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214

RESEARCH PROJECT STATEMENT

March 1975

18p

1. Project Summary

Project Title:	Feasibility Study for Health and Nutrition Benefits of New or Improved Water Supplies
New/Extension:	New
Contractor and Address:	Regional Staff International Statistical Programs Center Bureau of Census Washington, D.C. 20233
Principal Investigators:	D.P. McNelis and K.K. Kindel
Duration:	One Year
Estimated Total Cost:	$195,612
Project Manager:	J.P. Keeve, AID/TA/N

Narrative Summary

International agencies make water supply investments in less developed countries on the faith that these outlays return substantial health benefits. That faith is based partially on theories of how disease is transmitted and partially on the speculation of the value of health improvements. These theories have been subjected to little well-designed research and remain largely untested. This project proposes to devise a methodology (research design) which may be used to execute a major scientific prospective study to test the impact of water supplies on health particularly regarding diarrheal diseases and nutrition.

The proposed study will search for other factors besides contaminated water, such as diet and hygienic practices which affect health and nutritional status. Diarrhea is highly concentrated in pre-school, particularly weanling, children. This study will develop research methods to investigate the specific role of water in diarrheal disease among children, test the feasibility of the approach, and will design the necessary procedures for undertaking a full-scale study.

2. Purpose and End-Products

A. The purpose of this feasibility study is to design and pretest a research methodology to study the impact of new or improved water supplies in developing countries. Intrinsic to this study is the requirement that research tools such as survey instruments, sampling and statistical approaches, data collection methods, processing and analysis systems and appropriate indicators, will be devised and created for use in testing a set of hypotheses which will be acceptable to developing countries around the world.

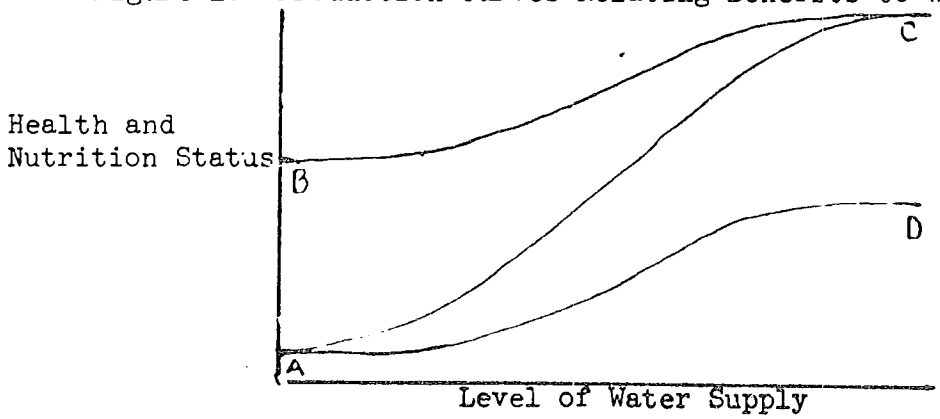
Census will develop the experimental design, the sampling protocol, subject matter content of questionnaires, editing, coding and other manual systems and procedures, enumerator training manuals, data processing specifications, table outlines and final report outlines, etc., and will be responsible for organizing and supervising the data collection and processing. The Bureau will also be responsible for collecting water samples and arranging for their appropriate analysis, and making anthropomorphic and other physical measurements during the study. A series of publications will be written for documenting these various steps and procedures.

B. The ultimate goal of this research is to provide foreign assistance agencies with evaluative guidance to use in making judgments and decisions in the water supply field. For example, investors and donors could base their decisions on the following criteria:

1. Priority ranking of a particular site at a particular time.
2. Comparison and benefits of a water supply project as an alternative to other social or economic development projects (opportunity cost).
3. Knowledge of preconditions required to maximize the success of the project according to an established set of indicators.

The essence of this research is depicted in Figure 1 in which health and nutrition status are related to investment level of water use. The Y-intercepts at A and B refer to differential levels of initial health conditions which may improve gradually (curve AD or BC) or rapidly (curve AC) with increasing water use. The points C and D represent diminishing output returns for increasing investment. The feasibility study will provide the instruments for determining the shape of the curve and make it possible to eventually fix the points of diminishing returns.

Figure 1. Production Curves Relating Benefits to Water Supply



C. Worldwide Applicability

The investment guidance provided by the results of this research project will be useful to the International Assistance Community and the methodology designed so that the standardized methods, tools, instruments, procedures, criteria, definitions and indicators will be generally applicable or adaptable worldwide.

The Field Laboratory - Brazil

This research will be conducted in Brazil because:

1. It provides the necessary population and geographic scale required to obtain the scientific evidence to confirm or reject the hypotheses of the experimental design.

2. The substantial investment funds needed to construct the water supply systems have been committed by the World Bank and the host government.

3. An appropriate mix of environmental and demographic conditions is present within the setting of the project.

4. The schedule of activities and events will permit careful planning and monitoring of the project within the projected time frame.

The World Bank loan of U.S. $36 million to partially fund water supply investments in over 722 communities in Minas Gerais has both created the opportunity and underlined the need for this study. The Minas Gerais project represents a major step toward realizing the Bank's broad goal of reaching those who live in rural areas of developing countries. Investments in water systems in rural towns have the least secure financial return, but it is suspected, the greatest return in health benefits.

The Minas Gerais project has created a unique opportunity for the study of these questions in that (1) one entity (COPASA) supervised by the Bank will make multiple investments to initiate or improve water supply systems in communities of various sizes over several years and (2) the cooperation of the entity and the relevant health authorities is assured. Conditions for this type of research--a veritable field laboratory of hundreds of towns--have not existed before.

3. Significance and Rationale for the Research

A. The Foreign Assistance Act of 1973 specifically calls for U.S. development cooperation to focus on critical problems in those functional sectors which affect the lives of the majority of an LDC's people: food production; rural development; and nutrition and health; and give highest priority to undertakings which directly improve the lives of the poorest and their capacity to participate in their country's development. The Minas Gerais World Bank Water Supply Loan Project is the first water supply loan of a sector-program type encompassing an entire State of a

major nation and directed towards the development problems of the poorest, mostly rural segment of twelve million people.

B. A resolution passed by the plenary session of 122 participating nations at the World Food Conference held in November 1974, calls for more worldwide effort to provide water to the millions of people still lacking public water supplies.

C. Applied and operational research such as this study is unique to the Technical Assistance Bureau's mission and function within AID.

D. Transporting household water in LDC's is the woman's task. This project thus responds to the Percy Amendment to improve the standard of living and lives of women in LDC's.

E. This project also represents a unique opportunity for AID to assess the effectiveness of a non-nutrient solution (water supplies and health) to worldwide nutrition problems.

AID has been encouraged by the Bank to assist in the research needed to appraise the impact of this pioneer large-scale investment effort in order to help answer fundamental questions still not answered satisfactorily:

1. What are the nature and magniture of water supply benefits?

2. Under what conditions are benefits realized?

3. What indicators could be used in the regular appraisal of water supply programs to select and design projects in an economical way?

The Bank has gone to some length to determine whether or not a study such as this should be attempted. Warford and Saunders' paper on "Village Water Supply and Sanitation in Less Developed Countries," Keeve and Wall's paper on "Water Supply, Diarrheal Disease, and Nutrition: A survey of the Literature and Recommendations for Research," and D.J. Bradley's paper on "Measuring the Health Benefits of Investments in Water Supply," all address the issue of whether or not studies already completed have adequately resolved the questions surrounding the impact of improved water supplies on health. All agree that these questions have not been adequately answered. The latter two have specifically recommended a research project of the type envisioned in Minas Gerais. In addition, a fourth paper, that of the Ad-Hoc Working Group on Rural Potable Water Supply and Sanitation, "Report of the Meeting of the Technical Panel on Rural Potable Water Supply and Sanitation," recommended a study very similar to this one. While not minimizing the difficulties, Dr. Bradley (a leading expert in this field) concluded such a project could be successful and because of its importance, should be undertaken.

White, Bradley and White in their book "Drawers of Water" diagram the relation of disease prevalence to water, dividing diseases into two categories: those which are related to the quantity or volume of water and those related to the purity or quality of water.

They state that these two classes of diseases react to different variables and point out that water-borne diseases (such as typhoid) are due to polluted supplies and "reach their greatest importance in urban areas where the number of households per source is highest and for their prevention require completely pure supplies." On the other hand, diseases such as skin sepsis are "clearly of the water-washed category and prime need in most rural areas is for a more accessible supply of greater volume.". "Diarrheal diseases also seem to diminish when water supplies are more accessible" although they note that their precise etiology is not clear and other factors are important.

It may be useful to note that the authors also point out that there is a basic difference between households which are connected to a piped water supply and those which are not (and must carry their water) in terms of volume consumed. The water consumption ranged from 4 to 21 liters in households which had to carry water versus 30 to 254 liters per capita in connected households. This is significant for the design of this research where quantity and accessibility are used as experimental variables.

4. Plans to Coordinate and Link Research

The prototype study will be conducted in the State of Minas Gerais, Brazil, where the World Bank is making a major loan for expanding the public water supply to areas which are now without it. The World Bank and the Water Authority in Minas Gerais (COPASA) are both interested in the study and have indicated they will give their full support to this research.

Since COPASA is interested in this project, they are willing to cooperate with the contractor as far as possible, to execute the research strategy. This permits an unusual opportunity to set up a research design without being overly concerned with losing the results because of non-experimental interference.

The study is intended for worldwide application. The contractor, the International Statistical Programs Center of the Bureau of Census, will work with AID, the World Bank, the National Center for Health Statistics, the Center for Disease Control of HEW, and PAHO along with various Brazilian agencies. CDC, NCHS, PAHO and IBRD will review the final protocol for technical competence and will provide continuing advice and consultation, as needed, throughout the study. A panel of expert advisors has been established by AID to advise and consult on the various aspects of this study as they develop. The panel, which met February 19, 1975, consists of experts in the field of water supply

and related areas and representatives of interested organizations. These experts will meet once or twice a year formally and will be available individually or as small groups to provide help as the need arises. The World Bank will also have an independent expert panel review of this proposal in May 1975.

5. Plan to Facilitate Utilization of Research Results

The benefits of research dealing with these questions will have a profound influence on both donor and lending agencies and the recipients of their development efforts in LDC's. Interest in this research has been expressed by several other countries also contemplating or engaged in water supply projects, by PAHO, other offices within AID, the World Bank, by universities and individuals and organizations working in the fields of public utilities, capital and non-capital development, health and nutrition.

A series of publications are planned for documenting the various steps which will be taken to complete this study. Some of the subjects to be covered are experimental design, sampling design, definitions of health and related variables, editing and coding procedures, table design and the like. These publications will be sent to colleges and universities, professionals and technicians in related fields (from a list which will be developed), to the many lending institutions which are involved in health and water supply, and to the development community at large.

6. Management Considerations

The Bureau of the Census has a Regional Staff in the International Statistical Programs Center which is organized to carry out the general purpose survey work in this project. Through the Regional Staff, AID has access to experienced specialists in many fields in the Bureau of the Census, including economists, demographers, statisticians, data processing specialists, etc., who are essential to the successful conduct of this study.

Census will utilize medical and technical consultants as needed to fully implement this project. There will be active Brazilian participation in the study both integrally and peripherally. Questionnaire design and content, technical considerations of the experimental design, and the analytical content of this study are areas in which Brazilian participation will be essential. During the data collection phase field interviewers and supervisors will be Brazilian. They may come from the Brazilian Census Bureau (IBGE) or from other institutions or organizations such as CEDEPLAR. Data processing, including clerical editing, coding and computer-runs, will be done by Brazilians. This will be a primary area of study during the feasibility stage. Somewhat more peripherally, COPASA, the housing bank and possibly others will have responsibilities for advisory oversight and monitoring of the study at regular intervals.

7. Technical Review

The consensus of expert opinion in the water and disease literature agrees that more research is needed in the following areas which are the foci of this research:

(1) The relationship between levels of service and health benefits. Much research suggests a relation between quantity of water used and improved health, but the shape of the function relating increments in health benefits to increments in water supplies is unknown (Fig. 1).

(2) The relationship between real costs to users of obtaining water and demand for water. The relationship can be broken into two parts: relating increments in water used to decrements in distance water has to be carried for households without house connections; and relating increments in water used to decrements in unit price for connected households.

(3) The relationship between the provision of improved water supply and the provision of complementary improvements in public health, such as waste disposal or health education.

(4) The interaction of diseases directly affected by water supply (such as diarrhea) with those which are not, such a malnutrition.

The major conclusions to be drawn from major studies and a review of the literature on the impact of water supply investments are:

(1) Health effects are the main extra-financial benefits of water supply investments.

(2) There is a relation between quality of water and the reduction of water-borne diseases such as typhoid and cholera.

(3) Little is known about the health effects beyond a general association between improved quality and, particularly, increased quantity of water and a reduced incidence of enteric disease.

(4) For the purposes of rational investment decisions, more information is needed about the effect on health of the design of water projects in the context of the social, cultural, economic and educational environment for which projects are designed.

Although many of the studies reviewed suffered from impaired conceptualization or inadequate implementation, taken as a whole, the studies do show that improved water supply in terms of both quality and quantity, is associated with decreased incidence in enteric disease. Further, for most diarrheal diseases and skin infections, incidence is inversely related to volume of water used. The studies do not provide a basis for estimating incremental health benefits that can be expected from incremental investments in water supply systems. Nor did the previous studies reviewed give any indication of what pre-existing conditions or what complementary changes, if any, are needed to realize the expected health benefits.

8. Research Project Design and Methods

Only a general description of the design is given since the final research design is the objective and end-product of this study. The final design for the research will have integrated into it the sampling protocol, along with the experimental design. The technical provisions will be resolved as this first phase is completed and a final design is settled upon.

Hypotheses and Hypotheses Testing

There are certain hypotheses which this research study will test. These basic hypotheses are listed below. There are many ancillary or peripheral hypotheses, probably too many to enumerate here. In any case, this study will be so designed that any new advances, tehcniques and ideas arising during the course of project development can be incorporated into the basic analytic design without disruption of the basic plan. The following hypotheses are illustrative:

1. Mortality and morbidity will decrease as a function of higher levels of water availability holding quality constant.

2. Mortality and morbidity will decrease as a function of higher levels of sewerage facilities in use.

3. Mortality and morbidity will decrease as a function of higher levels of water quality holding level of water availability constant.

4. The combination of higher levels of water and sewerage from hypotheses (1) and (2) above will decrease mortality and morbidity to a greater extent than either alone.

5. Mortality and morbidity will decrease as a function of increasing distance (and/or time) to the water source even excluding an in-house source.

6. Holding the level of water availability and quality constant, mortality and morbidity will decrease as a function of (1) higher levels of literacy and education, (2) higher income, (3) higher levels of sanitary and child-rearing practices, (4) increased medical care, (5) better housing, (6) smaller family size, (7) higher levels of nutrition and (8) higher consumption of water.

7. Sanitary and child-rearing practices, and nutrition will improve as a function of level of water availability.

A discussion on the methodology of testing hypotheses and data collection problems is available separately.

Measurement Variables

This particular study will generate a large number of possible variables which may be difficult to measure. The objective of this feasibility study is to test those which can be given measurement dimensions and to develop limits for those variables which are less difficult to measure. The following sampling of variables from both classes have been identified and defined:

Water quality will be measured at outlet by the use of millipore filter and appropriate analysis. The water quality will also be determined at the water source using data developed by COPASA in their laboratory.

Nutrition can be measured with standardized and widely accepted anthropometric methods of height (or length) or weight and arm circumference for all preschool children.

The various demographic variables to be studied are mortality for all ages, but with concentration on 0 to 5 year olds and special attention on one and two year olds. Mortality data will be collected for the household and will include only live births. Morbidity data

for water-related diseases will be collected, and an attempt will be made to develop morbidity measures which are easier to apply than the standard bacteriological measures and are well defined. Fertility statistics will be collected during the initial part of each interview.

Sociological data will also be collected which are pertinent to household health. Specifically, the age distribution of the family in the household and family composition in terms of an extended family or a nuclear family. Also data on labor force participation of the household and income of members of the family will be collected.

Water use measures will be adapted and developed to measure the frequency water is used orally (as a food or drink), for bodily use (i.e. ablution), for washing dishes and utensils, for clothes washing, for cleaning and environment, and for all other uses. Data will be collected only for water used in the household.

Education and child-rearing practices are variables which the literature search indicated are highly correlated with infant and child survival. This study will attempt to test the effect of education through questions on highest level and grade attained, literacy, frequency or amount of time spent reading magazines or newspapers and time spent listening to the radio.

Experimental Design and Analysis

The experimental design can be conceived as having several different treatments; i.e., water supply; accessibility to water, and type of sewerage disposal. Each of these treatments is divided into various appropriate levels; water supply, which ranges from poor to little (from ponds or rain) to excellent or abundant (from modern city water systems); accessibility of water, which ranges from far away (in terms of distance and time) to in-house taps; and type of sewerage disposal, which ranges from none to modern in-house facilities. The cells of the experimental design will thus be formed from these treatments and levels, and in its final form, can be visualized as a two-dimensional design.

The experimental design contemplated at this time has three levels of water quantity or supply, three levels of sewerage disposal and three levels of water accessibility which will produce 11 cells in the design as shown below in Figure 2. The different levels of water supply have tentatively been defined as follows:

Water I - In-house taps; 24 hour continuous water availability; piped system; hand pumped or forced flow (i.e., flow controlled).

Water II - Outside of house; 24 hour continuous water availability; piped system; hand pumped or forced flow (i.e., flow controlled).

Water III - Outside house; well, cistern, river, spring, etc., uncontrolled flow.

At this point, water that is not usually available on a 24-hour basis will be excluded as will water that is bought from a supplier. These two considerations will be pretested during this study for prevalence and any problems this might incur.

There are three levels of sewerage disposal which are presently being considered for this feasibility study:

Sewerage I - flush toilet (either automatic or with bucket or other mechanism), modern, in-house, piped system.

Sewerage II - all other systems including latrines with pipe trap, etc.

Sewerage III - no system or sewerage disposal facility.

Three levels of accessibility have been defined. These are preliminary at this time and undoubtedly will be adjusted as more research on this question is completed. The levels are as follows:

Distance I - inside the household.

Distance II - less than 100 meters from the household but outside the household.

Distance III - more than 100 meters from the household.

It may also be necessary to define other obstacles to accessibility such as geographical features or lack of transport, by introducing a time element, but this will have to be tested in the field. In any case, since the sampling will be done in rural county seats, probably few problems of this type will surface.

The contemplated disign is thus two dimensional. Normally there would be 21 cells, but since Water I does not apply to Distance II and III, and Distance I does not apply to Water II and III, there are only 11 effective cells. This Latin square design is shown below (Fig. 2).

Figure 2.

	Distance I	Distance II	Distance III
Water I Sewer I		Not applicable	Not applicable
Water I Sewer II		Not applicable	Not applicable
Water I Sewer III		Not applicable	Not applicable
Water II Sewer II	Not applicable		
Water II Sewer III	Not applicable		
Water III Sewer II	Not applicable		
Water III Sewer III	Not applicable		

Note that the design allows for controls for both high and low incidence of morbidity and mortality, for the various levels of water supply. There are four basic types of households in the study; 1) households without a piped, in-house water supply for the term of the project; 2) households which have and have had for at least a few years, a piped, in-house water supply and will continue to have that supply for the term of the project; 3) households which have no piped, in-house water supply presently, but one will be installed during the term of this project; and 4) households which have a piped, in-house water supply installed within the first year of the study and continues for the term of the project.

The first two categories combine in this design to be the high and low controls for the last two. A more detailed discussion of this aspect of the study is available separately.

Design of the Sample

The design of the Water Supply sample will ultimately be modified to take advantage of what is learned in the feasibility study. The extent of the modification will depend on how well the conditions that presently exist in Brazil can be anticipated before any field work is actually done. In the meantime, it is necessary to outline the framework for a sample design that can serve as the basis for research into sample design problems during the feasibility study.

A large section of the State of Minas Gerais will be chosen as the research area. Within that area the project will be limited to county seats (Sedes dos Municipios). At present that part of the State of Minas Gerais south of Belo Horizonte (the main city) is under consideration.

Within the geographic limits thus defined, the primary universe will consist of all children under the age of 5 years. Naturally, in a broad study of the type proposed, there will be some interest in other sub-classes of the population of the research area, but the primary objective of the sample design will be to obtain an efficient probability sample of all children of less than 5 years of age within the research area. In order to select a sample of the children, it will be necessary to select a sample of households containing them.

The study is designed to permit the observation of sample households over a period of five years and measure changes that are related to various levels of water supply. The study will also permit a cross-sectional look at morbidity and mortality rates by each of the cells of the experimental design. The current thinking is to conduct as many as 6 interviews per calendar year at each sample households. A more technical discussion of the sample design is available separately.

Personnel

To complete the feasibility study, various financial and personnel resources will be required. The personnel include the partial services of the Regional Staff director, a Systems Analyst and a Mathematical Statistician, and the full-time services of the Project Director, two Survey Statisticians specializing in survey design and implementation, field measurement design, editing, coding and classification specifications, development, training and management of the field work, data processing, and data analysis, and a secretary or clerk-typist. In addition a small field staff will be required for a short period during this study. This field staff will consist of a Project Coordinator (either a Brazilian or, preferably, a resident member of the Regional Staff) and secretary, and four field interviewers.

9. Overall Cost Estimates

The overall cost estimates are shown in Figure 4. AID will fund this project and the World Bank and various other organizations have indicated they will supply technical advice as needed and will lend non-financial support to the staff for the amount of time required to provide the service.

10. Work Plan and Contract Budget

Major Tasks

The following steps are the major tasks which will be undertaken in the course of this research study. These steps correspond to the tasks shown on Figure 3.

1. Statement of Objectives - This has already been done in the various memos and papers from AID and the World Bank including a survey of literature.

2. Pre-design Reconnaissance - This will include a number of trips to Brazil, but in the beginning it includes meeting the people involved in this effort in AID/Brazil, COMAG, the Brazilian Housing Bank, etc., getting some idea of resources available such as maps, data available, personnel (especially for interviewers), transporation-related problems, clerical and computer data processing capabilities, legal problems with the data and relationships with the State and Federal governments.

3. Experimental Research Design - This includes defining the experimental treatments and interventions and the various levels at which they will be studied, the basic unit(s) to be observed and the analytical measures to be applied to the data.

4. Tables and Output Design - This is the design of the final output which will be generated. It includes descriptive tabulations and tables, analytical tables and analytical measures not included in 3 above.

5. Begin Logistic Arrangements - These are arrangements for transportation, supplies, office space, printing, copying and distribution of materials, implementing reporting systems and developing local support and contacts for the areas to be surveyed.

6. Sample Design - This includes methods of selection, sampling stages, relation to other surveys (such as the socioeconomic survey) and various other techniques for selecting a sample.

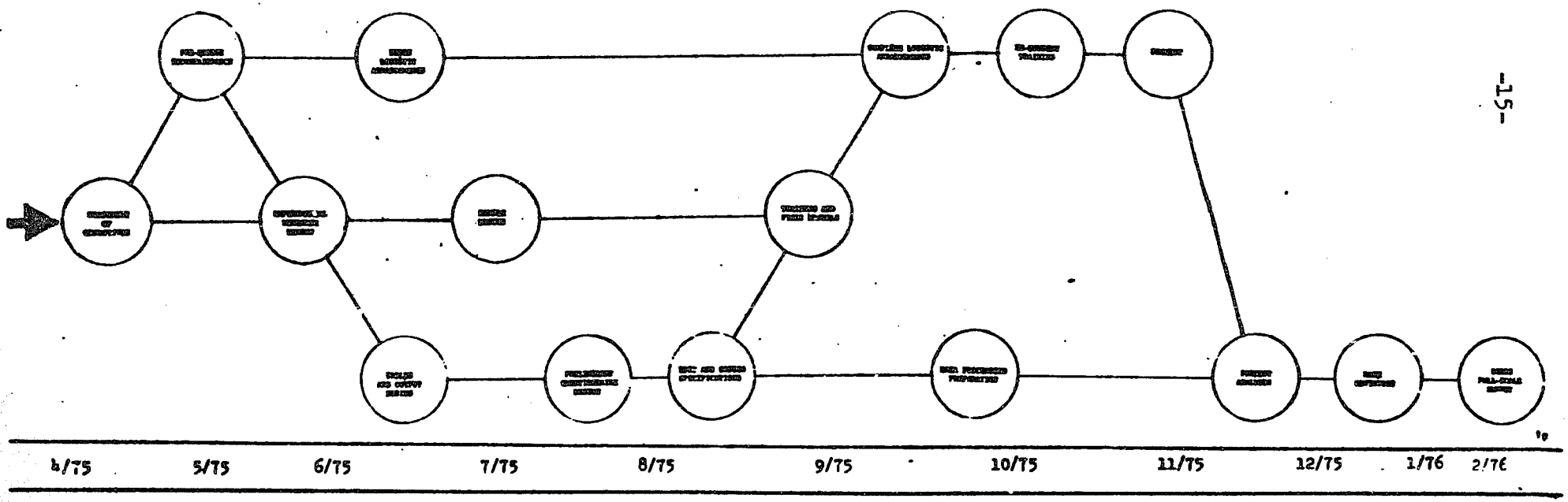
7. Preliminary Questionnaire Design - The definitions and concepts of the topics to be studied, the wording and formatting of the questionnaire, specifications integrated for editing and coding needs, translation, approval, review and printing are all included here.

8. Edit and Coding Specifications - These are specifications which must be designed for both clerical and computer coding and editing. This includes describing and writing the specifications, and translation where necessary.

Figure 3

Feasibility Study for
Health and Nutrition Benefits of New or Improved Water Supplies Project

NETWORK ANALYSIS



9. Training and Field Manuals - This includes writing training manuals, field manuals, mock interviews and the manual edit and coding procedure manuals.

10. Complete Logistic Arrangements - This is the finalization of 5 above. This will enable the survey to go ahead, with all transportation, paperwork, personnel and other logistic problems worked out.

11. Data Processing Preparation - This includes preparing for check-in and control of forms, editing, coding, punching and verification, and the programming of tabulations and tables (those mentioned in 3 and 4 above).

12. In-country Training - This is the training to take place in Brazil of supervisors, interviewers, editors, and coders and at a different level, of managers and officials who will have a peripheral function in the conduct of this study.

13. Pretest - This is the testing of the various procedures and methods to be used in the full-scale survey. Some of the areas which will come under scrutiny are questionnaire evaluation, interviewer evaluation, sampling procedures, data evaluation (by question, for content), procedures evaluation, logistics, training, staffing, and an evaluation of training and field documents and manuals.

14. Pretest Analysis - These will include the final recommendations gotten from the pretest and also will include an analytical report and as statistical methods analysis. The data processing part will also be reviewed.

15. Make Revisions - On the basis of 13 and 14 above, revisions will be incorporated into any procedures, methods or documents which are indicated.

16. Begin Full-scale Survey - This would begin Phase II, of this study.

Budget

Figure 4 is the proposed budget for this project. The figures for the man months required and the expected expenditures are broken down into figures for Washington and figures for Brazil.

Figure 4. Budget for Brazil Water Supply Study

	Washington		Brazil	
	Man Months	FY-1976	Man Months	FY-1976
Salaries	46.75	81807	7.00	9454
Consultants	2.50	14850	-	-
Emp. Bene. (10%)	-	8182	-	946
Travel	-	24300	-	900
Overhead	-	35580	-	3518
Allowance	-	-	-	-
Other Direct	-	12575	-	3500
Equip., Veh.	-	-	-	-
Publication	-	-	-	-
Sub-contracts	-	-	-	-
Total	49.25	177294*	7.00	18318

Total, Feasibility Study 195,612*

* These figures do not include charges for office space in Washington which later may become necessary. Currently, negotiations are underway between Census and AID for Census to take over, and pay for, space that is presently paid for by AID.

It should be noted that no workplan by specific objectives has been attached as an annex to this proposal nor has a budget by objectives been attached. The reason for this is that this study has essentially one objective--todesign a method to reliably collect the needed data. The sub-parts of that objective are so interrelated that an attempt to sort them out for budgeting would be extremely time-consuming and of little ultimate utility.

11. General Appraisal

Appraisal of Project and Research Proposal:

Internal review of the project in draft have been made by various staff members of TA/H, TA/N and circulated to other offices of TAB. External review has been accomplished by IBRD, PAHO, special consultants notable in the field of water projects; David Bradley (England), CDC, Dennis Warner (Duke University); BuCensus, NCHS, and others. A consultant panel of the World Bank will also review any proposed research design and

BuCensus will also convene a special panel of experts to make recommendations and suggestions before the final protocol is adopted.

The office of Nutrition together with the other offices of the Technical Assistance Bureau judge this project as one of paramount importance in terms of addressing a fundamental need of the poorest segment of LDC's. Various committees and individual experts have corraborated TA/N's high appraisal of the project and its technical excellence and we urge its approval.

A World Bank panel of consultants consisting of leading authorities in the water field (Dr. Abel Wolman of Johns Hopkins is the Chairman) have commented informally and favorably on the project and will provide additional recommendations and suggestions in May 1975.