter.

-the determination of an index (i.e. the choice of a common scale and the weighting of the various variables) if an hypothesis can only be expressed by using several variables. This will be done on a trial and error basis during the first phase of testing the analytical framework.

-the measurement of the degree of failure/success of the project and the determination of the relationship between success of the project and the various levels of the variables chosen.

2. The choice of the variables to test the hypotheses

The choice of the variables attempted to take into account the following criteria:

-relevance: the variables permit the validation or invalidation of the hypotheses;

-sensitivity: the measurement of the variables permits scaling of differences in the variables;

-objectivity: the variables have verifiably similar meanings to different people;

-economy: the data are available or can be collected easily.

The variables chosen have been classified in an order of increasing complexity and "fine tuning." The first variables for each hypothesis are the least sensitive in expressing the degree of fulfillment of the hypothesis, but also the most certain to be available. The subsequent variables permit a finer distinction between various degrees of fulfillment of the hypotheses, however, they might not be available for all of the projects analysed. The first phase of the project i.e. the testing of the framework will allow a limitation of the number of variables proposed by:

-eliminating the first variables for which the data collection has shown that the more interesting and more sensitive variables are available:

-eliminating the more sensitive variables for which the data collection and analysis has shown that they are either not available or that they do not contribute to improving the analysis.

It might be worthwhile to note that quite an effort has been made to choose the hypotheses and variables proposed. The choice of the hypotheses and variables has not been an easy and unambiguous task and we are fully aware that any of the variables can be criticised. The problem stemmed from the difficulty of satisfying the two criteria: relevance and availability, which often turned out to be irreconcilable. Thus many very interesting variables had to be abandoned and others, intellectually less appealing, had to be introduced. The subjectivity of the selection process has partly been eliminated by discussing the variables with many different people and we hope that the proposed indicators constitute a reasonable compromise.

3. The expression of the hypotheses in variables that can be measured and compared.

The rest of this chapter discusses the variables that will be collected to test the hypotheses chosen.

Hyp. 1: National political support and consciousness of water problems is important for the success of projects

A. Introduction: The first two indicators attempt to show whether drinking water supply is considered within a national framework or on an ad-hoc basis. The third indicator shows the relative importance of drinking water supply to other investments. The last three indicators show the degree of national planning and coordination. The indicators chosen are progressive, i.e. each indicator shows a higher degree of support and indicators 1 and 2 are a precondition for the others.

B. Indicators:

(1) Existence of a national water policy: This indicator shows the consciousness that the drinking water supply problem has to be solved in a coordinated manner and cannot be handled on an ad-hoc basis. The content and extent of the policy is irrelevant at this point, however the policy has to include the projects analysed. (Refer to Questionnaire 1, questions 15 and 16)

(2) Existence of a national water agency: This indicator is considered as the minimum organisational structure necessary if a national coordination is attempted. The degree of responsibility and the existence of several national water agencies is of no concern here, as long as the national organisation has some policy authority at the national level for the type of projects analysed in the study. (Refer to Questionnaire 1, question 23)

(3) Provision of national funds:

- % of national development budget allocated to water
 - % of national recurrent budget allocated to water
- (Refer to Questionnaire 1, question 18)

(4) Existence of targets and calculation of financial implications: The operational determination of targets indicates the degree of national planning and the comparison of indicator 3 with the financial implications of the targets will permit judgement of the degree of feasibility of the stated targets. (Refer to Questionnaire 1, question 17)

(5) Existence of investment criteria: It indicates the operational relevance of national policy and planning. The degree to which the criteria are applied is not considered here. (Refer to Questionnaire 1, question 20)

(6) Standardisation of designs & material: This information indicates a high degree of national coordination. The standardisation is not required for all water schemes, but only for the material and design used within the rural water schemes analysed. (Refer to Questionnaire 1, questions 21 and 22)

C. Sources of information:

National Plan, Water Sector Study, annual reports of water agency, annual report Ministry of Finance, project documents, project implementation reports, final project report.

Hyp. 2: The recognition of water-related diseases as a priority concern and the relative importance given to rural water supply compared to urban water supply are important for the success of rural drinking water projects

A. Introduction: Rural water projects are normally justified on the basis of their impact on health and on the general development of rural areas (social overhead). It is therefore assumed that the priority given to those two problems and the identification of the proposed link between these problems and rural water supply will influence the success of the projects. The indicators chosen attempt to show:

- the awareness of the problem and its understanding
- the priority given to the problem

B. Indicators:

(1) Existence of health sector study: This is assumed to show the awareness of the health problems and is used as a partial indicator of importance given to health problems. (Refer to Questionnaire 1, question 14)

(2) Determination of causes of diseases: This shows the degree of comprehension of health problems and the possibility of having a problem oriented policy. (Refer to Questionnaire 1, question 14)

(3) % of water-related diseases to total diseases: This indicates the importance of the problems for which water supply is supposed to be a solution. A comparison with indicator 3 of hyp. 1 shows the relation between the identified problem and the funds devoted to it. (Refer to Questionnaire 1, question 14)

(4) Provision of national funds for health:

-% of national budget going to health (Refer to Questionnaire 1, questions 10 and 13).

This indicator shows the relative importance given to health compared to other priority areas.

(5) % of total water investment that goes into rural areas: This shows the relative importance given to rural water supply in relation to total water supply investments. (Refer to Questionnaire 1, question 13)

(6) Investment/capita in rural and investment/capita in urban water supplies: This adjusts indicator for population distribution. (Refer to Questionnaire 1, questions 4 and 13)

C. Sources of information:

Ministry of Health: annual reports, health sector study, project document, annual implementation reports; National Plan, Ministry of Finance, annual report, etc.

Hyp. 3: A functioning national/regional/local organisational system and clear lines of responsibility and decision-making power facilitate the execution of water schemes:

A. Introduction: Rural water supply implies a multitude of small scale schemes. For reasons of efficiency (economies of scale) different activities and decisions are best taken at different levels. It is therefore not unreasonable to assume that the existence/non-existence of a functioning hierarchical organisation of the service has an influence on the success of rural drinking water projects.

B. Indicators:

(1) Different levels in the organisation of the rural water service: (Refer to Questionnaire 1, question 24)

(2) Number of schemes served by each organisational level and area covered: This indicator should relate the organisational complexity to the size and dispersion of the programme. (Refer to Questionnaire 1, question 24)

(3) Functional differentiation of tasks at different levels: A repartition of the tasks according to their complexity indicates a national organisational set up. (Refer to Questionnaire 1, questions 24 and 25)

(4) National/regional guidelines at regional/local level: The knowledge/implementation of those guidelines at the regional/local level indicate the existence of a functioning communication system. (Refer to Questionnaire 2, questions 10 and 23)

(5) Information on local/regional programmes or activities at the national level: This indicates that the information flow is two way. (Refer to Questionnaire 2, questions 10 and 11)

(6) Existence of regional reunions of local water and/or national seminars of regional water authorities: This expresses the integration of activities at different levels. (Refer to Questionnaire 2, question 18)

(7) Clear authority & responsibility patterns at each level concerning:

- selection of schemes (Refer to Questionnaire 2, questions 14 and 17)
- construction work (Refer to Questionnaire 2, questions 15, 16, and 18)
- maintenance & operation (Refer to Questionnaire 2, questions 19 and 20)
- financial operations (Refer to Questionnaire 2, question 21)

Note: All the indicators chosen concern the organisational set up. The impact of the set up on the projects (number of visits by regional authority, distance from nearest warehouse, etc.) will be tested at the micro project level analysis.

C. Sources of information:

Ministry in charge of water programme; Water Master Plan, project files, sector study, organigrams, etc.

Hyp. 4: One agency in charge of all water projects influences the success rate of water schemes:

This hypothesis can be directly observed and therefore needs no indicators. The hypothesis has been included because the multitude of independent water authorities has often been mentioned as one of the major constraints for management of water schemes. (Refer to Questionnaire 1, questions 23 and 24)

The following stages of integration can be identified:

- multitude of authorities with responsibility limited to some area or specific projects;
- one authority for each different type of water scheme;
- one authority for urban water supplies and several for rural water supplies;
- one authority for urban and one for rural water supply;
- one authority for urban and rural water supplies with different departments.

Hyp. 5: Community development projects within one party systems are more successful than community development projects within multiparty systems:

It is assumed that the political organisation of the country has an influence on the success of community water development schemes.

The hypothesis can be directly observed.

Hyp. 6: A water committee and strong local authority facilitate the execution of water projects:

A. Introduction: A water committee and a strong authority is considered important for the construction of the water system and necessary to guarantee popular involvement in the project. Moreover, the existence of a local authority seems to be important for the organisation and execution of self-help schemes.

B. Indicators:

(1) Existence and activity of a water committee: (Refer to Questionnaire 2, questions 41 and 42 and Questionnaire 3, questions 10 and 11)

(2) Composition of water committee: This will indicate the authority of the committee (participation of local leaders) and the participation of the population (representation of various groupings). Refer to Questionnaire 2, question 43 and Questionnaire 3, question 12)

(3) Responsibilities of the committee: Indicators of the authority of the committee will be its involvement in:

- choice of level of service of water system;
- input into design specification;
- responsibility for organisation of self-help labour;
- responsibility for collection of local contribution to construction costs.

(Refer to Questionnaire 2, question 44)

(4) Contribution of m/m labour per population: This is an indicator of the effective authority the committee has on the population and its power of mobilisation. (Refer to Questionnaire 2, questions 53 and 58, and Questionnaire 3, questions 25, 26, 28, and 29)

(5) Months of delays and number of disputes due to local labour participation: This indicates the authority and ability of the local committee to mobilise and organise communal work. (Refer to Questionnaire 2, question 49)

(6) Local contribution/capita to the cost of construction: This indicator will have to be related to the capacity to pay (see below) to judge the ability of the local committee to mobilise savings. (Refer to Questionnaire 3, questions 25 and 26)

C. Sources of information:

Project reports, guidelines, local and regional authorities.

Hyp. 7: A local water board is necessary for the maintenance and operation of the system

A. Introduction: The local water board is normally created once the system is constructed. It normally differs in its composition (only local population) and its attributes from the water committee. While the water committee's main task is mobilisation, the board's responsibility is management.

B. Indicators:

(1) Existence & activity of water board: (Refer to Questionnaire 2, questions 45 and 46, and Questionnaire 3, questions 16 and 17)

(2) The composition of the water board: (Refer to questionnaire 2, question 47, and Questionnaire 3, question 18)

(3) Responsibilities of water board:

- financial: collection of fees, determination of rates
- management of system: operation & maintenance, upgrading of service and extension of system.

(Refer to Questionnaire 2, question 48, and Questionnaire 3, question 19 and 20)

(4) % of water dues collected: This indicates the authority of water board and its ability to influence the setting of the water rate at a level that can be collected. (Refer to Questionnaire 2, question 61 and Questionnaire 3, question 32)

C. Sources of information:

Annual reports of rural water supply agency at local or regional level; final project report; local authorities; sanitary engineers.

Hyp. 8: Projects for which the initiative has come from the village have a greater chance of success:

The reasoning behind this hypothesis is:

-that local initiative means that the investment into a rural water supply corresponds to a perceived priority need;

-that a water scheme that responds to a priority need has a greater chance of success;

Village initiative can be categorised into:

-request by development officer (health auxiliary, agricultural extension officers, etc., teachers) living in village but not part of local community;

-request by local leader (politician)

-request by local community.

The hypothesis is directly observable. (Refer to Questionnaire 2, question 22 and Questionnaire 3, questions 1 through 9)

C. Sources of information:

Project document; official request; regional or local rural water supply office; sanitary engineers; village authorities.

Hyp. 9: An incremental change in water quality and supply has a greater chance of success than radical change

A. Introduction: It is assumed that the villages can cope with a gradual improvement much better than with a radical difference in the level of water service as:

-villages can only cope with incremental changes; (behaviourally, technically and financially);

-villagers can only identify with a water system that is similar to the one they are used to.

(Refer to Questionnaire 2, questions 36,37,38,39, and 40, and Questionnaire 3, questions 35,45,46, and 47)

B. Indicators: The following changes are considered incremental:

- unprotected source → limited number of standpipes;
- standpipes → public distribution system with few house connections;
- public distribution system → majority of house connections;
- untreated public distribution system → treated distribution system.

C. Sources of information:

Reports of sanitary engineers, project reports, direct observation.

Hyp. 10: Water schemes in villages with relatively homogeneous population have a greater chance of success:

A. Introduction: It is assumed that a relatively homogeneous population in the village facilitates cohesion and therefore the organisation of communal work and the participation in construction and maintenance costs.

B. Indicators:

(1) Number of tribes and % of population belonging to the dominant tribe: (Refer to Questionnaire 3, question 55)

(2) Distribution of land: (Refer to Questionnaire 3, questions 60 and 61)

(3) % of population participating in other communal activities (cooperatives, etc.): (Refer to Questionnaire 3, question 64)

(4) % of population using modernised techniques: (refer to Questionnaire 3, question 65)

(5) % of population in two main occupations: (Refer to Questionnaire 3, questions 66 and 67)

(6) Number of religious beliefs and % of population within the 2 most important groupings: (Refer to Questionnaire 3, question 57)

C. Sources of information:

Census, agricultural survey, extension worker, school-teacher, project document, direct observation, local authorities.

Hyp. 11: The value given to water by the local population influences the chances of success of a project:

A. Introduction: The villager's perception of the value of water is clearly a variable that influences the success of a

water project. However, without an in depth, local level study it is extremely difficult to judge it. Nevertheless an attempt to evaluate it will be made.

B. Indicators:

(1) Distance of alternative water sources: The greater the distance to alternative sources of water, the higher the value the villagers attribute to the water scheme. (Refer to Questionnaire 3, question 46)

(2) Reliability of alternative water sources: The greater the unreliability of alternative water sources, the higher the value given to the water scheme. (Refer to Questionnaire 3, question 4)

(3) Hygienic conditions around water sources: The greater the value given to the water, the more care is given to the water sources (fencing, cleanliness, stagnant waste water etc.). (Refer to Questionnaire 3, question 49)

(4) Water regulations: The greater the value given to water, the more water regulations exist: children are forbidden, rules of manipulation, etc. (Refer to Questionnaire 3, question 53 and 54)

(5) The participation in costs: This is an indicator of the value given to the water. (Refer to Questionnaire 3, question 27)

C. Sources of information:

Local direct observation, village authorities, sanitary engineer, local water board, water agency, project reports.

Hyp. 12: Community involvement in water supply has greater success where direct precedences of community owned property exist:

The hypothesis attempts to determine the importance of past experiences of community owned property for the success of community involvement in water supply. Two different precedences of community owned property have to be distinguished:

-traditional community ownership: communal land, forest, pasture;

-modern community ownership: cooperatives, community hospitals, feeder roads, etc.

The hypothesis is directly observable. (Refer to Questionnaire 3, questions 64 and 71)

Sources of information:

Direct observation, local authorities, agricultural reports, etc.

Environment, alternative formats and strategies of investment

Hyp. 13: Projects where alternative water sources have a high perceived opportunity cost have a better chance of success:

A. Introduction: It is assumed that the appreciation of the water system depends on the availability of alternative water sources and that the value of the service depends on the difference of the cost for water at the new source compared to the perceived cost of the traditional source.

B. Indicators:

(1) Time saving/day per family due to new source of water: This is probably the most important and perceived gain from new water service. The time saving will have to be calculated for:

- rainy season
- dry season

The quality of the traditional water source is not taken into account here. The nearest water source that is or has been used is taken into consideration. (Refer to Questionnaire 3, questions 45, 46, and 48)

(2) Quality of water:

According to most micro studies villagers have clear preferences for specific sources which mostly relate to colour, taste and brackishness. Only perceived qualities will be taken into account. (Refer to Questionnaire 3, question 52)

(3) Social constraints: Traditional water sources may be regulated by social prohibitions that break down with the new system, e.g. the Harijans in India are not allowed to share the open well with other tribes as they "contaminate" the common source. However, they are often allowed to use the public standpipe, as there is no direct contact with the water at a closed source. (Refer to Questionnaire 3, question 53 and 54)

(4) Health benefits: The improvement of the water quality from a health point of view will only be taken into account if there is a clear awareness of the population of the health cost of the traditional source. The health opportunity cost is therefore only taken into account if it can be established that an available traditional water source is abandoned for the benefit of the new source despite the longer distance to the new source and no difference in taste and colour of the two sources. (Refer to Questionnaire 3, question 47)

C. Sources of information:

Project document, appraisal report, direct observation.

Hyp. 14: Projects in villages where other basic needs are already satisfied have higher chance of success:

A. Introduction: This hypothesis attempts to identify the relative priority of drinking water to other basic needs. The hypothesis assumes that drinking water is not the first priority as long as other basic needs are not satisfied.

B. Indicators: The indicators chosen are of two types:

-the availability of certain basic services (school, medical facilities, market, roads). (Refer to Questionnaire 3, question 62, 68, 69, and 70)

-the % of households that actually use modern inputs or have access to non-agricultural income. (Refer to questionnaire 3, question 65, 66, and 67)

C. Sources of information: Local observation, reports from various development agencies; project reports; surveys in villages of similar conditions.

Hyp. 15: The capacity of the village (resources, commercial, technical and political, institutional capacities) has a significant influence on the rate of success of water projects:

A. Introduction: The indicators of this hypothesis are related to the satisfaction of basic needs, however the perspective is not one of priority of needs, but of establishing the capacity of the village to maintain and operate the water scheme. The indicators will therefore have to be related to the level of service provided and to the complexity of the technology used.

B. Indicators:

-Resource endowments and technical know-how:

(1) Yield/ha of major crops and median land holding/family: This is used as an indicator of agricultural production potential and income potential/family. (Refer to Questionnaire 3, questions 59, 60 and 61).

(2) % of households using modern inputs: (HPU, pesticides, improved cattle, etc.). The use of modern inputs will make it possible to judge the relative development of agricultural know-how. (Questionnaire 3, question 65).

(3) % of planted land used for cash crops:

(4) Availability of non-agricultural income: (Questionnaire 3, questions 66, 67).

(b) Services available:

These indicators will indicate the villages' experience with modern services that are supposed to increase the villagers' ability to participate in development activities.

(1) The availability of basic services: (School, health care, medical supplies). Refer to Questionnaire 3, questions 62, 68.

(2) The % of people having access to modern facilities and communication: (Electricity, radio, etc.) See questionnaire 3, question 65.

(c) Commercial capacity:

(1) The availability of roads indicates the possibility of exchanging products with other regions (refer to questionnaire 3, question 63).

(2) Markets: Indicators showing the availability of markets and their importance have been used. (Refer to questionnaire 3, questions 69 and 70), and the existence of marketing services (questionnaire 3, question 62).

(3) Availability of inputs: The use of agricultural inputs is used as an indicator to show the existence of commercial channels (questionnaire 3, question 65).

(d) Institutional capacity:

Four indicators have been chosen to show the institutional capacity of the village to administer a drinking water scheme.

(1) Existence of village development committees: (Questionnaire 3, questions 10, 11, 16 and 17).

(2) The participation of villagers in communal development efforts: (Communal work, cooperatives). (Refer to questionnaire 3, questions 64, 65).

(3) Presence of the party: (Questionnaire 3, question 62).

(4) Experience of administering other services:
(Questionnaire 3, question 71).

C. Sources of Information:

Local direct observation, reports of development agencies, project reports, interviews of local administrators.

Hyp. 16: Projects that are part of a national or regional water supply development programme have a greater chance of success:

A. Introduction:

As rural drinking water projects normally need technical and administrative assistance for construction, operation and maintenance it is assumed that projects that are part of a national/regional programme have easier access to such assistance. The importance of this factor will be listed for the construction and operation/maintenance phase.

B. Indicators:

The hypothesis is directly observable. Questions 10 and 11 of questionnaire 2 will provide information on how effective the link between the project and the national programme was.

C. Sources of Information:

Project document, annual reports, agency staff and project director.

Hyp. 17: Water schemes that are part of a multisectoral project have a greater chance of success:

This hypothesis is based on the assumption that complementary investments are necessary for the success of a rural drinking water project and that these investments are only forthcoming if rural drinking water is part of a multipurpose project.

The hypothesis is directly observable and the information is obtained through question 24 of questionnaire 2.

Hyp. 18 and 19: Complementary investment components:

A. Introduction:

Sanitary education and training of villagers for the operation and maintenance of the schemes are considered to be important complementary investments for the success of drinking water schemes.

B. Indicators:

The hypotheses are directly observable. The indicators chosen attempt to differentiate the complementary components by their size and type of training. (See questionnaire 2, questions 25 and 26).

C. Sources:

Project document, annual reports.

Hyp. 20, 21, 22, 23: Alternative strategies for the selection of villages:

A. Introduction:

The village selection criteria have a big influence on the possibilities and needs to provide support to the villages in constructing, operating and maintaining their drinking water schemes. It is attempted to show whether all these strategies are administratively and technically feasible or whether existing constraints limit the choice of strategies.

B. Indicators:

The hypotheses are directly measurable. Question 23 of questionnaire 2 provides the necessary information to test these hypotheses.

C. Sources:

Project document, annual reports, instructions and requests for water schemes.

Hyp. 24: Projects having organised outside technical support have a better chance of success:

A. Introduction:

This hypothesis attempts to show which separation of tasks between villagers and technical staff has been more (or less) successful.

B. Indicators:

The indicators are self explanatory. The apportionment of functions is investigated for the various tasks (design, feasibility, construction, operation and maintenance). See questionnaire 2, questions 14-21, and questionnaire 3, questions 01-05.

C. Sources:

Project document, annual reports, agency staff.

Hyp. 25: A bonus incentive system increases the chances of a project's success:

The hypothesis is directly observable. The information is obtained through question 52 of questionnaire 2.

Hyp. 26: Relatively low salaries, poor living conditions and few career opportunities reduce the chances of a project's success:

A. Introduction:

Rural drinking water projects have difficulties to attract qualified people:

- the technology involved is not prestigious;
- the necessity to live in more remote areas is not appreciated;
- rural water administration rarely has an attractive career system or pay scale.

B. Indicators:

The hypothesis will be tested by comparing conditions of work of the people working on the rural water scheme with people in similar positions in other administrative services. (Questionnaire 2, question 51).

C. Sources:

The indicator is a qualitative assessment of the conditions in various agencies, based on interviews.

Hyp. 27: A combination of self-help and technical supervision increases the chances of a project's success:

A. Introduction:

This hypothesis uses the same information as hypothesis 24. However, the treatment of the information will attempt to relate various levels of community involvement to the success rate of the projects analysed.

B. Indicators:

The indicators chosen will provide information on various levels of self-help (decisions, material and financial contributions, responsibility for operation and maintenance). See questionnaire 2, questions 22, 44, 48, 58 and questionnaire 3, questions 2, 3, 5, 9, 27, 30.

C. Sources:

Project reports, accounting, local authorities and agency staff.

Hyp. 28: Numbers of staff/unit cost of system influences the chances of success:

A. Introduction:

This hypothesis was chosen to control for various levels of staffing that might explain differences in success rate. As the number of staff per schemes implemented or maintained has been checked it seemed important to distinguish between simple and more complicated schemes. The unit cost of schemes has been chosen to indicate the complexity of the schemes.

B. Indicators:

The indicators are self-explanatory. The information is obtained through questionnaire 2, questions 9 and 54.

C. Sources:

Project document, annual reports, accounts, agency staff.

Hyp. 29: Different compositions of various skill levels have significant effects upon success/failure:

A. Introduction:

The hypothesis attempts to test the various combinations of professional-subprofessional staff and to identify which professional skills seem to be crucial for the functioning of a rural drinking water scheme.

B. Indicators:

Since most projects do not have a self contained staff, but depend on the national administration it is proposed that this hypothesis be tested at the national level (questionnaire 1, question 25) and then controlled at the project level for the numbers of persons involved at each administrative level, (questionnaire 2, questions 9 and 50).

C. Sources:

Annual reports from Water Agency, project document, sector survey.

Hyp. 30: The availability of training facilities and the number of trained people/1,000 population is positively related to professional and subprofessional staff in projects:

A. Introduction:

The provision of training is very often considered as one of the major constraints to the expansion of rural water supply to the rural population. This hypothesis attempts to test

whether the lack of trained people can be overcome by the provision of training facilities or whether the leakages to other sectors are so big that the number of trained people has no influence on the availability of trained staff for rural water supply schemes.

B. Indicators:

The hypothesis will be tested by relating the number of training facilities and their output to the number of staff in water agencies per 1,000 population having access to water. (See questionnaire 1, questions 26 and 27).

C. Sources:

WHO survey on water supply training facilities and output, annual agency reports.

Technology, Costs and Pricing

Hyp. 31: Low cost, easily maintained and operated systems have a greater chance of success:

A. Introduction:

The hypothesis seems self-evident. However, experience shows that this is not necessarily the case, as these systems have often a smaller chance of getting the technical support necessary than the ones where some organisation for maintenance is justified by the necessity to "protect" the relatively high investment costs.

B. Indicators:

The indicators chosen will provide information on the level of services, the source of water and the unit cost of the project compare to national averages. See questionnaire 1, questions 30 and 31; questionnaire 2, questions 37-40 and 54, 56 and 57.

C. Sources:

Sector surveys, project document, annual reports, accounts.

Hyp. 32: Projects using local materials and skills and which use little imported material have a greater chance of success:

The hypothesis is self-explanatory. Question 56 of questionnaire 2 provides the information on material, and question 21 of questionnaire 3 provides some information on the involvement of local skills.

Hyp. 33: Automated systems, serviced by outsiders, have a higher chance of success:

The hypothesis is self-explanatory. The systems constructed will be ordered according to the technological level involved. See questionnaire 2, question 37, and questionnaire 3, question 35.

Hyp. 34: Labour-intensive, hand-operated systems are preferable to capital-intensive, automatic systems:

This hypothesis is the pendant of hypothesis 33. In addition to the information used in hypothesis 33, the cost breakdown will be used to test this hypothesis (see questionnaire 2, questions 55 and 56).

Hyp. 35: The lower the construction cost/head the greater the degree of success:

A. Introduction:

This hypothesis is based on the assumption that lower cost schemes are less dependent on outside assistance and correspond to the ability of the villagers to maintain them by their own means.

B. Indicators:

The information will be obtained by comparing the number of people served to the unit cost of construction and operation, maintenance. See questionnaire 2, questions 54 and 57, and questions 02, 03, 04; and questionnaire 3, question 50.

C. Source:

Annual reports, accounts, village observation.

Hyp. 36: Schemes with house connections recover more of the costs than schemes with public standposts:

The hypothesis is self-explanatory and directly observable. Information is provided through questionnaire 2, questions 37, 58, 61 and questionnaire 3, questions 35, 28 and 32.

Hyp. 37: Charges collected by a national agency have a higher collection rate than charges collected by local authorities:

The hypothesis is self-explanatory and directly observable. See questionnaire 2, questions 21, 48 and 61, and questionnaire 3, questions 08, 32, 33 and 34.

Hyp. 38: Charges that exceed 5% of total estimated income are difficult to collect:

A. Introduction:

It is assumed that the rate of recovery of charges is dependent on the adequateness of the charges compared to the ability to pay off the beneficiaries. The literature generally considers 5% as the amount of income the villagers can afford to pay for the water supply.

B. Indicators:

The charges paid, the criteria of fixing the amount and the village characteristics will be used to assess to what per cent of income the charges for water would amount. See questionnaire 2, questions 58 and 61, questionnaire 3, questions 28, 29, 32 and 59, 60, 61, 65 and 67.

C. Sources:

Project document, accounts, village observation, annual reports.

Hyp. 39: Systems which do not collect enough charges to cover operation and maintenance have a lower rate of success

The hypothesis is self-explanatory. It attempts to test whether it is realistic to foresee a subsidy for operation and maintenance or whether this subsidy is, in reality, never really forthcoming. Question 59 of questionnaire 2, and question 30 of questionnaire 3, provide the necessary information.

ANNEX I

List of the Proposed Hypotheses

1. National political support and consciousness of water problems is important for the success of projects
2. The recognition of water-related diseases as a priority concern and the relative importance given to rural water supply compared to urban water supply are important for the success of rural drinking water projects
3. A functioning national/regional/local organisational system and clear lines of responsibility and decision-making power facilitate the execution of water schemes
4. One agency in charge of all water projects influences the success rate of water schemes
5. Community development projects within one-party systems are more successful than community development projects within multi-party systems
6. A water committee and strong local authority facilitate the execution of water projects
7. A local water board is necessary for the maintenance and operation of the system
8. Projects for which the initiative has come from the village have a greater chance of success
9. An incremental change in water quality and supply has a greater chance of success than radical change
10. Water schemes in villages with relatively homogeneous population have a greater chance of success
11. The value given to water by the local population influences the chances of success of a project
12. Community involvement in water supply has greater success where direct precedences of community-owned property exist
13. Projects where alternative water sources have a high perceived opportunity cost have a better chance of success
14. Projects in villages where other basic needs are already satisfied have a higher chance of success
15. The capacity of the village (resources, commercial, technical and political, institutional capacities) has a significant influence on the rate of success of water projects

16. Projects that are part of a national or regional water supply development programme have a greater chance of success
17. Water schemes that are part of a multisectoral project have a greater chance of success
18. Sanitary education increases chances of success of a project
19. Programmes which include a training component have a greater chance of success
20. Villages chosen according to a growth point strategy have a greater chance of success
21. Villages chosen according to a worst-first strategy have no less chance of success
22. Villages chosen according to perceived and expressed needs have greater chance of success
23. Villages chosen according to a maximising strategy for a given investment have higher rates of success (clustering + costs)
24. Projects having organised outside technical support have a better chance of success
25. A bonus incentive system increases the chances of a project's success
26. Relatively low salaries, poor living conditions and few career opportunities reduce the chances of a project's success
27. A combination of self-help and technical supervision increases the chances of a project's success
28. Numbers of staff/unit cost of system influences the chances of success
29. Different compositions of various skill levels have significant effects upon success/failure
30. The availability of training facilities and the number of trained people/1,000 population is positively related to professional and sub-professional staff in projects
31. Low cost, easily maintained and operated systems have a greater chance of success
32. Projects using local materials and skills and which use little imported material have a greater chance of success
33. Automated systems, serviced by outsiders, have a higher chance of success

34. Labour-intensive, hand-operated systems are preferable to capital-intensive, automatic systems
35. The lower the construction cost/head, the greater the degree of success
36. Schemes with house connections recover more of the costs than schemes with public standposts
37. Charges collected by a national agency have a higher collection rate than charges collected by local authorities
38. Charges that exceed 5 per cent of total estimated income are difficult to collect
39. Systems which do not collect enough charges to cover operation and maintenance have a lower rate of success

ANNEX II

Questionnaire 1: Analysis of Rural Drinking Water Supply:
Information on Rural Water Supply Policies

Country:

I. SOCIO-ECONOMIC STATUS OF THE COUNTRY

01 Total area: km²/miles² (*)

(*) Delete where not applicable

02 Rainfall: disintegrated into the major climatic zones of the country, including area and approximate population in each zone:

| | m/m or inches of rainfall/year | area in(*) km ² /miles ² | approximate population |
|---------|-----------------------------------|---|---------------------------|
| Zone I | | | |
| Zone II | | | |
| | | | |
| | | | |
| | | | |

(*) Delete where not applicable

Explanations:

Sources:

| 03 | <u>Total population:</u> | in millions |
|----|--------------------------|-------------|
| | 1960 | ..... |
| | 1970 | ..... |
| | 1971 | ..... |
| | 1972 | ..... |
| | 1973 | ..... |
| | 1974 | ..... |
| | 1980 (estimate) | ..... |

Sources:

| 04 | <u>Urban/rural population:</u> | in millions | | % of total population | |
|----|--------------------------------|-------------|-------|-----------------------|-------|
| | | urban | rural | urban | rural |
| | 1960 | ..... | ..... | ..... | ..... |
| | 1970 | ..... | ..... | ..... | ..... |
| | 1974 | ..... | ..... | ..... | ..... |
| | 1980 (estimate) | ..... | ..... | ..... | ..... |

Notes:

Sources:

| | | | |
|----|--------------------------------|------------------|--------------|
| 05 | <u>Population growth rate:</u> | (annual average) | |
| | | <u>urban</u> | <u>rural</u> |
| | 1960 - 1970 | ..... | ..... |
| | 1970 - 1974 | ..... | ..... |

Notes:

Sources:

| | | | |
|----|--------------------|--------------------------|--------------|
| 06 | <u>GNP/capita:</u> | <u>in local currency</u> | <u>in \$</u> |
| | 1960 | ..... | ..... |
| | 1970 | ..... | ..... |
| | 1974 | ..... | ..... |

Notes:

Sources:

07 Active population in agriculture:

| | <u>Number active popu- lation in agriculture</u> | <u>% of total active population</u> |
|------|--|---|
| 1960 | | |
| 1970 | | |
| 1974 | | |

Notes:

Sources:

08 Actual public expenditures:

(If more than one year, give mean annual average)

| Year | Total amount (in mio.) | % of GNP | Per capita | Current expenditures | | Investment expenditures | |
|-----------|---------------------------|----------|------------|----------------------|-------------------------|-------------------------|------------|
| | | | | Total amount | % of total expenditures | amount | % of total |
| 1960-1970 | | | | | | | |
| 1971 | | | | | | | |
| 1972 | | | | | | | |
| 1973 | | | | | | | |
| 1974 | | | | | | | |

Planning period (specify):

Notes:

Sources:

09 Actual public revenues

| Year | National revenues | | Loans & deficits | | Foreign aid | | Total revenues |
|---------|-------------------|---------------------|------------------|-------|-------------|-------|----------------|
| | Total | % of total revenues | Total | % | Total | % | |
| 1960-70 | | | | | | | |
| 1971 | | | | | | | |
| 1972 | | | | | | | |
| 1973 | | | | | | | |
| 1974 | | | | | | | |

Planning period (specify years):

Notes:

Sources:

10

National budget for health:

| | <u>amount</u> | <u>% of total budget</u> |
|-----------|---------------|--------------------------|
| 1960-1970 | | |
| 1971 | | |
| 1972 | | |
| 1973 | | |
| 1974 | | |

Planning period (specify years):

Explanations:

Sources:

II. GENERAL SITUATION OF WATER SUPPLY IN THE COUNTRY

11 Population supplied with water as of December 1970

| | <u>Number</u> | <u>% of total population</u> | |
|----------------------------|---------------|------------------------------------|-------------------------------|
| Total population served: | | | |
| | <u>Number</u> | <u>% of total urban population</u> | |
| - urban population served: | | | |
| | | | of which house connections: % |
| | | | reasonable access: |
| | <u>Number</u> | <u>% of total rural population</u> | |
| - rural population served: | | | |

Notes:

WHO definitions for rural/urban are used

Sources:

WHO survey 1970.

12 Additional people served since 1970

| | <u>1971</u> | <u>1972</u> | <u>1973</u> | <u>1974</u> |
|---|-------------|-------------|-------------|-------------|
| Additional urban population served by house connections | | | | |
| Additional urban population served by standpipes | | | | |
| Additional rural population served | | | | |

Explanations:

Sources:

13

Water quality control

Water quality controls (except for some large-scale urban schemes) are rarely implemented. The questions here are supposed to provide some information on the Government's position concerning water quality control.

- Have national standards for drinking water quality been adopted by the Government?

Yes

No

- Extent and frequency of bacteriological examinations:

| | | | | |
|-------|------|--------------------------|-----------------|--------------------------|
| Urban | some | <input type="checkbox"/> | regularly | <input type="checkbox"/> |
| | | | occasionally | <input type="checkbox"/> |
| | | | never | <input type="checkbox"/> |
| | most | <input type="checkbox"/> | regularly | <input type="checkbox"/> |
| | | | occasionally | <input type="checkbox"/> |
| | | | never | <input type="checkbox"/> |
| Rural | some | <input type="checkbox"/> | regularly | <input type="checkbox"/> |
| | | | occasionally | <input type="checkbox"/> |
| | | | never | <input type="checkbox"/> |
| | most | <input type="checkbox"/> | at construction | <input type="checkbox"/> |
| | | | regularly | <input type="checkbox"/> |
| | | | occasionally | <input type="checkbox"/> |
| | | | never | <input type="checkbox"/> |
| | | | at construction | <input type="checkbox"/> |

Explanations

Sources:

III. NATIONAL WATER POLICY

14

Availability of health information necessary for a problem-oriented drinking water policy

- Existence of a health sector study: Yes No
- Have the major diseases and their incidence been identified? Yes No

If available, specify them:

- % of water-related diseases to the total number of diseases:

Explain:

Sources:

15

Existence of national policy for drinking water supply:

- Has the country a national water policy in some form?
Yes No

- What is the scope of that policy?

- regional
- national
- urban and rural
- rural only
- urban only

- Relation of the water policy to the national plan:

- The water policy is part of national development plan.
- The national plan refers to the water policy.
- The national plan does not mention the water policy.

- Status of water policy:

- The water policy is part of national legislation.
- date of promulgation:
- The water policy is only a proposal.

Note: If there are several policies that have been adopted, answer this question for each one of them.

Explanations:

6

Existence of a national strategy for drinking water supply
(more long-term):

- Does the water supply strategy identify the needs?

- needs of rural population: Yes No

- needs of urban population: Yes No

- Does there exist a long-term goal satisfying those needs and a strategy of how to achieve that goal?

- long-term goal Yes No urban - rural

If available, specify goal:
.....
.....

- strategy to achieve goal: Yes No urban - rural

If available, specify strategy:
.....
.....

- Origin of strategy

- The strategy is independent of national plan. Yes No

- The strategy is part of national plan. Yes No

- Period of strategy: Date: Time span:.....

Note: If there are several strategies, answer this question for each one of them.

Explanations:

17

Existence of targets and calculations of financial implications

- For which years did targets exist and what were those targets and to what extent were those targets met?

| <u>Year</u> | <u>Target</u> | | | <u>Execution</u> | | |
|-------------|---------------|-------|-------|------------------|-------|-------|
| | total | urban | rural | total | urban | rural |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

- What have been planned and actual costs for the target years (use given definition for urban - rural)

| <u>Target years</u> | <u>Planned costs</u> | | | <u>Actual costs</u> | | |
|---------------------|----------------------|-------|-------|---------------------|-------|-------|
| | total | urban | rural | total | urban | rural |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

- What are the targets and planned costs for the current planning period:

| <u>Planning period</u> | <u>Targets</u> | | | <u>Planned costs</u> | | |
|------------------------|----------------|-------|-------|----------------------|-------|-------|
| | total | urban | rural | total | urban | rural |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Explanations:

Sources:

18

Provision of national funds for drinking water supply:

- Give for years available in actual expenditure:

| <u>Years</u> | <u>Water budget</u> | | | <u>Annual investment</u> | | | <u>Annual reccurent costs</u> | | |
|--------------|---------------------|-------|-------|--------------------------|-------|-------|-------------------------------|-------|-------|
| | total | urban | rural | total | urban | rural | total | urban | rural |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Planning period:

- % of total water expenditure to total public expenditure:

[For calculations, use figures given questions (18) and (08)]

| <u>Years</u> | <u>%</u> |
|--------------|----------|
| | |
| | |
| | |
| | |
| | |

- % of water expenditure to total expenditure for health:

[For calculations, use figures from question (10)]

- Explanations:

- Sources:

19

External assistance received for rural drinking water supply:

| <u>Years</u> | <u>Total</u> | <u>Loans and grants</u> | <u>Material</u> | <u>Others</u> <u>(specify)</u> |
|--------------|--------------|-------------------------|-----------------|-----------------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Explanations:

Sources:

20

Investment criteria for rural water supply:

Describe the specific criteria used to decide where to construct a rural water supply system.

22

Design criteria and unit cost (rural only unless specified):

- How are the capacity of the system and the level of services chosen?

- Is there a reserve capacity for future consumption (increase of beneficiaries and/or increase in per capita consumption)?

- On a national scale, what is the approximate cost (in equivalent US \$) per person supplied of construction:

- urban public standpost:

- rural supplies:

| type of service | cost/beneficiary |
|-----------------|------------------|
| | |
| | |
| | |
| | |
| | |

Specify date of cost calculations:

22 (continued)

Explanations:

Sources:

IV. INSTITUTIONAL AND ORGANISATIONAL STRUCTURE

23

Existence of a national water agency:

Enumerate all agencies in charge of rural water supply. Make an organigram of the water agencies that have jurisdiction over rural water projects. Identify also agencies and foreign donors that construct rural water supplies without being integrated into the national structure (e.g., private institutions, etc.).

Describe how the various agencies interact, for what each agency is responsible and how the information is flowing between the agencies.

23 (continued)

24

Organisational levels and responsibilities:

This information is needed to understand the degree of decentralisation within the major rural water development agencies and to understand the decision-making process and the responsibilities within an agency.

- Describe (organigram) the different levels of the major rural water organisations;
- Number of schemes served by each organisational level and area covered;
- Tasks at different levels concerning:
 - general policy and standard designs;
 - specific designs and feasibility studies;
 - selection of projects;
 - responsibility for supply of material and spare parts;
 - responsibility for financing construction;
 - responsibility for executing repairs;
 - responsibility for operation and maintenance;
 - responsibility for recurrent costs.

24 (continued)

24

(continued)

V. ADMINISTRATION AND TRAINING

25

Staffing of organisation:

- Total number of staff working in water supply (urban and rural):

| <u>Years</u> | <u>Professionals</u> | <u>Sub-professionals</u> | <u>Total</u> |
|--------------|----------------------|--------------------------|--------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

- Number of staff working in major organisation responsible for rural water supply (professionals/sub-professionals):

| <u>Years</u> | <u>Professionals</u> | <u>Sub-professionals</u> | <u>Total</u> |
|--------------|----------------------|--------------------------|--------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

- Number of staff required to execute the planned water programme:

| <u>Years</u> | <u>Professionals</u> | <u>Sub-professionals</u> |
|--------------|----------------------|--------------------------|
| | | |
| | | |
| | | |
| | | |
| | | |

Note: Professionals are considered to have a university or university equivalent education;

Sub-professionals are lower clerical employees, carpenters, skilled labourers, etc.

(continued)

2 (continued)

Explanations:

Sources:

26 Training facilities and output for each skill level:
 (according to WHO survey)

| <u>Skill levels</u> | <u>1970</u> | <u>1971</u> | <u>1972</u> | <u>Planning period</u> |
|---------------------|-------------|-------------|-------------|------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Source:

27 Number of staff of water agencies/1000 population having access to water /use questions (11) and (12) and (26) for calculations/

| <u>Years</u> | <u>Professionals</u> | <u>Sub-professionals</u> |
|--------------|----------------------|--------------------------|
| | | |
| | | |
| | | |
| | | |
| | | |

Explanations:

VI. TECHNOLOGY, COST AND PRICING

28

Technology and level of service

Give approximate % of schemes (or persons served) according to following classifications:

| | <u>Rural</u> | <u>Total</u> |
|--|--------------|--------------|
| - % of population (schemes) using handpumps: | | |
| - % of population (schemes) using public hydrants: | | |
| - % of population (schemes) using house connections: | | |
| - % of schemes providing standpipes and house connections: | | |
| - TOTAL | | |

Explanations:

Sources:

29

Material and equipment:

- Give approximate % of material and equipment imported in total investment costs:

total water supply:

rural only:

- Give list of major items produced and indicate:

| Item | Production | | |
|------|------------|---------------|-------|
| | sufficient | >50% of needs | < 50% |
| | | | |

Explanations:

Sources:

30

What contribution to construction costs are made by the different levels involved (rural schemes only)?

| | <u>Total amount</u> | <u>% of total cost</u> |
|------------------------|---------------------|------------------------|
| Central Government | | |
| Regional Government | | |
| Local Government | | |
| Population (financial) | | |

Note: The three Government levels are illustrative. They may have to be replaced according to Government structure in the country. Local Government contributions are distinguished from population contributions by the fact that the local population is not directly contributing the financial support.

The information should be valid for the years around 1974 and/or the planning period.

| | <u>Material</u> | <u>Labour</u> |
|---|-----------------|---------------|
| Population's contribution (other than financial): | | |
| | | |
| | | |

Note: If population's contribution is not expressed in financial terms, enumerate simply without costing them (or attempt to include them in total % of costs).

Explanations:

Sources:

31

What contributions on operation and maintenance are made by the different levels of Government?

| | Urban | | Rural | |
|---------------------|--------------|-----------------|--------|-----------------|
| | total amount | % of total cost | amount | % of total cost |
| Central Government | | | | |
| Regional Government | | | | |
| Local Government | | | | |
| Population | | | | |

Note: Same clarifications on Government levels and contributions as in question (30).

Explanations:

Sources:

32

What is the policy of recovery of costs of the Government?

- % of construction costs that has to be recovered:

urban:

rural:

- % of operation and maintenance costs that has to be recovered:

urban:

rural:

- What is the rate structure of water services?

urban:

rural:

Explanations:

Sources:

33

What is the amount of charges actually collected?

| Years | Amount collected | | | Amount due | | |
|-------|------------------|-------|-------|------------|-------|-------|
| | urban | rural | total | urban | rural | total |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Explanations:

Sources:

VII. A BRIEF QUALITATIVE ASSESSMENT OF THE WATER POLICY
AND ITS IMPLEMENTATION

This part is a verbatim explanation of the data presented in Part III and a description of qualitative aspects that are important to understand the functioning of the rural water supply situation. The assessment should not exceed five pages.

The paper should include:

1. a short description of the most important factors affecting the rural water supply situation;
2. an assessment of the policy pursued, its validity and the possibility of executing it;
3. an assessment of the targets and the proposed means to achieve them;
4. an assessment of the designs and levels of services in view of the possibility of providing access to water to the largest number of people possible;
5. an assessment of the financial situation and the rating policy;
6. an assessment of the strength and weaknesses of the existing organisational structure in view of a country-wide coverage;
7. an assessment of the present staffing situation and possibilities of training within the near future;
8. a short description of the most important constraints and bottlenecks.

ANNEX III

Questionnaire 2: Analysis of Rural Drinking Water Supply Projects:
Project Level Information

- * COUNTRY ← Col 1-2
- * NAME OF PROJECT ← Col 3-4
- * REGION ← Col 5-6
- ← Col 7

HOW TO FILL IN THIS QUESTIONNAIRE

I. Introduction

The analysis of projects (or programmes) for supplying water to rural areas consists of two parts:

1. "project-questionnaire": This questionnaire supplies the necessary information for a comprehensive analysis of the project and in particular, its policy, its organisation, its technology and the selection criteria. This analysis will reveal the policy followed by the project.

2. "village-questionnaire": This questionnaire will be completed in several of the villages concerned with the project. The villages will be selected in terms of their representativeness with regard to all the villages in which the project (or programme) has constructed water systems.

It is possible that the methods employed in the village do not correspond exactly to the policy initially envisaged by the project. Comparison between the project-questionnaire and the village-questionnaire will permit analysis of the variation between what was planned and what was actually carried out at the village level. This is why a certain number of questions have been asked both in the project-questionnaire and in the village-questionnaire.

II. Definition of "unit"

In the project-questionnaire, we ask a number of questions concerning a unit (costs/unit, personnel/unit, etc.). However, the diversity of projects involves variations in the definition of what constitutes the base unit. In certain projects, the village constitutes this unit; in others, it is the source of water supply (e.g. a well). It is, therefore, necessary to clearly define what constitutes, in the framework of your project, the basic unit (see question 54).

III. Instructions for filling in the questionnaire

To facilitate understanding and use of this questionnaire, you are asked to respect the following instructions :

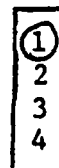
1. Wherever possible, please reply to all questions.

2. According to the questions, you should :

either encircle the number(s) corresponding to your reply(ies)

example: question 12

If your reply is "by central administration", you encircle number 1



- or write the numbers which correspond to your reply in the appropriate boxes. Put one figure in each box and keep your numbers to the right.

example: question 34

| | | | | |
|----------------------|--|---|---|---|
| if your reply is 5 | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td><td>5</td></tr></table> | | | 5 |
| | | 5 | | |
| if your reply is 28 | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>2</td><td>8</td></tr></table> | | 2 | 8 |
| | 2 | 8 | | |
| if your reply is 155 | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>5</td><td>5</td></tr></table> | 1 | 5 | 5 |
| 1 | 5 | 5 | | |

Percentages should be noted in the same way:

example: question 53

percentage of total cost

| | | | | |
|---------------|--|---|---|---|
| if it is 100% | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>0</td><td>0</td></tr></table> | 1 | 0 | 0 |
| 1 | 0 | 0 | | |
| if it is 56% | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>5</td><td>6</td></tr></table> | | 5 | 6 |
| | 5 | 6 | | |
| if it is 8% | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td><td>8</td></tr></table> | | | 8 |
| | | 8 | | |

3. When you are asked to "enumerate in order of importance" put the number 1 opposite the most important, number 2 opposite the second most important and so on.

example: question 23

If the request from the village is the most important criterion you put number 1 opposite "village had made the application themselves"; similarly if relatively cheap water supply = second criterion and the quality of the water = third criterion :

| | | | |
|-------------------------------------|--|--|---|
| quality of water | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>3</td></tr></table> | | 3 |
| | 3 | | |
| distance of water from village | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td></tr></table> | | |
| | | | |
| cheap to provide water supply | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>2</td></tr></table> | | 2 |
| | 2 | | |
| willingness and ability to pay | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td></tr></table> | | |
| | | | |
| village made application themselves | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>1</td></tr></table> | | 1 |
| | 1 | | |
| potential development area | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td></tr></table> | | |
| | | | |

etc.

4. When the question involves a date, and years in numbers as follows:

write the months

if reply = June 1970

| | | | |
|-------|---|------|---|
| 0 | 6 | 7 | 0 |
| month | | year | |

I - CHARACTERISTICS OF THE PROJECT

Leave Blank

01 Area covered by the project : 8 to 13

02 Population in the area covered by the project: 14 to 20

03 Percentage of the population covered in the project area : 21-22-23

04 Average population per village : 24 to 27

05 Type of communities: concentrated: 1 28
dispersed : 2

06 Rainfall: millimetres rain per year: mm → 29 to 32

07 Number of rainy seasons : 33

08 Are the villages concerned in the project representative of villages:
in the region 1 34
in the country 2
not representative 3

If not, why not - - - - -
- - - - -
- - - - -
- - - - -

| |
|----------------------------------|
| II - ORGANISATION OF THE PROJECT |
|----------------------------------|

| |
|----|
| 09 |
|----|

Description of the organisational structure (if possible illustrated by an organigram). Distinguish if necessary between the construction phase and the present operational phase. Please indicate the number of personnel at each level of the organisation. At each level please indicate:

- distribution of tasks (selection of villages, design of scheme, execution of work, operation and maintenance, financial control, etc.);
- number of wells (or villages) supervised at each level.

AUTONOMY OR INTEGRATION OF THE PROJECT

Leave Blank

10 Are there links between the project and the national administration:

Yes
No

| |
|---|
| 1 |
| 2 |

Col 36

11 Does the project provide information to national or regional services on its activities:

Yes
No

| |
|---|
| 1 |
| 2 |

Col 37

If so, which activities - - - - -
- - - - -
- - - - -
- - - - -

12 By whom was the material for the project chosen:

- by a national agency
- by the project according to national criteria
- freely by the project
- ← others : specify

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |

Col 38

13 Have the project personnel participated in national or regional seminars on water:

Yes
No

| |
|---|
| 1 |
| 2 |

Col 39

14 Who designed the scheme ?

- the villagers 1
- the local administration 2
- name: _____
- national administration 3
- name: _____
- water authority 4
- private national agency 5
- name: _____
- foreign organisation 6
- name: _____
- ← other, specify 7

Col 40

15 Who conducted the feasibility study ?

- the villagers 1
- the local administration 2
- name: _____
- national administration 3
- name: _____
- water authority 4
- private national agency 5
- name: _____
- foreign organisation 6
- name: _____
- ← other, specify 7

Col 41

16 Who ordered the equipment ?

- the villagers 1
- the local administration 2
- name: _____
- national administration 3
- name: _____
- water authority 4
- private national agency 5
- name: _____
- foreign organisation 6
- name: _____
- ← other, specify 7

Col 42

17 Who selected the villages ?

- the villagers..... 1
- the local administration 2
name: _ _ _ _ _
- national administration 3
name: _ _ _ _ _
- water authority 4
- private national agency 5
name: _ _ _ _ _
- foreign organisation 6
name: _ _ _ _ _
- ← other, specify 7

Col 43



18 Who supervised the construction ?

- the villagers 1
- the local administration 2
name: _ _ _ _ _
- national administration 3
name: _ _ _ _ _
- water authority 4
- private national agency 5
name: _ _ _ _ _
- foreign organisation 6
name: _ _ _ _ _
- ← other, specify 7

Col 44



19 Who is responsible for maintenance ?

- the villagers 1
- the local administration 2
name: _ _ _ _ _
- national administration 3
name: _ _ _ _ _
- water authority 4
- private national agency 5
name: _ _ _ _ _
- foreign organisation 6
name: _ _ _ _ _
- ← other, specify 7
- there is no maintenance 8

Col 45



20 Who orders spare parts ?

- the villagers 1
- the local administration 2
name: _ _ _ _ _
- national administration 3
name: _ _ _ _ _
- water authority 4
- private national agency 5
name: _ _ _ _ _
- foreign organisation 6
name: _ _ _ _ _
- ← other, specify 7

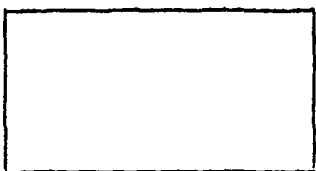
Col 46



21 Who collects the charges ?

- the villagers 1
- the local administration 2
name: _ _ _ _ _
- national administration 3
name: _ _ _ _ _
- water authority 4
- private national agency 5
name: _ _ _ _ _
- foreign organisation 6
name: _ _ _ _ _
- ← other, specify 7
- there are no charges 8

Col 47



III - CHOICES AND DECISIONS

22 Who requested the new scheme?

- the village population 1 Col 48
- a local personality 2
- the local administration 3
- the central administration 4
- ← others, specify 5

23 Was the choice of villages based on any criteria?

(Show your replies in order of importance by putting 1 against the most important criteria, 2 against the next and so on)

- poor quality of water serving the village Col 49
- distance of water point from village Col 50
- relatively cheap to provide water supply Col 51
- willingness and ability of the villagers to pay the expenses Col 52
- the village had made the application themselves ... Col 53
- the village was seen as a potential development centre Col 54
- the village was poor and had hitherto been neglected Col 55
- other criteria, specify Col 56
- []
- no precise criteria Col 57

INVESTMENT STRATEGY

24 Was the project part of

- an integrated multisectorial programme (e.g. rural development, irrigation project, etc.) 1 Col 58
- a regional water supply programme 2
- other: specify 3
- the project was not part of any programme 4

COMPLEMENTARY ACTIVITIES OF THE PROJECT

Leave Blank

25

Did the project include or was it related to a health education scheme?

Yes
No

1
2

Col 60

If so, what connection was there between the project and this health education scheme?

61

Approximate cost of this scheme: -----

62

Number of people working on this scheme: -----

Specify their qualifications:

63

26

Did the project include or was it related to a training scheme?

Yes
No

1
2

Col 64

If so, for whom was it designed?

65

Type of training: -----

66

Total cost: -----

67

Length of the training scheme: -----

68

CHOICE OF WATER SYSTEM

Annex III
Leave Blank

27 What factor determined the level of services offered by the project (i.e. proximity of water points to the inhabitants, convenience, yield, etc.)?

69

28 What factors determined the choice of source for the water supply?

(List your replies in order of importance)

- access
- quality of water
- cost of construction/exploitation
- only source possible
- ← other, specify



Copy from 1 to 6
and 2
7

Col 8
Col 9
Col 10
Col 11

12

29 Was any precise per capita consumption used?

- Yes
- No

1
 2

Col 13

If so, what -----

14

30 Were national guidelines respected?

- Yes
- No

1
 2

Col 15

If so, which ones -----

16

31 Did the project provide for any future improvement or extension of the scheme?

- Yes
- No

1
 2

Col 17

If so, specify -----

32 Were there any allowances in the project for future increase in consumption or population?

Yes
No

| |
|---|
| 1 |
| 2 |

Col 18

If so, specify -----

| |
|----|
| 19 |
|----|

33 Did the project adopt national or regional standards for:

Planning arrangements → Yes
No
Selection of sites → Yes
No
Level of services provided → Yes
No
Equipment used → Yes
No
Costs and charges → Yes
No

| |
|---|
| 1 |
| 2 |

| |
|---|
| 1 |
| 2 |

| |
|---|
| 1 |
| 2 |

| |
|---|
| 1 |
| 2 |

| |
|---|
| 1 |
| 2 |

Col 20

Col 21

Col 22

Col 23

Col 24

IV - TECHNICAL CHARACTERISTICS OF THE PROJECT

34

Scope of the project:

Number of villages covered by the project

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

Col 25 to 27

Number of wells provided by the project

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

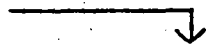
Col 28 to 31

35

Foreign assistance to the project

Was the foreign assistance:

(List your replies in order of importance)



financial assistance

| |
|--|
| |
|--|

Col 32

- what were the funds assigned to

- amount of assistance

| |
|--|
| |
|--|

33

organisational assistance

| |
|--|
| |
|--|

Col 34

- at what level

- amount of assistance

| |
|--|
| |
|--|

35

technical assistance

| |
|--|
| |
|--|

Col 36

- at what level

- amount of assistance

| |
|--|
| |
|--|

37

assistance for training

| |
|--|
| |
|--|

Col 38

- what type of training

- amount of assistance

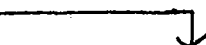
| |
|--|
| |
|--|

39

36

Operations undertaken by the project

(List your replies in order of importance)



- construction of new water schemes

| |
|--|
| |
|--|

Col 40

- improvement of existing schemes

| |
|--|
| |
|--|

Col 41

- operation and maintenance

| |
|--|
| |
|--|

Col 42

- organisation and training of personnel

| |
|--|
| |
|--|

Col 43

- any other operation (please specify)

| |
|--|
| |
|--|

Col 44

37 Description of the type of installations covered by the project

(List your replies in order of importance)

- protection of the water point: how many ----- Col 45
- hand pumps: how many ----- Col 46
- powered pump: how many ----- Col 47
- piped supply with public water points:
 how many points ----- Col 48
- up to 50% house connections Col 49
- over 50% house connections Col 50
- individual rain water catchment tanks Col 51

Characteristics of the installations

- Water storage - collective: capacity ?..... 1 Col 52
- . surface 2
 - . elevated 3 53
 - . other characteristics: specify.. 4 54
-
-
-

38 Origin of the water used by the project

(List your replies in order of importance)

- underground Col 55
 - surface water Col 56
 - rain water Col 57
 - exact origin Col 58
-

39 Quality of the water used by the project

- treated water: % of installations Col 59-61
- non treated water: % of installations..... Col 62-64

40 Distribution system

- pumped: % of installations Col 65-67
- gravity fed: % of installations..... Col 68-70

LOCAL OPERATION OF THE PROJECT

Organisation of the construction. Often, before work is started, the project sets up or uses an existing village organisation to organise or oversee the work.

Copy
1 to 6
and 3
7

41 Are there any such village organisations which have a responsibility in implementing the project ?

Yes
No

1
2

Col 8

If so, what is their name If no, go direct to **45**

→

42 Were they specifically created for the water supply ?

Yes
No

1
2

Col 9

↓ If not, what were their tasks outside water supply?

43 How many members were there in this organisation ?

Numbers: - villagers
 - local administration
 - representatives of the water service...
 - others, specify

Col 10-11
Col 12-13
Col 14-15
Col 16-17

←

44 What were their activities in general ?

- choice of level of service
- choice of technical specifications.....
- determination of the construction charges to be born by the population
- determination of the charges for the utilisation of water
- collection of the village financial contribution
- organisation of village labour.....
- other activity (give details)

1
2
3
4
5
6
7

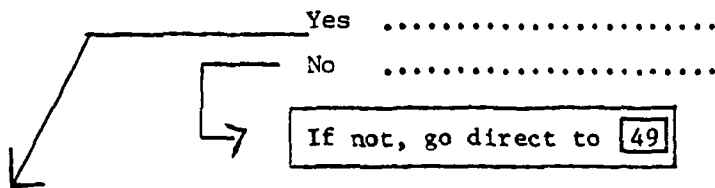
Col 18

↓

ORGANISATION OF OPERATION AND MAINTENANCE

45

Is there a village organisation in charge of the management and utilisation of the installations ?



| |
|---|
| 1 |
| 2 |

Col 19

If yes, what is their name -----

46

Was this organisation specially created for the running of the water supply ?

Yes
No

| |
|---|
| 1 |
| 2 |

Col 20

If not, what are the tasks of this organisation

47

How many members has it ?

- Numbers: - villagers
- local administration
- utilisers of the water
- representatives of the water service
- ← others (specify)

| | |
|--|--|
| | |
| | |
| | |
| | |
| | |

Col 21-22
Col 23-24
Col 25-26
Col 27-28
Col 29-30

48

What are the activities of this organisation?

- determination of water rates
- collection of charges
- operation and maintenance
- improvement and/or extension of the installations, or services
- - other activities (specify)

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |

Col 31

V - STAGES OF THE PROJECT

Leave Blank

CONSTRUCTIONAL WORK

49

Progress of operations

Average time elapsing in months between the decision and the beginning of construction work

- in months Col 33-34
- date at which work began Col 35-38

| | |
|-------|------|
| month | year |
|-------|------|
- duration of the work (months) Col 41-44
- date of termination of foreign assistance in respect of operations included in survey Col 41-44

| | |
|-------|------|
| month | year |
|-------|------|
- number of months delay in construction Col 45-46
- origin of delays (climate, materials, etc.)

47

OPERATION AND MAINTENANCE

50

Who repairs the installations:

- a team from the project 1 Col 48
- a team exterior to project (e.g.national organisation) 2
- by nobody 3

Composition of this maintenance team

- number of engineers and management - nationals Col 49-50
- number of engineers and management - foreign Col 51-52
- number of foremen and skilled labour Col 53-54
- village labour Col 55-57

How many wells or villages do the personnel cover ? Col 58-61

CONDITIONS OF WORK WITHIN THE PROJECT

51

A comparison of the conditions of work (salary, working conditions, promotion)within the project and in other organisations

62

52

Do the project personnel have any particular benefits?

Yes

No

1
2

Col 63

If so, please enumerate

64

VI - COSTS

Leave Blank

Copy 1 to 6

4
7

53

INVESTMENT BREAKDOWN

| Contribution from: | Amount | Percentages of Total Cost | |
|---|--------|---------------------------|--------------|
| - central authorities | | <input type="text"/> | Col 8 9 10 |
| - regional authorities | | <input type="text"/> | Col 11 12 13 |
| - local authorities | | <input type="text"/> | Col 14 15 16 |
| - foreign or international organisation | | <input type="text"/> | Col 17 18 19 |
| - villagers (cash) | | <input type="text"/> | Col 20 21 22 |

If there is a village contribution, is it a contribution:

| | | |
|---------------------|---|--------|
| - of work | 1 | Col 23 |
| - of material | 2 | |
| - of cash | 3 | |

If available, please indicate the village contribution by percentages

| | | |
|---------------------|----------------------|-----------|
| - of work | <input type="text"/> | Col 24-26 |
| - of material | <input type="text"/> | Col 27-29 |
| - of cash | <input type="text"/> | Col 30-32 |

Total cost of project

33 34 35 36 37 38

54

COST OF CONSTRUCTION PER UNIT

What can be considered as this unit: (village, well, etc.)

39

What is the approximate cost per unit ?

40 41 42 43 44

55

BREAKDOWN OF CONSTRUCTION COSTS

Leave Blank

For preference, please give unit costs. But if unit costs not available give the total construction costs of the project.

- the costs given are: per unit 1
- or per whole project 2

Col 45

- number of man months for:

- engineers and management -----

| | | | |
|----|----|----|----|
| | | | |
| 46 | 47 | 48 | 49 |

- foremen and skilled men -----

| | | | | |
|----|----|----|----|----|
| | | | | |
| 50 | 51 | 52 | 53 | 54 |

- village labour -----

| | | | | |
|----|----|----|----|----|
| | | | | |
| 55 | 56 | 57 | 58 | 59 |

- cost of personnel, material, etc.:

| Cost | Percentage of Total Cost | | |
|----------------------------------|---|--|--|
| - engineers and management | <table border="1"><tr><td> </td><td> </td></tr></table> | | |
| | | | |
| - foremen and skilled men | <table border="1"><tr><td> </td><td> </td></tr></table> | | |
| | | | |
| - village labour | <table border="1"><tr><td> </td><td> </td></tr></table> | | |
| | | | |
| - material | <table border="1"><tr><td> </td><td> </td></tr></table> | | |
| | | | |
| - other expenses (detail) | <table border="1"><tr><td> </td><td> </td></tr></table> | | |
| | | | |
| ----- | | | |
| ----- | | | |
| ----- | | | |
| ----- | | | |

Col 60-61

Col 62-63

Col 64-65

Col 66-67

Col 68-69

| |
|----|
| |
| 70 |

56

If available, please give the approximate average cost for the different types of installation.

Copy 1 to 6 and 5
7

- protection of a water point: -----

| | | | |
|---|---|----|----|
| | | | |
| 8 | 9 | 10 | 11 |

- installation with a hand pump: -----

| | | | |
|----|----|----|----|
| | | | |
| 12 | 13 | 14 | 15 |

- installation with a motorised pump: -----

| | | | |
|----|----|----|----|
| | | | |
| 16 | 17 | 18 | 19 |

- piped supply - only public points: -----

| | | | |
|----|----|----|----|
| | | | |
| 20 | 21 | 22 | 23 |

- piped supply with house connections : -----

| | | | |
|----|----|----|----|
| | | | |
| 24 | 25 | 26 | 27 |

- distribution of water by pump: -----

| | | | |
|----|----|----|----|
| | | | |
| 28 | 29 | 30 | 31 |

- distribution of water by gravity: -----

| | | | |
|----|----|----|----|
| | | | |
| 32 | 33 | 34 | 35 |

What is the cost of the material imported and/or
what is the percentage of material imported to
total cost ?

36 37

57 Cost of operation and maintenance

- for the whole project: -----

38 39 40 41 42

- per unit: -----

43 44 45 46 47

- per head of population: -----

48 49 50 51

58 Charges (or taxes) paid by the villagers

What is the charge (or tax for water) by household
and per year:

- in the case of a public source
- for private connection
- there are no charges

Col 52-56
Col 57-61
Col 62

How are the charges calculated:

| | For a Public Source | For Private Connection |
|--|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> |
| | 63 | 64 |

- | | | |
|--|--------------------------|--------------------------|
| - by the cost of the installations..... | <input type="checkbox"/> | <input type="checkbox"/> |
| - by the ability of the villagers to pay | <input type="checkbox"/> | <input type="checkbox"/> |
| - by the quantity of water used | <input type="checkbox"/> | <input type="checkbox"/> |
| - by predetermined standards | <input type="checkbox"/> | <input type="checkbox"/> |
| - by the type of service obtained | <input type="checkbox"/> | <input type="checkbox"/> |

- other criteria, specify -----

65

59

What percentage of operation and maintenance is covered by the charges ?

| | | |
|--|--|--|
| | | |
|--|--|--|

Col 66-68

60

Do the charges also cover part of the cost of construction ?

Yes

| |
|---|
| 1 |
| 2 |

Col 69

No

If so, please give the percentage construction costs covered by the charges:

| | | |
|--|--|--|
| | | |
|--|--|--|

Col 70-72

61

Last year, what was the percentage of the charges recovered ?

- less than 25%
- from 26% to 50%
- from 51% to 75%
- from 76% to 99%
- 100%
- non recovered

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |

Col 73

VII - A BRIEF QUALITATIVE ASSESSMENT OF THE WATER SUPPLY PROJECT

This part is a verbatim assessment complementing the data collected.

The paper should include :

1. Project background and local environment;
2. The different stages of the project;
3. Project implementation :
 - an assessment of the design and level of services of the water project (technology used);
 - an assessment of the strength and weaknesses of the organisational structure;
 - an assessment of the financial situation and the possibility for cost recovery;
 - a short description of the most important constraints and bottlenecks.
4. Replicability
 - an assessment of the possibility of using the same approach in other areas and villages;
 - an assessment of self-sufficiency of the project.
5. Lessons for design and implementation

Describe the various lessons that are offered by the project experience.

ANNEX IV

Questionnaire 3: Village Level Questionnaire

COUNTRY

TITLE OF PROJECT

NAME OF VILLAGE

REGION

| Leave Blank | |
|--------------------------|---------|
| _____ | Col 1-2 |
| _____ | Col 3-4 |
| _____ | Col 5-6 |
| <input type="checkbox"/> | |
| 7 | |

HOW TO FILL IN THIS QUESTIONNAIRE

I. Introduction

This questionnaire should be given to a sample section of villages benefiting from a water installation constructed by the project. It should be filled in during a visit to the village and should reflect the actual situation of the village.

The information requested in this questionnaire is divided into two categories:

1. Precise information on the description and function of the hydraulic installations in each of the sample villages. You can obtain this information:

1. by direct observation of the situation in the village;
2. by questioning the village authorities and the villagers themselves;
3. by questioning those in charge of the project and of the village's hydraulic installations and by reading their progress reports.

Note: It is a case of knowing the situation as it actually exists in the village and not as it should exist. The information obtained from those in charge of the project should be checked by direct observation.

2. More general information on the village environment (Part III)

This information will, by definition, be more approximate. To reply to these questions, we ask you :

- to question those in charge of the village;
- to question technical staff working in the village, (teachers, extension workers, medical staff, etc.);
- to possibly consult existing documentation on the village or region (feasibility study, etc.);
- to make an accurate as possible estimation of what you yourself have observed in each village.

Note: The information obtained should be the best estimation available to a careful observer during a short stay in the village.

II. Instructions for filling in the questionnaire

To facilitate the understanding and use of this questionnaire, you are asked to respect the following instructions :

- 1. Wherever possible, please answer all the questions.
- 2. To reply you should, according to the question :
 - either encircle the number(s) corresponding to your replies

example: question 01

If your reply is "a personality" you encircle number 2. Then next to "who?" you write which person is concerned.

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |

- or write the numbers which correspond to your reply in the appropriate boxes. Put one number in each box and keep your numbers to the right

example: question 42

if your answer is 8

| | | |
|--|--|---|
| | | 8 |
|--|--|---|

if your answer is 12

| | | |
|--|---|---|
| | 1 | 2 |
|--|---|---|

if your answer is 125

| | | |
|---|---|---|
| 1 | 2 | 5 |
|---|---|---|

Percentages should be noted in the same way.

example: question 67

non agricultural income

if it is 100%

| | | |
|---|---|---|
| 1 | 0 | 0 |
|---|---|---|

if it is 56%

| | | |
|--|---|---|
| | 5 | 6 |
|--|---|---|

if it is 8%

| | | |
|--|--|---|
| | | 8 |
|--|--|---|

- 3. When the question concerns a date, you should write the months and years in figures as follows:

example: question 49

if answer = June 1970

| | | | |
|-------|---|------|---|
| 0 | 6 | 7 | 0 |
| month | | year | |

I - DESCRIPTION OF PROJECT

Leave Blank

ORGANISATION OF PROJECT

(Please complete the following questions by circling the appropriate number)

01 Who originally requested these installations ?

- villagers or their representatives
- a personality
Who ? _____
- local administration
Who ? _____
- central administration or national body
Name _____
- private national organisation
Name _____
- international organisation, society or country
Name _____

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |

Col 8

02 Who prepared the project ?

- villagers or their representatives
- a personality
Who ? _____
- local administration
Who ? _____
- central administration or national body
Name _____
- private national organisation
Name _____
- international organisation, society or country
Name _____

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |

Col 9

Leave Blank

03

Who participated in its implementation ?

- villagers or their representatives
- a personality
Who ? -----
- local administration
Who ? -----
- central administration or national body
Name -----
- private national organisation
Name -----
- international organisation, society or country
Name -----

1

Col 10

2

3

4

5

6

04

Who financed the operations ?

- villagers or their representatives
- a personality
Who ? -----
- local administration
Who ? -----
- central administration or national body
Name -----
- private national organisation
Name -----
- international organisation, society or country
Name -----

1

Col 11

2

3

4

5

6

05

Who actually is responsible for maintenance in the village ?

- villagers or their representatives
- a personality
Who ? -----
- local administration
Name -----
- central administration or national body
Name -----
- private national organisation
Name -----
- international organisation, society or country
Name -----
- there is no maintenance

1

Col 12

2

3

4

5

6

7

06

Who fixed the amount of the charges (or taxes) for water to be paid by the villagers ?

- villagers or their representatives
- a personality
Who ? _____
- local administration
Who ? _____
- central administration or national body
Name _____
- private national organisation
Name _____
- international organisation, society or country
Name _____
- there are no charges (or taxes) for water

1
2
3
4
5
6
7Leave Blank

Col 13

07

Who apportioned the charges among the villagers ?

- villagers or their representatives
a personality
Who ? _____
- local administration
Who ? _____
- central administration or national body
Name _____
- private national organisation
Name _____
- international organisation, society or country
Name _____
- there are no charges (or taxes) for water

1
2
3
4
5
6
7

Col 14

03

Who collects the charges for water ?

- villagers or their representatives
- a personality
Who ? _____
- local administration
Who ? _____
- central administration or national body
Name _____
- private national organisation
Name _____
- international organisation, society or country
Name _____
- there are no charges (or taxes) for water

1
2
3
4
5
6
7

Col 15

Leave Blank

09 Who chose the site for the installations ?

- villagers or their representatives
- a personality

Who ? -----

- local administration

Name -----

- central administration or national body

Name -----

- private national organisation

Name -----

- international organisation, society or country

Name -----

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |

Col 16

ORGANISATION OF THE WORK

Often before the start of work, those responsible set up or use an existing village organisation to organise or control the project.

10 Has a village organisation been used to execute the project ?

Yes

No

| |
|---|
| 1 |
| 2 |

Col 17

If so, what is its name

If No, go directly to Question 14

11 Was this organisation specifically created for the water supply project ?

Yes

No

| |
|---|
| 1 |
| 2 |

Col 18

If not, what else did it do ? -----

12 How many members has this organisation ?

(Write numbers in the space provided)

- Numbers :
- villagers
 - local administration
 - representatives of water service
 - ← others, specify

| | |
|--|--|
| | |
| | |
| | |
| | |

Col 19-20
Col 21-22
Col 23-24
Col 25-26

Leave Blank

13 Would the construction of these installations without the intervention of this organisation have been:

- more effective 1
- less effective 2
- as effective 3

Col 27

14 How many villagers have participated in the construction work ?

- number of villagers paid | |
- number of villagers not paid or paid in kind | |

Col 28-29

Col 30-31-32

15 On average, how many days has each villager worked ?

- paid worker | |
- non paid | |

Col 33-34

Col 35-36

ORGANISATION OF OPERATION AND MAINTENANCE

16 Has the village organisation been made responsible for the management and operation of the installation ?

- Yes 1
- No 2

Col 37

If yes, what was their name

[]

If not, go direct to question 21

38

17 Was this organisation specifically created for the management of the water supply ?

- Yes 1
- No 2

Col 39

If not, what are the other functions of this organisation :

18 How is the organisation made up ?

- Numbers:
- of villagers | |
 - local administration | |
 - users | |
 - representatives of the water service... | |
 - others (specify) | |

Col 40-41

Col 42-43

Col 44-45

Col 46-47

Col 48-49

[]

Leave Blank

19

What is the function of this organisation ?

- to determine the charges for water.....
- collect the charges
- operation and maintenance of the installations..
- improvements or extension of the services
- other activities (specify)

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |

Col 50

20

Is this organisation effective ?

- To collect the charges

- Yes
- No

| |
|---|
| 1 |
| 2 |

Col 51

Why ? -----

- For the operation

- Yes
- No

| |
|---|
| 1 |
| 2 |

Col 52

Why ? -----

- For the repairs

- Yes
- No

| |
|---|
| 1 |
| 2 |

Col 53

Why ? -----

21

Is there a caretaker or someone responsible for the installations ?

- Yes
- No

| |
|---|
| 1 |
| 2 |

Col 54

→ If no, go direct to question 25

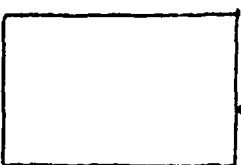
22

Who appoints the caretaker ?

- the villagers
- the village authorities
- the local administrative authorities
- the project itself
- ← others (specify)

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |

Col 55



| | | | | |
|----|--|-----------|---|--------|
| 23 | Is the caretaker paid ? | Yes | 1 | Col 56 |
| | | No | 2 | |
| 24 | With what funds is he paid ? | | | |
| | Funds of: - villagers | | 1 | Col 57 |
| | - village authorities | | 2 | |
| | - local administration authorities | | 3 | |
| | - project | | 4 | |
| | ← others (specify) | | 5 | |

FINANCIAL PARTICIPATION OF THE POPULATION IN THE PROJECT

a) Participation in the costs of construction

Copy 1 to 6
and 2
7

| | | | | |
|----|---|-----------|---|-----------|
| 25 | Have the population had to pay a certain sum before the start of work ? | Yes | 1 | Col 8 |
| | | No | 2 | |
| | If so, how much ? | | | |
| | - by the village ..... | \| \| \| \| \| |  | Col 9-14 |
| | or - by household ..... | \| \| \| \| \| |  | Col 15-19 |
| | or - per person ..... | \| \| \| \| \| |  | Col 20-24 |

| | | | | |
|----|---|-----------|---|-----------|
| 26 | Did the population pay a further sum at the end of the work ? | Yes | 1 | Col 25 |
| | | No | 2 | |
| | If so, how much ? | | | |
| | - by the village ..... | \| \| \| \| \| |  | Col 26-31 |
| | or - by household ..... | \| \| \| \| \| |  | Col 32-36 |
| | or - per person ..... | \| \| \| \| \| |  | Col 37-41 |

| | | | | |
|----|--|---------|--|-----------|
| 27 | What is the % participation by the population in the total cost of the project ? | % ..... | \| \| | Col 42-43 |
|----|--|---------|--|-----------|

Leave Blank

b) Regular charges for operation and maintenance

28 What are the charges per household per year ?

- public water point

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
|--|--|--|--|--|--|

 Col 44-48
- private connection

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
|--|--|--|--|--|--|

 Col 49-53
- there are no charges

| |
|---|
| 1 |
|---|

 Col 54

29 What criteria are used to calculate the charges ?

| | Public Water point | Private Connection |
|--|--------------------|--------------------|
| | Col 55 | Col 56 |
| - cost of the water | 1 | 1 |
| - ability of the villagers to pay | 2 | 2 |
| - quantity of water used | 3 | 3 |
| - predetermined levels | 4 | 4 |
| - by the type of service or installation | 5 | 5 |
| - other criteria (specify) | 6 | 6 |

→

30 What is the % of the cost of operation and maintenance covered by the charges ?

%

| | | |
|--|--|--|
| | | |
|--|--|--|

 Col 57-59

31 Do the charges also cover a part of the construction cost ?

Yes

| |
|---|
| 1 |
|---|

 Col 60
No

| |
|---|
| 2 |
|---|

If so, what is the % recovered

%

| | |
|--|--|
| | |
|--|--|

 Col 61-62

32 Last year, what % of the charges were collected ?

- less than 25%

| |
|---|
| 1 |
|---|
- 25% to 50%

| |
|---|
| 2 |
|---|

 Col 63
- 50% to 75%

| |
|---|
| 3 |
|---|
- 75% to 99%

| |
|---|
| 4 |
|---|
- 100 %

| |
|---|
| 5 |
|---|

Leave Blank

33 What measures are taken in practice when charges are not paid by a household ?

┌

64

34 Who decides to apply these measures ?

┌

65

RESULTS OF THE PROJECT

35 What types of water points have been installed in the village ?

- Improvement of an existing supply:
 - How many
- Hand pumps:
 - How many
- Motorised pump :
 - How many
- Piped supply with public hydrants:
 - How many points
- Piped supply with private connections:
 - How many connections
- Rainwater catchment tanks:
 - How many

┌ Col 66

┌┌ Col 67-68

┌┌ Col 69-70

┌┌ Col 71-72

┌┌┌ Col 73-75

┌┌┌ Col 76-78

36 What is the method of water storage ?

- surface storage
- raised storage
- no collective storage

┌ 1

┌ 2 Col 79

┌ 3

What is the capacity of the collective storage? :

┌

80

37 What is the water source for the installations ?

- underground
- surface
- rainwater

┌ 1

┌ 2

┌ 3 Col 8

Copy 1 to 6
and 3
7

Leave Blank

| | | | | |
|----|--|---|-----------|--|
| 38 | Quality of water used by the project ? | | | |
| | - water treated | 1 | Col 9 | |
| | - water untreated | 2 | | |
| 39 | Distribution system | | | |
| | - by pump | 1 | Col 10 | |
| | - by gravity | 2 | | |
| 40 | What is the % of installations at present out of order ? | | | |
|  | % ..... | \| \| | Col 11-12 | |
| | /if 100 %, put 99/ | | | |
| 41 | Why are they out of order ? | | | |
|  | ----- ----- ----- |  | \| \| 13 | |
| 42 | Duration of the longest breakdown last year ? | | | |
| | No. of days ..... | \| \| \| | Col 14-16 | |
| 43 | Since completion, have the installations been : | | | |
| | - extended | 1 | Col 17 | |
| | - unchanged | 2 | | |
| | - reduced | 3 | | |
| 44 | And has the output been: | | | |
| | - increased | 1 | Col 18 | |
| | - left the same | 2 | | |
| | - reduced | 3 | | |

Leave Blank

II - COMPARISON OF DIFFERENT WATER POINTS
IN THE VILLAGE

45

How many times per day do you collect water ?

| Traditional water points in the village | | New water points (of the project) |
|---|-----------------------|-----------------------------------|
| Wells | River spring swamp | |
| 1 19 | 1 20 | 1 21 |

46

On average, how long does it take to go from the house to the water point ?

- less than 1/4 hour
- from 1/4 to 1/2 hour
- 1/2 to 1 hour.
- 1 to 2 hours
- 2 to 5 hours
- more than 5 hours

| | | |
|-----------------------------------|-----------------------------------|-----------------------------------|
| 1 2 3 Col 22 4 5 6 | 1 2 3 Col 23 4 5 6 | 1 2 3 Col 24 4 5 6 |
|-----------------------------------|-----------------------------------|-----------------------------------|

47

Quality of the water point according to the villagers

Is the water point:

- good for health ?
- bad for health ?
- indifferent ?

| | | |
|----------------|----------------|----------------|
| 1 2 25 3 | 1 2 26 3 | 1 2 27 3 |
|----------------|----------------|----------------|

48

Sufficiency of supply

- sufficient in dry season
- insufficient in dry season
- dry in dry season
- sufficient in rainy season

| | | |
|---------------------|---------------------|---------------------|
| 1 2 28 3 4 | 1 2 29 3 4 | 1 2 30 3 4 |
|---------------------|---------------------|---------------------|

49

Hygienic conditions around the water point

Is the water point:

- very clean
- clean enough
- dirty
(rubbish, stagnant water, etc.)

| | | |
|----------------|----------------|----------------|
| 1 2 31 3 | 1 2 32 3 | 1 2 33 3 |
|----------------|----------------|----------------|

Leave Blank

| | Traditional water points in the village | | New water points (of the project) | | | | | | | | | | | | | | | | | | |
|--|--|--------------------|-----------------------------------|----|----|---|----|--|----|----|---|----|----|----|--|---|---|---|----|----|----|
| | Wells | River spring swamp | | | | | | | | | | | | | | | | | | | |
| <p>50 <u>Proportion of the population using the water point</u></p> <p>%</p> | <table border="1"> <tr> <td>□</td> <td>□</td> <td>□</td> </tr> <tr> <td>34</td> <td>35</td> <td>36</td> </tr> </table> | □ | □ | □ | 34 | 35 | 36 | <table border="1"> <tr> <td>□</td> <td>□</td> <td>□</td> </tr> <tr> <td>37</td> <td>38</td> <td>39</td> </tr> </table> | □ | □ | □ | 37 | 38 | 39 | <table border="1"> <tr> <td>□</td> <td>□</td> <td>□</td> </tr> <tr> <td>40</td> <td>41</td> <td>42</td> </tr> </table> | □ | □ | □ | 40 | 41 | 42 |
| □ | □ | □ | | | | | | | | | | | | | | | | | | | |
| 34 | 35 | 36 | | | | | | | | | | | | | | | | | | | |
| □ | □ | □ | | | | | | | | | | | | | | | | | | | |
| 37 | 38 | 39 | | | | | | | | | | | | | | | | | | | |
| □ | □ | □ | | | | | | | | | | | | | | | | | | | |
| 40 | 41 | 42 | | | | | | | | | | | | | | | | | | | |
| <p>51 <u>Number of water points dry or out of use</u></p> | <table border="1"> <tr> <td>□</td> <td>□</td> </tr> <tr> <td>43</td> <td>44</td> </tr> </table> | □ | □ | 43 | 44 | <table border="1"> <tr> <td>□</td> <td>□</td> </tr> <tr> <td>45</td> <td>46</td> </tr> </table> | □ | □ | 45 | 46 | <table border="1"> <tr> <td>□</td> <td>□</td> </tr> <tr> <td>47</td> <td>48</td> </tr> </table> | □ | □ | 47 | 48 | | | | | | |
| □ | □ | | | | | | | | | | | | | | | | | | | | |
| 43 | 44 | | | | | | | | | | | | | | | | | | | | |
| □ | □ | | | | | | | | | | | | | | | | | | | | |
| 45 | 46 | | | | | | | | | | | | | | | | | | | | |
| □ | □ | | | | | | | | | | | | | | | | | | | | |
| 47 | 48 | | | | | | | | | | | | | | | | | | | | |

III - VILLAGE CHARACTERISTICS

Leave Blank

Copy 1 to 6
and $\frac{4}{7}$

55 Number of inhabitants of the village:

Grid for question 55

Col 8-11

56 Names and the approximate % of the main ethnic groups, tribes or casts in the village:

Dashed lines for question 56

Box 12

57 Names and approximate % of the main religions of the village :

Dashed lines for question 57

Box 13

58 Proportion of the village land cultivated for home consumption and proportion under market crops:

- home consumption crops.....
- market crops

Grid for question 58

Col 14-15
Col 16-17

59 What is the average yield/hectare in the village (or area) of the 3 or 4 main crops ?

(hectares/acres*)

Dashed lines for question 59

Boxes 13, 19, 20

* cross out whichever does not apply.

60 Approximate size of the holdings farmed by the poorest villagers (this refers to villagers who own the crops they produce):

Dashed line for question 60

Box 21

61 Approximate size of the holdings farmed by the richest villagers (farmed by themselves or their employees)

Dashed line for question 61

Box 22

62

Do the villagers have:

- a school at less than 2 hours walking distance ?

Yes 1

Col 23

No 2

- a dispensary or hospital at less than one days walking distance ?

Yes 1

Col 24

No 2

- an agricultural cooperative in the village ?

Yes 1

Col 25

No 2

- a Party cell in the village ?

Yes 1

Col 26

No 2

- a place where certain medical supplies can be purchased in the village ?

Yes 1

Col 27

No 2

63

Is the village situated on a road ?

- on a main road 1

Col 28

- on a secondary road 2

- on a local road 3

If on a local road:

How far is the nearest main or secondary road ?

Km: | | |

Col 29-31

64

Is there any communal village land which can be used by everyone ?

Yes 1

Col 32

No 2

Do the villagers participate from time to time in unpaid collective agricultural work ?

Yes 1

Col 33

No 2

Leave Blank

| | | | |
|----|---|---|-----------|
| 65 | <u>Approximately what % of households :</u> | | |
| | - use fertilisers ? ..... | \| \| | Col 34-35 |
| | - use insecticides/pesticides?..... | \| \| | Col 36-37 |
| | - use an animal drawn plough ? ..... | \| \| | Col 38-39 |
| | - use a tractor ? ..... | \| \| | Col 40-41 |
| | - belong to an agricultural cooperative ? ..... | \| \| | Col 42-43 |
| | - have irrigated crops ? ..... | \| \| | Col 44-45 |
| | - have electricity in the home ? ..... | \| \| | Col 46-47 |
| | - have a radio ? ..... | \| \| | Col 48-49 |
| | - have at least one man working in town or abroad ? | \| \| | Col 50-51 |
| | - send at least one child to school ? ..... | \| \| | Col 52-53 |
| | - keep poultry ? ..... | \| \| | Col 54-55 |
| | - keep small or large livestock ? ..... | \| \| | Col 56-57 |
| 66 | Apart from agriculture, what other sources of income have the villagers (trade, handicrafts, administration, etc.) ? | | |
|  | ----- |  | \| \| 58 |
| | ----- | | |
| | ----- | | |
| 67 | What is the % of villagers who have non agricultural incomes ? | \| \| | Col 59-60 |
| 68 | How many times did a doctor or nurse visit the village last year ? | \| \| | Col 61-62 |
| 69 | Is there a market in the village ? | | |
| | Yes ..... | \| 1 | Col 63 |
| | No ..... | \| 2 | |
| 70 | <u>If yes</u> , approximately how many cars and lorries come to the market on this day ? | \| \| \| | Col 64-66 |
| 71 | Before this water supply project, had the administration already undertaken other operations connected with development (e.g. health education, agricultural training, adult education, etc.) ? | | |
| | Yes ..... | \| 1 | Col 67 |
| | No ..... | \| 2 | |
| | <u>If so</u> , do these activities still exist ? | | |
| | Yes ..... | \| 1 | Col 68 |
| | No ..... | \| 2 | |

Leave blank

72

Name and address of the person completing the questionnaire :

