WATER AND SANITATION
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WILLINGNESS TO PAY FOR WATER IN NEWALA DISTRICT, TANZANIA: STRATEGIES FOR COST RECOVERY

WASH FIELD REPORT NO. 246

JUNE 1989

Prepared for
the USAID Mission to Tanzania
and UNICEF / Tanzania
WASH Activity No. 445

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under WASH Activity No. 445

by

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TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

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EXECUTIVE SUMMARY

In July and August 1988, a WASH team carried out a study of households' willingness to pay for water in southern Tanzania. The study area is served by the Kitangari Water Scheme, a project financed by FINNIDA, UNICEF, ODA, and the Government of Tanzania. When it is operating at capacity, the Kitangari Water Scheme serves 106 villages and about 162,000 people. The source of the water for the scheme is six boreholes in the Kitangari valley off the Makonde Plateau. Diesel fuel is trucked to the pumping station and water treatment plant where it is used to generate electricity to pump water from the valley up to the Makonde Plateau and to the project villages. The problem is that the Ministry of Water is responsible for providing the diesel fuel, and when funds from the central treasury are not available, diesel cannot be purchased, and the Kitangari scheme does not operate.

When the scheme is not functioning, villages are without water, and their residents move around the project area searching for water from either traditional sources or villages which at the time are receiving water from the Kitangari scheme. The traditional sources are typically five to ten miles away from a village, and women spend much of the day collecting one bucket of water for their families. Domestic taps in villages with more reliable service will often have queues of a few hundred people who have walked from as many as ten other villages in search of water. The WASH study team observed some queues in which women and children had been waiting since the previous day for their turn at the tap.

The objectives of this study were to determine

(1) whether households served by the Kitangeri water scheme are willing to contribute to the operation and maintenance costs of their water system so that it can be kept running;

(2) if they are willing to contribute, how much they can afford to pay; and

(3) what type of cost recovery system they would prefer.

To determine whether households were actually prepared to pay for the costs of the diesel fuel to run the system, the WASH team used a willingness-to-pay (WTP), or "contingent valuation," methodology. WTP studies are simply household surveys in which a member of a household is asked a series of structured questions which are designed to determine the maximum amount of money the household is willing to pay for a good or service. The WASH team carried out 829 in-depth household interviews in six villages served by the Kitangari scheme.

The questionnaire consisted of three parts. The first section dealt with the household's water use practices and attitudes. The second section consisted of two WTP "bidding games": (1) one to determine how much the household would pay for water from a kiosk if a price were charged for each bucket, and (2) one to determine how much the household would pay in terms of a flat monthly fee for unlimited access to a public tap or "distribution point" (DP). The third section asked for information on the respondent's education level and the household's assets.

The results of the survey showed that people served by the Kitangari scheme treat water as they do any other highly valued commodity in short supply. Households are willing to incur substantial capital expenditures to meet their water needs. Slightly more than a third of the households in the sample had a rainwater collection tank. Households with rainwater collection tanks sometimes sell water to neighbors; the average price of water from a rainwater collection tank in the sample villages was Tsh 9 for a 20-liter bucket. Vendors who transport water by bicycle or carry tins balanced on their shoulders sell water in some villages served by the Kitangari scheme, but the price is even higher. The average price of water sold by vendors in the study villages was Tsh 12 per bucket. In the town of Newala itself, the price of water sometimes reaches Tsh 30 per bucket. This is equal to an entire day's wages in agriculture.

The survey results showed that households in the study area are certainly willing to contribute what for them are substantial amounts of cash toward the operation and maintenance costs of the Kitangari scheme. This study indicates, however, that they cannot currently afford to pay for the entire operation and maintenance costs of the system. If a system of kiosks were established and the price were set at Tsh 0.50 per bucket, 89 percent of the population say that they would purchase at least some water from a kiosk. The total revenues from such a system would be on the order Tsh 20 million per year, but the net revenues after paying for the costs of the kiosk system would be about Tsh 13-14 million. If a flat fee of Tsh 25 per household per month were charged, 79 percent of the households state that they would pay it. Total revenues in this case would be about Tsh 7 million. Revenues in the range of Tsh 7-14 million will pay for 60-120 percent of the costs of the diesel fuel needed to run the Kitangari scheme (at the existing subsidized diesel prices). They will not come close to paying the full annual operation and maintenance costs of about Tsh 40 million.

The costs of operating and maintaining the Kitangari scheme are not, however, large by international standards, about US$1.00 per month per household. If the diesel fuel were priced at its real resource costs (i.e., if the people had to pay international prices for diesel), this figure would rise to US$1.30. Moreover, in the long run the capital costs of replacing the system must also be paid; this would add about US$1.00 per month per household to the costs. The real economic costs of providing water to households in the project area are thus about US$2.30 per month, or US$28.00 per year. For this level of investment, a family would probably save 6 months of a woman's time, compared to a situation in which households had to rely completely on rainwater and traditional sources. This 6 months of labor would no longer have to be spent hauling water and could be devoted to other activities. In the long run this

must be a good investment for the people served by the Kitangari scheme if they are to achieve sustainable economic development.

The fact that people cannot now pay the real economic costs of improved water services is no reason to abandon a strategy of full cost recovery. On the contrary, it is all the more urgent to establish a cost-recovery mechanism now which will improve the performance of the Kitangari system so that the potential time savings for women will be realized, and these labor resources can contribute to both economic and child development. If the Kitangari scheme is to be sustainable in the long run, the price of water will have to rise as economic development proceeds in order to cover the real economic costs of providing water.

The following are other interesting findings of the survey:

- During the dry season when the scheme is operating, the average per capita water consumption reported by respondents is about 17 liters per capita per day. In the dry season when the scheme is not operating, water consumption falls to about 8 liters per capita per day. One-third of the respondents reported that per capita consumption fell to less than 4 liters per day in the dry season when the water system was not working.

- In general, respondents were willing to pay substantially more money for water if a pay-by-the-bucket system were used for cost recovery than if a flat monthly fee were used. Respondents were also asked directly, "Would you prefer a pay-by-the bucket or flat monthly fee system of collecting for the costs of providing water?" Out of 615 responses, 58 percent preferred the pay-by-the-bucket system, and 42 percent preferred the flat monthly fee.

- Respondents who could read a newspaper with ease bid Tsh 10 per month more than those who could not read a newspaper at all.

- On average, female respondents were willing to pay about Tsh 7 per month more than male respondents for improved water service.

- The respondent's attitude toward government policy and perceived entitlement to water was measured by the responses to three statements, including the following: "It is the responsibility of the government alone to provide water free to every citizen of this country." A respondent's attitude toward government policy had a statistically significant effect on the WTP bids. Respondents who did not believe that the government was responsible for providing free water were on average willing to pay Tsh 6 more per month for improved service than those who felt it was the government's responsibility.

- Households were asked what organization or authority should have the responsibility for the management of the Kitangari scheme. Almost half of the respondents preferred a new Kitangari Water

Board. The remainder of the responses were split almost evenly between the District Council and the central government (Ministry of Water).

An earlier draft of this report was the focus of a workshop held in Newala October 12-13, 1988, which was attended by high-level representatives of the national, regional, and district governments, UNICEF, USAID, and the WASH study team. The report formed the basis for a decision by the responsible authorities to begin immediately to establish a cost recovery system based on kiosks where people pay by the bucket for water.

Chapter 1

INTRODUCTION

1.1 Statement of the Problem

In May, 1988, the United States Agency for International Development (USAID) mission in Dar-es-Salaam, Tanzania, requested assistance from the Water and Sanitation for Health Project (WASH) in Washington, DC, in conducting a study of the willingness of households to pay for water in the Newala District of southern Tanzania. The study area in Newala District is served by the Kitangari Water Scheme, a project financed by FINNIDA (Finland's foreign aid agency) with additional support from the United Nations Children's Fund (UNICEF). When it is operating at capacity, the Kitangari Water Scheme serves 106 villages and about 162,000 people. The source of the water for the scheme is six boreholes in the Kitangari Valley off the Makonde Plateau. Diesel fuel is trucked to the pumping station and water treatment plant where it is used to generate electricity to pump water from the valley up the Makonde Plateau to the project villages. Households collect water from public taps in the villages free of charge.

The Ministry of Water is responsible for providing the diesel fuel, and when funds from the central treasury are not available, diesel cannot be purchased, and the Kitangari Scheme cannot operate. When this happens, people in the project area are forced to obtain water from their traditional sources. This means typically that a woman will be required to spend an entire day to collect one 20-liter bucket of water.

This situation gives rise to several questions. Are people in the project area willing and able to pay for the diesel fuel to keep the water system running? Or is the subsidy from the central government the only feasible financing mechanism? In other words, would the people be better off paying for water themselves than with the existing situation in which water is provided free but irregularly? From the perspective of the government, the answer is by no means obvious because, although the water situation is desperate when the system is not working, the people are very poor. Because the WASH project has been actively involved in developing methodologies for estimating the willingness of households to pay for improved water services, UNICEF and the USAID mission in Dar-es-Salaam sought its help in assisting the Government of Tanzania in conducting this study.

1.2 Objectives of the Study

The objectives of the study are to determine the following:

- The willingness of households in the project area served by the Kitangari Scheme to contribute to the operation and maintenance costs of the water system;

- the amount they can afford to pay; and
- the type of cost recovery system they would prefer.

The estimates of the willingness of households to pay for water with different cost recovery schemes should be of value to the Government of Tanzania and UNICEF, not only in Newala District for the management of the Kitangari Water Scheme, but in other parts of Tanzania as well. In particular, these estimates of willingness to pay should assist the Ministry of Water in its current deliberations on the appropriate level of service, cost recovery policies, and water pricing in rural areas.

1.3 WASH Project Team

The WASH team was headed by a water resources economist, Professor Dale Whittington, University of North Carolina at Chapel Hill. Prof. Whittington's counterpart on the study was Professor Mark Mujwahuzi, Institute of Resource Assessment, University of Dar-es-Salaam. Prof. Whittington and Prof. Mujwahuzi were assisted in the study by Mr. Gerard McMahon and Ms. Kyeongae Choe, both Ph.D. students in the Department of City and Regional Planning, University of North Carolina at Chapel Hill. In addition, the WASH team benefited greatly from the services of Mr. Hubert E. Meena, Planning Officer, Ministry of Water; and Mr. Deusdedit Ruhiye, Statistical Officer, Bureau of Statistics, National Accounts Unit. Both played a major role in the fieldwork.

1.4 Activities of the WASH Consultants

The WASH team spent one month in Tanzania, from July 10 to August 13, 1988, carrying out the field work for the study. The first week was spent on site reconnaissance, site selection, and drafting an English version of the questionnaire. The second week was spent translating and duplicating a Swahili version of the questionnaire, training enumerators, conducting a pretest, and making revisions in the questionnaire. The third and fourth weeks were spent administering the survey in six study villages. A more detailed itinerary of the WASH study team is presented in Appendix V.

1.5 Background: Water Sector Policy in Tanzania

1.5.1 Rural Water Supply Systems

The Government of Tanzania's policy on cost recovery for rural water supply systems has changed several times over the last few decades. Significant expenditures of public funds for the development of community water supply systems started about 1930. Until 1945 water supply activities were mainly limited to major administrative centers and a few private estates and Christian missions. Active government involvement in the construction of water supplies

for rural communities started in 1946 with the formation of a water department. This new department became involved with the development of two main types of water supplies: provision of domestic water supplies to outstations and minor settlements and rural systems for both domestic use and livestock. Construction costs of water supply systems for outstations and minor settlements were met entirely by the central government, which retained ownership of the systems. Maintenance funds were obtained from the central government (under the budget item "water supplies at outstations"). The day-to-day running of these systems was the responsibility of the district commissioner to whom the funds were allocated. Consumers were charged for the water, whether they had a house connection or collected water from a distribution point.

In contrast, water supplies for rural communities were owned by the local authorities (or "native authorities" as they were called before independence) of the region in which the supplies were located. From 1946 to 1953 construction costs of water supply systems were paid for from both central government funds and the treasuries of local authorities. The local authorities were required to contribute a third of the capital costs of the projects. From 1953 to 1956 the local authorities were required to meet the total capital costs of the projects. In 1956 this requirement was lowered to 50 percent, and then in 1958 lowered again to 25 percent.

This policy clearly made water supply development more likely in the richer local authorities because it depended upon the willingness and ability of local authorities to contribute to the costs of the project. Authorities which could meet their 25 percent share of the costs made substantial improvements in their water situation, but authorities in poor areas made little progress. To eliminate this imbalance, in 1965 the Government of Tanzania abolished the contribution of the local authorities, and the Water Department and Irrigation Division of the central government assumed full responsibility for all capital costs of rural water supply development.

1.5.2 Maintenance for Rural Systems

Maintenance procedures for rural water supply systems have also varied over the years. Initially, maintenance was the responsibility of local authorities, but in the 1950s the Water Department and Irrigation Division, having decided that the performance of local authorities was unsatisfactory, took over the responsibility of maintaining rural water systems. This involvement of the central government in maintenance activities was financed in part by a contribution from the local authorities into a maintenance and renewals fund. Local authorities were required to contribute 2.5 percent of the capital costs of their water supply system into the fund. However, this financing mechanism was clearly not sufficient to meet the ongoing maintenance costs of water systems, and central government budget allocations proved to be inadequate. Due to a shortage both of funds and trained personnel, the Water Department and Irrigation Division was unable to maintain rural water schemes, and maintenance was again turned over to local authorities.

In 1965 government policy shifted again, and the Water Department and Irrigation Division took back the responsibility for maintenance and repairs. This time

the local authorities were required to make an annual deposit of 1 percent of the capital costs of the system. If the costs of any maintenance and repair work exceeded this contribution, the Water Department and Urban Division would undertake the repairs on a prepayment basis only. Normal operation of the schemes, however, remained the responsibility of the local authorities, which did not charge for the water consumed for either domestic uses or livestock needs. Once again the government decided that this system was unsatisfactory, and in 1969 decided to take over the operation and maintenance of all water supply projects. All user contributions for operation and maintenance were abolished. This has remained official government policy until very recently.

1.5.3 Goals for Rural Water Supply

As a result of government policy, investment in the rural water sector has depended almost solely upon the central government budget and assistance from donors. In 1971 the Government of Tanzania announced that the entire rural population would be provided access to clean water by 1991 (defined as an improved source within 400 meters of each household). In 1975 this goal was raised to provide water for every village by 1981 (although no mention was made of distance criteria). These ambitious goals were in part the result of the optimism of the donor community, particularly Sweden, that believed the problem of rural water supply could be effectively solved by a centrally run, publicly financed program without the active involvement of the rural population.

Donor involvement in the rural water sector increased steadily over the period 1964-1984, accounting for between two thirds and three quarters of total investment in the sector. Despite the large amounts of foreign assistance, the gap between the stated goals and actual progress has remained wide. In 1985 the Government of Tanzania recognized that the 1991 goal could not be met and recommended that the target be revised to reach 60 percent of the rural population by 1991.

Part of problem has been that funding levels were never adequate to provide everyone in rural areas with an improved water supply by the time specified, but, perhaps more important, the existing policy environment did not support sound investment planning for the funds that were available or adequate cost recovery. Neither the government nor the donors paid adequate attention to the operation and maintenance of the systems being constructed, and many quickly fell into disrepair.

1.5.4 Shifts in the Government's Water Sector Policies

Over the last few years, however, there have been important shifts in the government's policies in the water sector. In March 1986, the Ministry of Water, the Norwegian National Committee for Hydrology, and others sponsored a seminar in Arusha, Tanzania, to review the status of the rural water supply and sanitation programs under way in Tanzania. Recognizing that Tanzania's target of clean water for everyone by 1991 was unrealistic, participants in the Arusha Seminar sought to identify problems in the existing policies and programs and to make recommendations for improvements. The recommendations of the Arusha

Seminar, which have received the support both of the Government of Tanzania and the donors, reflect the growing worldwide consensus on the need to involve communities in the design and choice of technology, financing, management, and operation and maintenance of their water systems.

Although the issue of establishing a realistic price for water was not specifically addressed in the recommendations and action plan of the Arusha Seminar, the Government of Tanzania has since recognized that water cannot be provided free and that prices and other forms of user contribution must be established for water services. Government officials have been publicly advocating this new policy. For example, in July 1987, Minister of Water Ndugu Pius Ng'wandu announced in the National Assembly that villages would be responsible for water projects in their respective areas. In November 1987, Dr. Ng'wandu stated in Iringa that villagers must raise funds for water projects rather than waiting for funds from foreign donors or the central government.

These policy changes are a significant step toward a sound investment strategy in the water sector, but they have only just begun to be implemented. There are no real models in Tanzania of how to design a sound cost-recovery system for a rural water supply scheme such as Kitangari, and in particular there is little information on what kind of cost-recovery scheme the people themselves desire and are willing to support. The implementation of a successful cost recovery system for the Kitangari scheme would have importance far beyond Newala District itself because communities throughout Tanzania will have to face many of the same issues as they attempt to improve the performance of existing water schemes and to finance new ones.

Chapter 2

OVERVIEW OF THE KITANGARI WATER SCHEME AND THE PROJECT AREA

2.1 The Study Area

Newala District is located in southern Tanzania in Mtwara Region; its southern border is the Ruvuma River, the boundary between Tanzania and Mozambique (Figure 1). Most of Newala District is on the Makonde Plateau, which dominates all aspects of water planning in this part of Tanzania. The plateau is situated 300 to 800 meters above sea level. There are no perennial surface water sources on the plateau, and groundwater, while plentiful, lies several hundred feet below the surface. Piped water schemes or rainwater collection are the only alternatives for water for domestic consumption other than lengthy water collection trips off the plateau (Finnwater 1986). In sum Newala District is one of the most difficult areas in southern Tanzania to serve with water.

In 1984 there were approximately 310,000 people living on the Makonde Plateau, including 39,200 in Newala town and Mahuta. It is estimated that the population of the district will increase to 380,000 in 2001, of whom 76,300 are projected to live in the urban areas (Finnwater 1986). In 1981 average per capita income in Tanzania was Tsh 3,444, or US$280. In 1977 the per capita income in Mtwara region was only Tsh 1,087, the fifth lowest regional average in the country (compared to a national average of Tsh 1,760) (Finnwater 1986). UNICEF estimates that average annual per capita cash income in the rural areas of Newala District is now about Tsh 2,000 (roughly US$21.00 at current exchange rates).

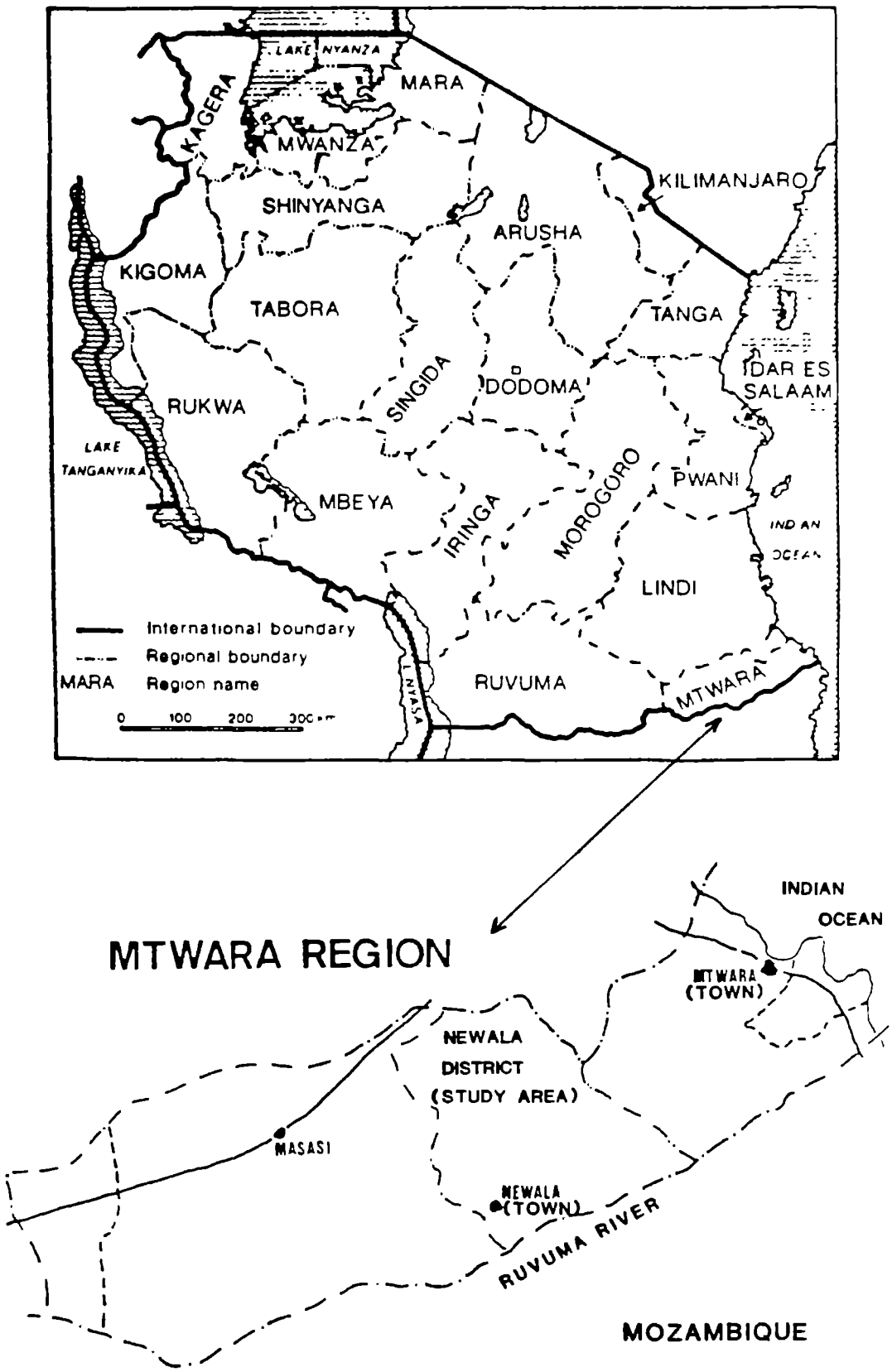
The economy of the study area is based on small-scale agriculture; the primary occupation of almost everyone in the project area except government officials is farming. The primary cash crop is cashew nuts, but yields have been substantially reduced the last few years due to both disease and aging of the existing stock of trees, with a resulting decline in the economic status of many households. The principal food crop is cassava.

In 1957 the British colonial administration commissioned the Makonde Water Supply System, the first large-scale piped distribution system in the district. Today over half of the households in the district have access to this old Makonde scheme--and its successor, the Kitangari scheme--at least when the system is functioning. Under the British administration, the operation and maintenance costs of the old Makonde scheme were financed by a system of kiosks which sold water to individuals by the bucket. There was typically only one kiosk in a village, and it was staffed by an attendant who sat inside the kiosk and controlled the tap. When a woman wanted to purchase a bucket of water, she would walk to the kiosk, pay the attendant, and then carry the bucket of water home.

This system of paying for water by the bucket was abolished in 1969, and, since then, water has been provided to people from the public taps free of charge.

Figure 1

Newala District



However, the old abandoned kiosks still may be found in the center of most villages where they serve as a vivid reminder of how the old cost-recovery system used to work. The older people in the village remember the pay-by-the-bucket system very well, and younger people have all heard about it.

When the Kitangari Water Scheme is not working and in those villages not served by the scheme, villagers rely on traditional water sources including springs (serving an estimated 9 percent of Newala District residents in 1977), rivers (7 percent), and collection pits (4 percent). River water is used primarily in the Ruvuma River valley, although water is also carried from the river up to villages on the plateau (Finnwater 1977). Rainwater is also a common traditional source of water in Newala and is collected in rainwater tanks that use either roofs or cleared ground as catchment areas.

Although the use of rainwater collection and other traditional sources is still common, piped water schemes are the only long-term solution to the district's water problems (Finnwater 1986). Of the six piped water schemes currently on the Makonde Plateau, only the Kitangari Water Scheme is in good condition and can function effectively when diesel fuel is available (Finnwater 1986).

2.2 Description of the Kitangari Scheme

In January 1972 the Government of Tanzania and the Government of Finland signed an agreement of technical cooperation which formed the basis for the Finnish government's support of the preparation of the Mtwara-Lindi Water Master Plan, which was completed in 1977. The Water Master Plan provided basic information on the region's water resources and water needs and suggested general proposals for water supply schemes. Based on this plan, a Rural Water Supply Construction Project, supported by FINNIDA, began in Mtwara and Lindi Regions in 1978. Three phases of this project have now been completed--including the planning and construction of the Kitangari Water Scheme--and the Mtwara-Lindi Water Master Plan has been revised. The Kitangari project was funded by FINNIDA, UNICEF and ODA; Finnwater was the engineering firm responsible for the design and supervision of the construction.

The Kitangari Water Scheme was completed in 1984 at a cost of Tsh 56 million (approximately US$5 million at the exchange rates existing at the time of construction). Of the total construction costs, 45 percent was spent on the distribution system; 38 percent on the pumping stations, rising main, and main storage tanks; and 17 percent on technical assistance and overhead. The capital costs were thus about Tsh 350 (US$30) per capita. Further work on the extension and rehabilitation of the system during phase IV of the FINNIDA project was estimated in 1984 to require an additional Tsh 10 million. The Kitangari scheme currently serves 92 villages in Newala District and 14 villages in Mtwara District. The 92 Newala district villages are served by 476 public taps (or distributions points--DPs), and the Mtwara villages are served by 45.

The Kitangari Water Scheme is actually a hybrid system, comprised of renovated segments of the old Makonde scheme, as well as a new pipeline distribution system, boreholes, and pumps constructed during the last decade. The pumping and treatment facility is located in the Kitangari Valley, one of the few

depressions on the Makonde Plateau. This facility has six boreholes, each with a rated pumping capacity of 100 cubic meters/hour. The chemical treatment facility has a capacity of 3,000 cubic meters/day. Treatment capacity essentially acts as the primary constraint on the water intake plant's production capacity. There are seven water reservoirs on site, with a total capacity of 1,750 cubic meters. The facility has seven booster pumps, five of which have a capacity of 100 cubic meters/hour, and two having a capacity of 22 cubic meters/hour. Generally only two or three boreholes are in use at any one time.

When diesel fuel is available, the pumps operate for 15 hours/day. Electric power is generated on-site for operating the pumps. The maximum sustainable production of the diesel generators is 5,500 kilowatt-hours per day, with an associated daily water production of about 5000 cubic meters. Operation of the scheme at full capacity should thus provide about 30 liters per capita per day to the service population, assuming no leakage from the system. The power plant had an average daily production level during the first six months of 1988 of 3,320 kilowatt-hours. When the plant is running at capacity--that is, when the pumps are operating 15 hours/day--the generators require 1,500 liters of diesel/day. Over the first six months of 1988 the facility used approximately 144,000 liters of diesel.

2.3 Operation and Maintenance Costs of the Kitangari Water Scheme

The principal cost of operating the Kitangari Water Scheme is the diesel required to run the pumping station. If the system were run at capacity, the annual diesel requirement of the pumping station would be about 547,500 liters. Diesel fuel costs Tsh 18.5 in Mtwara (this is a subsidized price), and is delivered to the pumping station by tanker trucks over 124 kilometers of paved road and 64 kilometers of unpaved road at a cost of Tsh 2.6 per liter. (The majority of the tanker trucks have a 9,000-liter capacity; a few carry 12,000 liters.) The cost of diesel at the pumping station is thus Tsh 21.1 per liter. The annual costs of the diesel to operate the scheme at maximum production are about Tsh 11.55 million, or about Tsh 70 per capita per year. For an average size household this would be about Tsh 350 per year, or Tsh 30 shillings per household per month--about 3 or 4 percent of the annual income of an average household.

Forty-eight people work at the Kitangari facility, and annual personnel costs are about Tsh 430,000. Other costs of operating and maintaining the pumping station include chemicals, oil, and grease. Table 1 summarizes the operation and maintenance costs of the Kitangari pumping station. As shown, the cost of diesel fuel constitutes over 90 percent of the total operation and maintenance costs.

Table 1

Annual Operation and Maintenance Costs of the Kitangari Pumping Station

	Cost (in Tsh)
Diesel Fuel	11,550,000
Labor	
Operations Staff	210,000
Maintenance Staff	220,000
Oil, Grease, Chemicals	500,000
Total	12,480,000

The WASH team was unable to obtain estimates of the operations and maintenance costs of the distribution system and the capital costs associated with maintenance of the pumping station and water treatment plant. However, if they are typical of similar schemes, they would run about 10 percent of the total capital costs. If calculated in terms of the initial capital costs in U.S. dollars, this would entail additional costs for the Kitangari scheme of about Tsh 48,000,000 annually (US$500,000 at current exchange rates). This estimate is almost certainly too high because labor costs have not inflated to compensate fully for the massive devaluation of the Tanzanian shilling. If calculated in terms of the initial capital costs in Tanzanian shillings, this would be about Tsh 6,000,000; converted to U.S. dollars at the current exchange rate, this would be about US$60,000 per year. This is too low because costs of pipe and equipment have increased to compensate for the devaluation. As a rough estimate of the additional annual maintenance costs for the system, this study will use Tsh 27,000,000 (US$280,000), the average of these two figures.

Based on this estimate, the total operation and maintenance costs of the Kitangari scheme would be Tsh 40 million (US$420,000), about 30 percent of which are the costs of the diesel fuel. The total annual operation and maintenance costs per capita would be about Tsh 250. For an average size family this would be about Tsh 1,250 per year, or about Tsh 100 per month. This would be about 12.5 percent of the annual cash income of the average household.

2.4 Performance of the Kitangari Scheme

In practice the Kitangari scheme has not operated at even close to its production potential. Average daily water production has been about 3,000 cubic meters, not 5,000 cubic meters. Diesel consumption from January 1988 through June 1988 was 144,000 liters, only 53 percent of what would have been used if the system had been operating at its maximum capacity.

The WASH study team did not have time to determine how the distribution system itself actually operated. It was clear, however, from observations over the three weeks of fieldwork, that even when diesel was available many villages still received inadequate water service. Pressure was low in some villages; others did not receive any water at all. When production at the pumping station is less than capacity, both the technical characteristics of the distribution system and the managerial decisions determine which villages actually receive water and which do not.

Although it is unclear what precise operational rules govern the rationing of water when supplies of diesel are limited, the results are not unclear. When villages are without water, their residents search for water around the area from either traditional sources or villages that at the time are receiving water from the Kitangari scheme. Domestic taps in villages with more reliable service will often have lines of a few hundred people who have walked from as many as ten other villages in search of water. The WASH study team observed some lines in which women and children had been waiting since the previous day for their turn at the tap.

2.5 Management of the Kitangari Scheme

The responsibility for the management of the Kitangari scheme is shared between the central government (the Ministry of Water) and the district water engineer, who reports to the district government. The Ministry of Water is responsible for the management and operation of the boreholes and the pumping station and the water treatment plant, and provides the funds for the diesel fuel. The district engineer is responsible for the operation and maintenance of the distribution network. As a result of this divided management, there is no clear accountability for the operation of the system.

Chapter 3

A BRIEF DESCRIPTION OF THE METHODOLOGY

3.1 Willingness-to-Pay Studies

To determine whether or not households served by the Kitangari Water Scheme were actually prepared to pay for the costs of diesel fuel to run the system, the WASH team used a willingness-to-pay (WTP) study methodology. WTP studies are simply household surveys in which a member of a household is asked a series of structured questions which are designed to determine the maximum amount of money the household is willing to pay for a good or service. When WTP studies are conducted to assist with water sector policy or planning, the specified good or service could be a house connection to a piped distribution system, access to a handpump or standpost, or provision of household sanitation facilities. WTP studies are also termed "contingent valuation" studies because the respondent is asked about what he or she would do in a hypothetical (or contingent) situation.

The methodology for conducting WTP studies has been largely developed over the last 15 years by resource and environmental economists interested in such problems as estimating the benefits of environmental improvements (for example, changes in air and water quality).[1] Efforts to develop and improve the WTP methodology have not only focused on the most appropriate means of asking the WTP questions, but also on ways of determining whether people have answered the questions truthfully.

There was initially little interest among economists in the WTP methodology because it was generally assumed that a respondent would attempt to influence the results of a WTP survey by answering "strategically." That is, instead of revealing his true valuation of the good or service, the respondent would give an answer designed to serve his own interests. For example, if an individual were asked how much he would be willing to pay per month for the use of a public standpost, he might say that he would not pay anything if he felt that the public standpost would be provided anyway and his answer might influence the amount he would be charged. Alternatively, he might give a very high amount if he felt his answer would influence whether or not the water agency would construct a water system in his community and if he felt that, once the system was installed, the water agency would not be able to collect any charges.

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[1] For excellent reviews of the current state of the art, see Ronald G. Cummings, David S. Brookshire, and William D. Schulze (editors), Valuing Environmental Goods: An Assessment of the Contingent Valuation Method (Totowa, New Jersey: Rowman and Allanheld, 1986); and Robert Cameron Mitchell and Richard T. Carson, Using Surveys to Value Public Goods: The Contingent Valuation Method (Washington D.C.: Resources for the Future, 1989).

The empirical evidence available to date from developed countries, however, suggests that the strategic bias is not as much of a problem as initially feared, and a consensus is gradually emerging that carefully conducted WTP studies can provide valuable information on the preferences of households. There have also recently been successful attempts to apply the WTP methodology in developing countries.[2] The possibility of using WTP studies in developing countries is particularly significant because there is a dearth of information on household demand for basic services, such as water supply, and there are few alternative approaches for estimating household demand for improved water services due to the absence of high-quality household-level data.

3.2 The Utility of Willingness-to-Pay Studies

Both policymakers and water resource planners working in developing countries have thus become increasingly interested in conducting WTP studies. This interest stems in large part from a widespread acknowledgment among professionals in the water sector that the preferences of communities regarding proposed water systems need to be incorporated into the planning and decision-making process, and communities need to contribute money (and perhaps labor) to a water project so that they will have a sense of ownership of the project and to ensure that the project will be both sustainable and replicable.

WTP studies in the water sector can provide information to assist policymakers and planners with four main types of decisions, each covered in a section below.

3.2.1 Site Selection for New Water Systems

If a water agency or donor has a limited investment budget and must choose which villages and towns are to receive a new water system, WTP studies can assist with the task of prioritizing investments. For example, villages in which households are quite willing to pay for improved water services are more likely to benefit most from a new water system and to pay for its recurrent costs. Similarly, if a village has many high-quality, traditional water sources nearby, the willingness of households to pay for water is likely to be low. In this case a new water system would be a poor investment.

3.2.2 Choice of Service Level

Water resource planners in developing countries have commonly assumed that a community should be provided with the highest level of service that can be obtained for less than 5 percent of the income of households in the community. It has also been assumed that so long as the financial requirements of the improved water system do not exceed 5 percent of income, households will abandon their existing water supply in favor of the improved system. Recent experience

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[2] See Dale Whittington, John Briscoe, Xinming Mu, and William Barron, "Estimating the Willingness to Pay for Water Services in Developing Countries: A Case Study of the Use of Contingent Valuation Surveys in Southern Haiti," forthcoming in Economic Development and Cultural Change, 1989.

has shown, however, that this simple model of behavioral response to improved water supplies has often proved incorrect, with the result that poor investment decisions are made with respect to choice of technology. Sometimes too low a level of service is selected, and households are not willing to pay for the service even though the costs are less than 5 percent of income. On the other hand, households may be willing to pay more than 5 percent of their income for a house connection because they receive much better service than from a handpump or standpost. Information from WTP surveys may provide an improved basis for predicting whether or not people will use an improved source and for estimating the benefits of different service levels, thus assisting in the selection of the most appropriate technology.

3.2.3 Tariff Design

Water utilities are under increasing pressure to be financially viable and to raise the prices they charge for water. However, few water utilities in developing countries have adequate information on which to base decisions regarding tariff design. If prices are set too low, revenues will not be sufficient to cover their costs of supplying water. If prices are set too high, households will not be able to afford to connect to a piped distribution system, and revenues will again be too low. WTP studies can provide information on the number of households that will choose to connect if different prices are charged. The relationships between the price of water, the number of households connected, and utility revenues can thus be estimated.[3]

3.2.4 Project Design: Benefit Estimation for Cost-Benefit Analysis

To the extent that households understand all the changes that will result from an improved water supply system, the amount they say they will pay for water--or, in WTP terms, their bids--can serve as a measure of the economic and social benefits of a project.[4] For example, the WTP bids of households may include their valuation of aesthetic, health, and other difficult-to-measure benefits of water. The summation of the WTP bids for all the households served by a project is an estimate of the total benefits of the project and can be compared with the costs of the project to decide whether the investment is justified.

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[3] See Dale Whittington, Donald Lauria, and Xinming Mu, Paying for Urban Services: A Study of Water Vending and Willingness to Pay for Water in Onitsha, Nigeria. World Bank, Infrastructure and Urban Development Department. Report INU 40, March, 1989. 34 pages.

[4] For a discussion of some of the difficulties involved in applying cost-benefit analysis to such investments in the water sector, see Duncan MacRae, Jr. and Dale Whittington, "Assessing Preferences in Cost-Benefit Analysis: Reflections on Rural Water Supply Evaluation in Haiti." Journal of Policy Analysis and Management, Vol.7, No. 2, 1987, pp. 246-263.

3.3 Willingness-to-Pay Studies As a Way of Communicating with Users

In addition to the economic information which can be obtained from WTP surveys, such surveys provide managers of water utilities and policymakers in the water sector with a new management tool. One of the most common themes in the current management literature is that managers--in both the public and private sectors--need to be in better touch with their customers. They should spend more time "wandering around" and talking informally with both their employees and their customers in order to understand their problems and needs better, and to get their input for fashioning solutions. WTP surveys are one means of facilitating this process. Such surveys provide a rich source of information for further questioning and probing by managers. By themselves WTP surveys are a highly structured, formal means of eliciting information on household preferences for improved water services, but they can be extremely valuable as a way of convincing managers and policymakers of the necessity of communicating with people and as a way of facilitating a more open, participatory management style.

Chapter 4

FIELD PROCEDURES

4.1 Selection of Study Villages

At the beginning of the study, the WASH team asked officials of the District Council in Newala to provide a list of fifteen villages which they felt would be representative of the villages served by the Kitangari Water Scheme. Five villages on the list were judged to have the best service available from the scheme; five to have moderately reliable service; and five to have the least reliable service. The study team then spent three days (July 13-15) touring these fifteen villages and interviewing village officials in order to select six villages in which to carry out the study. From the point of view of sampling theory, it would obviously have been preferable to randomly sample the 106 villages, but the logistical constraints and the time available for the study made it impractical to carry out the survey in more than a handful of villages. With such a small sample of villages, the possibility that a randomly selected sample would not be representative of the population was judged to be too high a risk to take.

The final decision regarding which villages to choose was made based on information collected from interviews with village representatives and the visual inspection of perhaps 30 additional villages in Newala District. The following six villages were selected (see Figure 2):

- Mtopwa (good reliability)
- Nanda " "
- Mkonga (moderate reliability)
- Juhudi " "
- Mnyambi " "
- Mkongi (poor reliability)

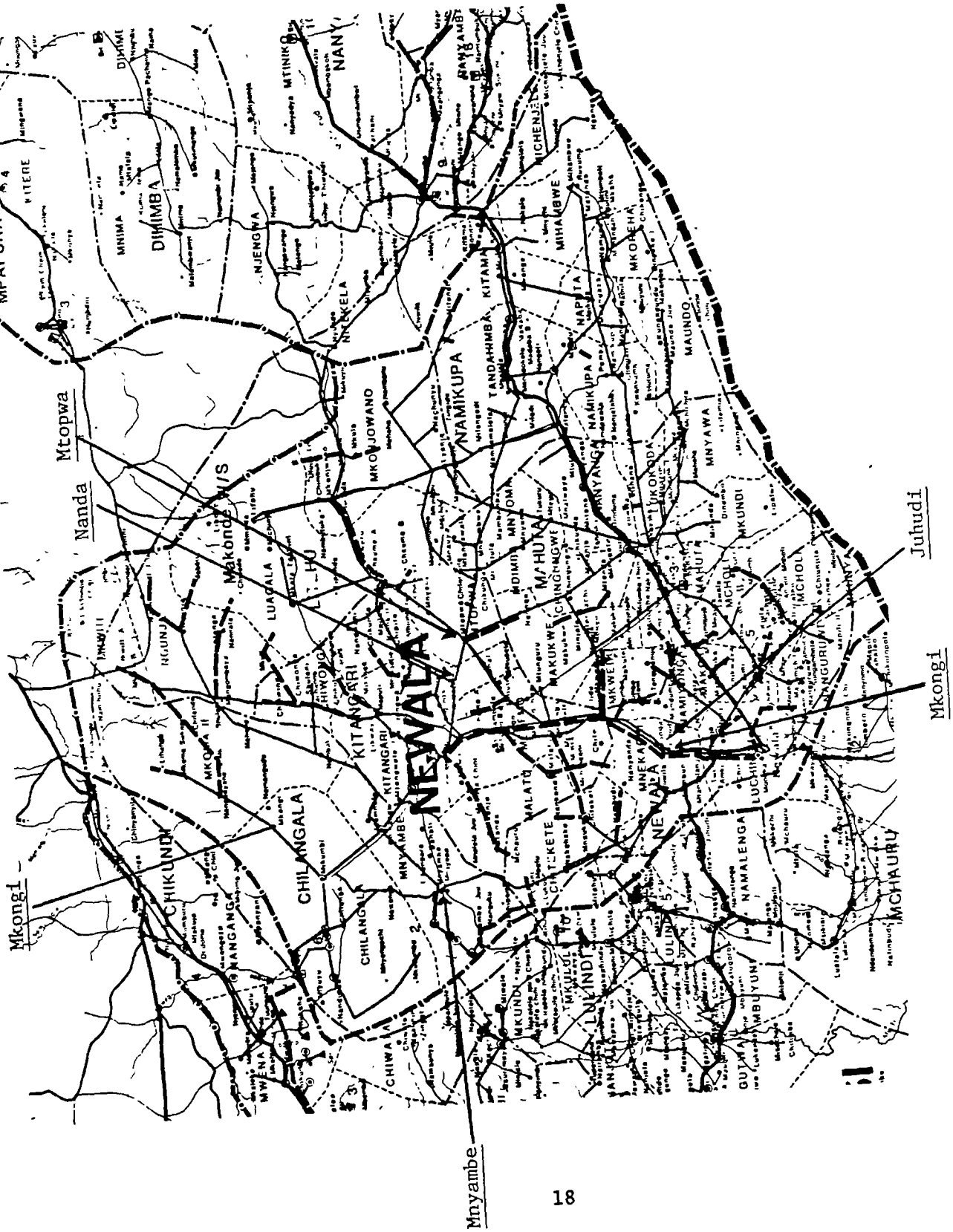
Both the district officials and the WASH team believe that the conditions in these six villages are representative of the situation in many other villages served by the Kitangari scheme.

4.2 Development of the Questionnaire

Based on a preliminary assessment of the field conditions in Newala District and the policy issues involved in achieving sound cost-recovery practices for the Kitangari Water Scheme, the WASH team drafted an English version of a household questionnaire, which was then translated into Swahili by Tanzanian members of the WASH team and the Ministry of Water representative on the study. The translation involved an intensive group effort over a three-day period; significant care was taken to capture the nuances of the wording, particularly of the willingness-to-pay questions themselves.

Figure 2

Villages in Study Area



The questionnaire consisted of three parts. The first dealt with the household's water use practices and attitudes. The second consisted of two bidding games: one to determine how much the household would pay for water from a kiosk if a price were charged for each bucket and another to determine how much the household would pay in terms of a flat monthly fee for unlimited access to a public tap. The third asked for information on the respondent's educational level and the household's assets. The survey collected information on both the socioeconomic characteristics and current water use practices and attitudes of the households so that the WASH team could examine how these factors influence the households' WTP bids.

The bidding games were designed to make the respondent consider his or her responses carefully. For example, after three iterations of the bidding game, the respondent was asked (for the flat monthly fee), "What is the most your household could afford to pay per month?" If the respondent gave an answer of zero, he was asked to explain why he could not afford to pay anything. If he gave any positive amount as an answer, the enumerator asked, "In order to be able to pay for water, which expenses would you reduce?" The enumerator then gave the respondent an opportunity to revise his bid downward.

4.3 Survey Procedures

In half of the interviews the enumerator started the bidding game at a high price. If the respondent initially said he could not pay, the price per bucket (or the flat monthly fee) was lowered, and the respondent was asked again. In the other half of the interviews, the enumerator started with a low price, and if the respondent indicated he could pay, increased the price. In this way the research was designed to test whether the starting point of the bidding game affected the WTP bids.

In half of the interviews the enumerator conducted the bidding game for the flat monthly fee first; in the other half of the interviews the enumerator asked the pay-by-the-bucket questions first. The objective was to test whether the order of the two bidding games influenced the respondents' WTP bids.

Finally, the respondents in Mkongi were divided into two groups, for which interviewers used different opening statements for the bidding game. The first group in Mkongi was read opening statement A (see the survey questionnaire in Appendix I), just as were respondents in the other villages. The second group was read opening statement B, which said that the respondent should think about how much he could pay for water and that the enumerator would come back the following day to get his answer (and complete the rest of the interview). The respondent was instructed that he was free to talk to his neighbors, but that the following day the answers he gave were to be for his own household. The objective of this variation in the survey procedures was to see whether the WTP bids would change if people had an opportunity to reflect and talk to their neighbors about the issue.

These three tests (for high-low starting point, question order, and stability of the bids) meant that eight different versions of the questionnaire (2x2x2) were administered in the field:

1) Opening Statement A; pay-by-the-bucket with high starting point; flat monthly fee with high starting point. (Used in all villages.)

2) Opening Statement A; pay-by-the-bucket with low starting point; flat monthly fee with low starting point. (Used in all villages.)

3) Opening Statement A; flat monthly fee with high starting point; pay-by-the-bucket with high starting point. (Used in all villages.)

4) Opening Statement A; flat monthly fee with low starting point; pay-by-the-bucket with low starting point. (Used in all villages.)

5) Opening Statement B; pay-by-the-bucket with high starting point; flat monthly fee with high starting point. (Used only in Mkongi.)

6) Opening Statement B; pay-by-the-bucket with low starting point; flat monthly fee with low starting point. (Used only in Mkongi.)

7) Opening Statement B; flat monthly fee with high starting point; pay-by-the-bucket with high starting point. (Used only in Mkongi.)

8) Opening Statement B; flat monthly fee with low starting point; pay-by-the-bucket with low starting point. (Used only in Mkongi.)

4.4 Training of Enumerators and Pretest of Questionnaire

Thirteen enumerators were employed for this study. All lived and worked in Newala District; most were employees of the district government. All the enumerators received one day of training before the pretest of the questionnaire. The field supervisor and counterpart study director explained the objectives of the study and went over each item in the questionnaire. The field supervisor and the Ministry of Water representative then role-played an interview for the benefit of all the enumerators. Finally the enumerators paired off and practiced the questionnaire twice while the counterpart study director and the field supervisor observed.

The following day a pretest was conducted in a nearby village. Each enumerator completed eight interviews. The WASH team spent that evening studying these questionnaires, and the next day held another meeting with all the enumerators to discuss the results of the pretest. The group discussed the pretest at

length, and the counterpart study director and the field supervisor went over problems in each enumerator's pretest questionnaires. Based on comments by the enumerators and the tabulated results of the pretest, extensive changes were made in the questionnaire. A final day of training was devoted to going over these changes.

4.5 Sampling Procedure

The WASH team visited each of the study villages, and the field supervisor explained the purpose of the research to the village secretary. The team then asked the village secretary for permission to conduct the survey. In each of the study villages the village secretary had a list of "ten-cell" leaders, each of whom was responsible for party matters for a group of ten households in the village. A few cells had more or fewer than ten households, but every household in the village was a member of one cell. The sampling procedure was to select a random sample of ten-cell leaders in a village, and then interview all of the households in the cells selected.

4.6 Conducting the Survey

The survey was carried out in the six villages over a two-week period (July 27-August 10, 1988). A total of 829 interviews were completed in the six study villages, as follows:

- Mtopwa (good reliability) : 139
- Nanda " " : 104
- Mkonga (moderate reliability) : 128
- Juhudi " " : 118
- Mnyambi " " : 102
- Mkongi (poor reliability) : 238

A greater number of interviews were conducted in Mkongi in order to test for the effect of opening statements A and B. All the interviews were carried out in Swahili. In the very few cases in which an elderly respondent was not able to follow Swahili. When this situation arose, enumerators were instructed to terminate the interview.

Only one day was spent in each village except Mkongi so that respondents would not have much, if any, time to learn about the contents of the survey before they were interviewed. Women enumerators were used to interview women respondents. If a male enumerator was assigned a group of households for a particular ten-cell leader, he asked to speak to the male heads of household. A female enumerator asked to talk with the senior female member of each household. Because the enumeration team had more men than women, the sample contains more male respondents than female respondents.

Chapter 5

FINDINGS OF THE STUDY

5.1 Water in Newala District: An Economic Good

People in Newala District--both those served by the Kitangari Scheme and those who are not--treat water as they do any other highly valued commodity in short supply. In theory the Government of Tanzania might like to make water freely available to all; in practice the price of water in Newala is often extremely high. The importance of water in the region is evidenced in the name of the principal town itself. "Newala" is a Swahili rendering of the English words "new well." During the colonial era the English drilled a well at the base of the escarpment. Although the town was up on the plateau, the well became the water source for the town, and the town itself became known as "New Well" or "Newala."

5.1.1 Rainwater Collection Tanks

Households are willing to incur substantial capital expenditures to meet their water needs. Many households in Newala District have built rainwater collection tanks beside their homes to collect surface water runoff and runoff from their roofs during the rainy season (photographs of these tanks and other photographs showing the situation in the district may be found in Appendix II). Such tanks may serve as a reserve for use during the dry season, but most do not provide a sufficient supply to last until the following rainy season. Such rainwater collection tanks cost on the order of Tsh 7,500-10,000 if built with hired labor--a huge expenditure in an area where average annual household cash income is about Tsh 10,000. Thirty-six percent of the households in the sample had a rainwater collection tank, although only about 50 percent of these were actually working, i.e., could hold water (Table A-8 in Appendix IV).[5]

When the Kitangari Scheme is not functioning, households with rainwater collection tanks sometimes sell water to neighbors in need. The average price of water sold from rainwater collection tanks across the entire sample was about Tsh 9 per bucket, but the average price reported in Mkonga was Tsh 15 per bucket (See Figure 3 and Table A-32). In some instances cassava is traded for water from rainwater collection tanks. However, households with rainwater collection tanks are often reluctant to sell because the opportunity cost is probably a four-hour one-way walk to a traditional source. For the old or sick, this may be impossible. One man interviewed in Mkongi indicated that he could only buy water from his brother, who charged him Tsh 10 per bucket.

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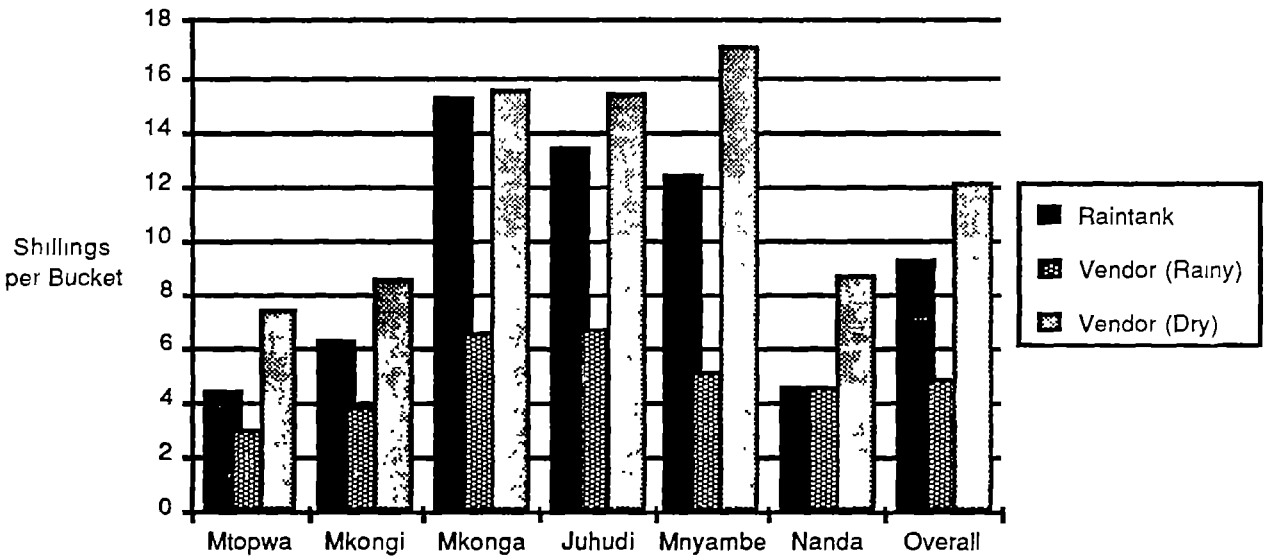
[5] Please Note: Statistical tables generated by the survey, grouped by subject, appear in Appendix IV).

Figure 3

Average Purchase Price of Water from Various Sources



5.1.2 Water Vendors

Vendors who transport water by bicycle sell water in some villages, but many locations can only be reached by roads which are unsuitable for bicycles. Vendors who carry two 20-liter tins (or debit cans) balanced on their shoulders with a pole sell water in some of the larger villages and small towns. The prices, however, tend to be even higher than for water from rainwater collection tanks. During the dry season, the average price of water sold by vendors in the six villages surveyed was Tsh 12 per bucket, but in Mnyambe, the average price reported was Tsh 17 per bucket (Table A-32). In the town of Newala itself, when the water system is not operating, vendors descend the escarpment to collect water from a well, and then return to town to sell the water for as much as Tsh 30 per bucket. This is equal to an entire day's wages in agriculture.

5.1.3 Traditional Sources

Water sold by vendors is simply too expensive for most people for regular daily consumption, and when the Kitangari scheme is not functioning in their village, the majority of the population is forced to use traditional sources or to obtain water from villages which are being supplied by the scheme at the time. The traditional sources are typically five to ten miles away, and women in many villages spend much of the day collecting one bucket of water for their families. The average time of a trip from the home to the traditional source, waiting in the queue, and then returning home varies from about 7 hours in Mnyambe and Nanda to 11 hours in Mkonga and Juhudi (see Figure 4 and Table A-30). Seventy-three percent of the respondents in the sample considered the water from traditional sources to be of poor quality, but when the water scheme is not working, they have no alternative (except those with rainwater collection tanks, and the quality of water from rainwater tanks is also widely perceived to be poor; see Table A-25).

5.1.4 Reasons for Low Per Capita Water Consumption

During the dry season when the scheme is operating, the average per capita water consumption reported by respondents is on the order of 17 liters per capita per day (Figure 5 and Table A-24). In the dry season, when the scheme is not operating, water consumption falls to about 8 liters per capita per day. One third of the respondents reported that per capita consumption fell to less than 4 liters per day in the dry season when the water system was not working (Table A-21). (Figure 6 shows consumption during the rainy season.) Water consumption at such levels is close to the minimum necessary for physical survival. As shown in Tables A-20 and A-23, low per capita water consumption tends to be associated with large households.

It is simple to understand how water consumption can fall to such low levels. If a household consists of a man and wife and three children, and the woman must be gone 11 hours to collect one 20-liter bucket of water, she will return with just 4 liters per capita for the day. The next day, of course, she must leave again to collect water. Such a scenario is not unusual in villages in Newala

Figure 4

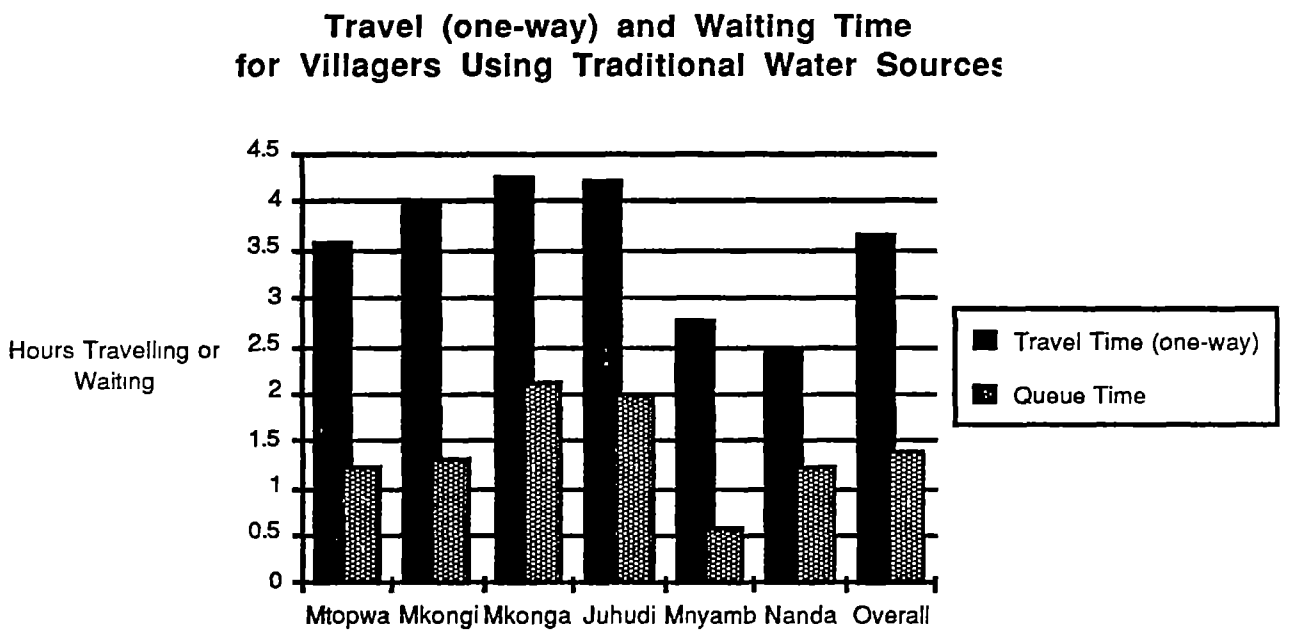

Travel (one-way) and Waiting Time
for Villagers Using Traditional Water Sources
Hours Travelling or Waiting
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Mtopwa
Mkongi
Mkonga
Juhudi
Mnyamb
Nanda
Overall
Travel Time (one-way)
Queue Time

Figure 5

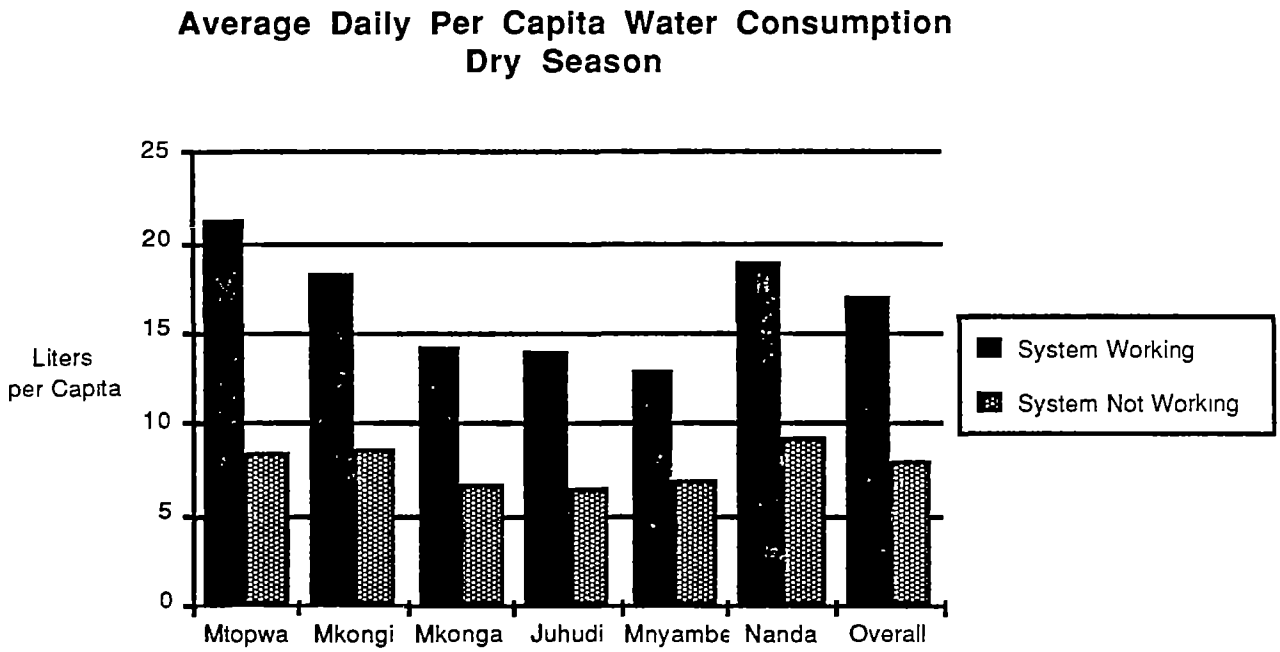
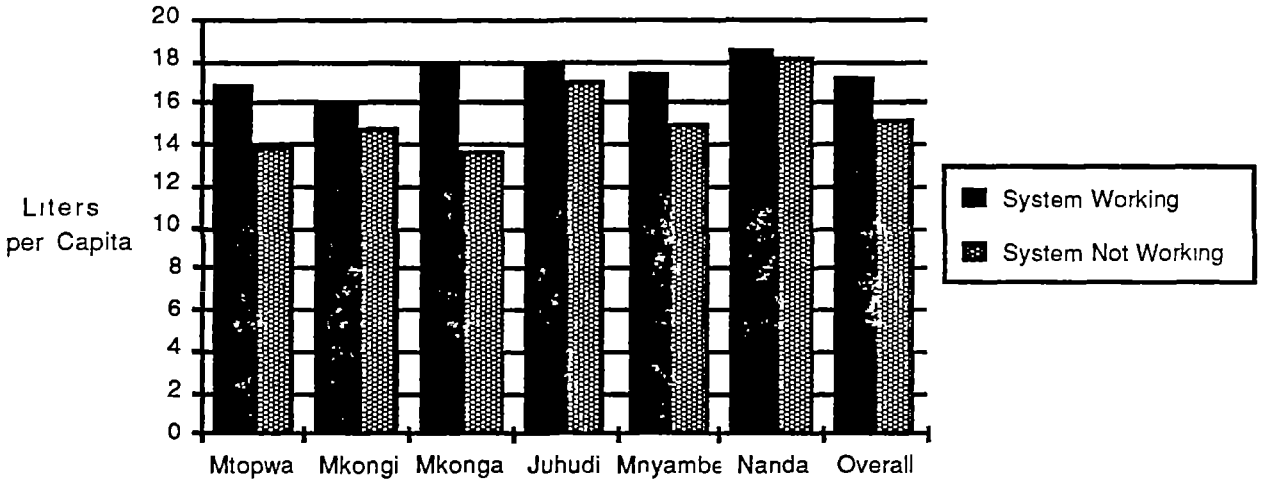

Average Daily Per Capita Water Consumption
Dry Season
Liters
per Capita
25
20
15
10
5
0
Mtopwa
Mkongi
Mkonga
Juhudi
Mnyambe
Nanda
Overall
System Working
System Not Working

Figure 6

Average Daily Per Capita Water Consumption
Rainy Season



District in the dry season. When the WASH team first visited Mkongi in mid-July 1988, there had been no water in the public taps for two months; in Mkonga and Juhudi, there had been no water for six weeks.

The lack of water is not only an obvious threat to health, but it is also a severe constraint on the economic production of the household unit. During the dry season when the system is not working, roughly a quarter to a third of the average household's labor is being devoted to collecting water. In such a situation, a household's decision on the amount of money it is willing to pay for an improved water supply is not simply a matter of how to allocate a fixed budget among different consumption items. An improved water supply opens up new production possibilities for the household because it frees substantial labor resources that can be allocated to other activities.

The lack of water also adversely affects the chances for children's survival. In November 1982, UNICEF carried out a household survey in 17 villages in Newala district. The results showed that 10 percent of the children under five years of age were severely malnourished (i.e., their weight-for-age ratio was less than 60 percent of the Harvard standard). One of the findings of this research effort was that the high incidence of malnourishment among young children was not simply due to an absolute shortage of food. One of the main reasons was that mothers of young children spent so much of their time collecting water that they did not have adequate time to prepare food for children or to feed them frequently enough during the day.

5.2 Socioeconomic Characteristics of the Sample Households

In order to better understand the households' WTP bids for improved water services, it is important to have a general understanding of the socioeconomic characteristics of the households which were interviewed for the study. Sixty one percent of the households in the sample had between three and six members; the average size was five (see Figure 7 and Table A-1). About a quarter of the households had seven or more members. The majority of households had two children or less. Less than 20 percent had more than four children (Table A-3).

The respondents were relatively evenly split between those that could read a newspaper easily (42 percent) and those that could not read at all (40 percent) (see Figure 8 and Table A-4). Eighteen percent reported that they could read a newspaper with some difficulty. Forty-seven percent of respondents had four years of schooling or less; only 3 percent had more than seven years.

The survey included a series of questions about characteristics of the respondent's housing in order to distinguish the socioeconomic status of different households. However, the results show that most households in the study villages have similar quality housing. Seventy-five percent of the sample households have a thatch roof (25 percent have corrugated metal); 58 percent have no floor (38 percent have a cement floor); 57 percent have no windows; 52 percent have mud walls with no plaster (Table A-6). Households' ownership of assets followed a similar pattern. Fifty-eight percent had no goats; 82 percent had no lamp; 86 percent did not own a radio; 83 percent did not own a bicycle.

In fact, a majority of the households did not have any identifiable assets (Table A-7).

5.3 Attitudes toward Government Policy in the Water Sector

The respondents were asked whether they agreed or disagreed with three statements about government policy in the water sector (see Figures 9, 10, and 11 and Table A-5). A large majority (82 percent) agreed that villages should be responsible for meeting the costs of operation and maintenance of their water systems, but their answers may be largely a reflection of their knowledge that this is now official government policy. When the question was turned around and respondents were asked whether or not they agreed with the statement that it is the responsibility of the government alone to provide water free to every citizen of Tanzania, only 51 percent disagreed. In both cases, however, the response of a majority of respondents could be interpreted to mean that they no longer believed in the welfare state's promises of free water. Perhaps surprisingly, the majority of respondents were optimistic that the water problem in Tanzania would be solved. Sixty-six percent agreed with the statement that in 10 years time every resident of Tanzania will have access to reliable sources of water in his village.

5.4 Willingness to Pay for Improved Water Services

5.4.1 WTP Bids for a Pay-by-the-Bucket System

As shown in the questionnaire (see Appendix I), respondents gave several answers in the bidding game to both a pay-by-the-bucket system and a flat monthly fee. The respondent's answers to the first three Yes/No questions in the pay-by-the-bucket bidding game place him or her into one of the following categories:

Tsh 0.00
Tsh 0.01-0.49
Tsh 0.50-0.99
Tsh 1.00-2.99
Tsh ≥ 3.00

The interval within which a respondent's bid falls is the range of the highest price per bucket at which he or she will buy at least some water from a kiosk. These results are presented in Table A-34. If the price of water from the kiosk were Tsh 0.50 per bucket, 89 percent of the respondents indicated that they would buy water from the kiosk. If the price of water were Tsh 1.00 per bucket, 72 percent of the respondents indicated that they could afford to buy at least some water from a kiosk.

Figure 7

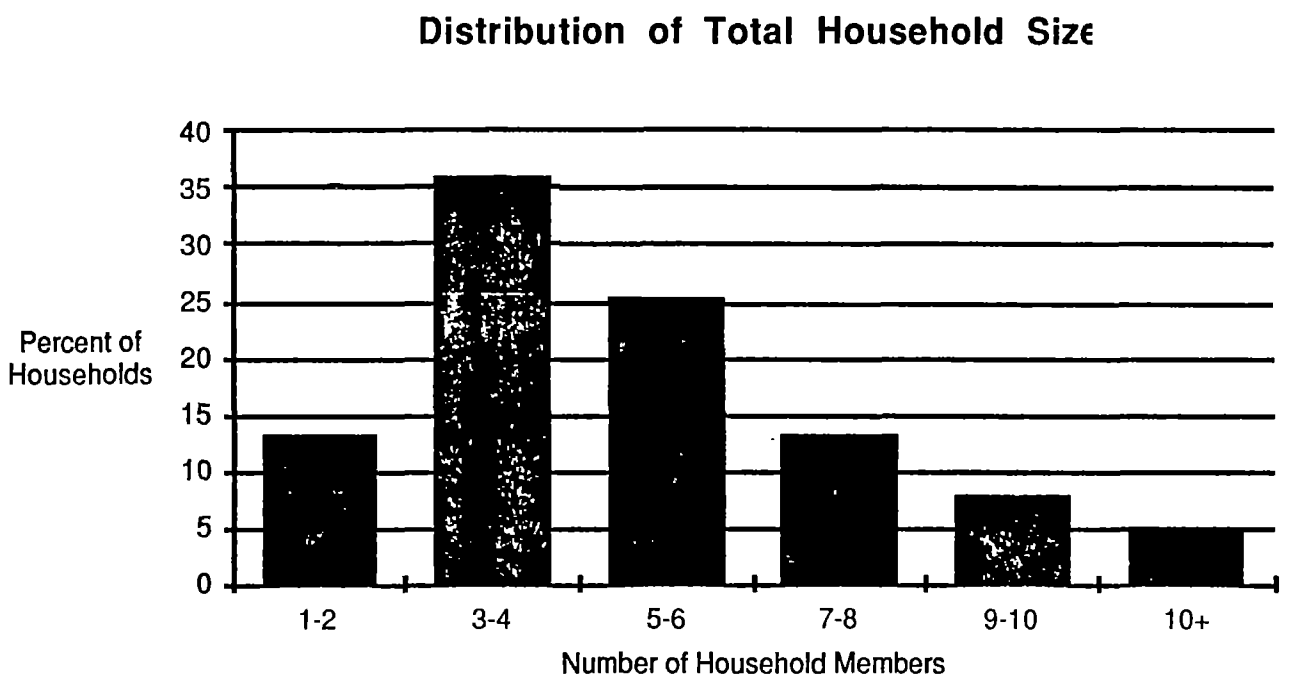

Distribution of Total Household Size
Percent of Households
40
35
30
25
20
15
10
5
0
1-2
3-4
5-6
7-8
9-10
10+
Number of Household Members

Figure 8

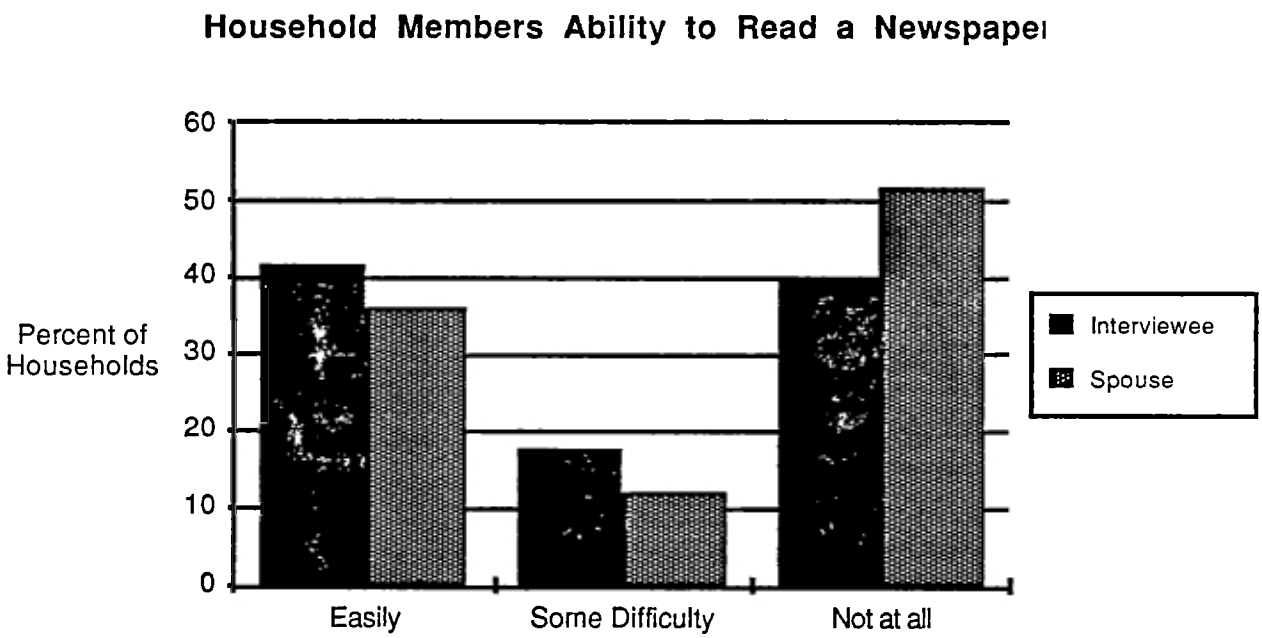

Household Members Ability to Read a Newspaper
Percent of Households
60
50
40
30
20
10
0
Easily
Some Difficulty
Not at all
Interviewee
Spouse

Figure 9

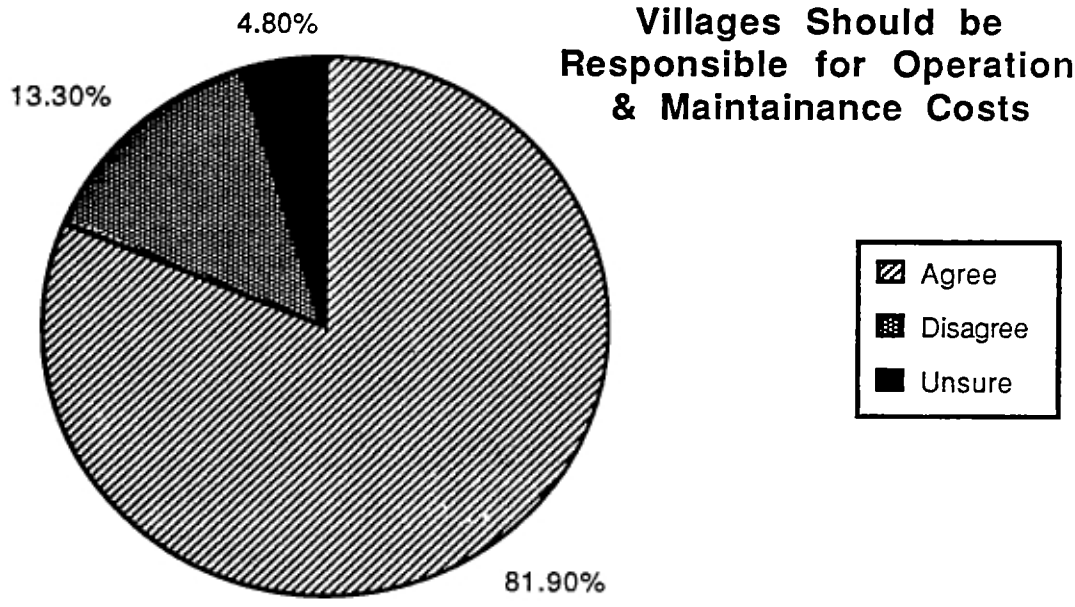

Villages Should be Responsible for Operation & Maintainance Costs
4.80%
13.30%
81.90%
Agree
Disagree
Unsure

Figure 10

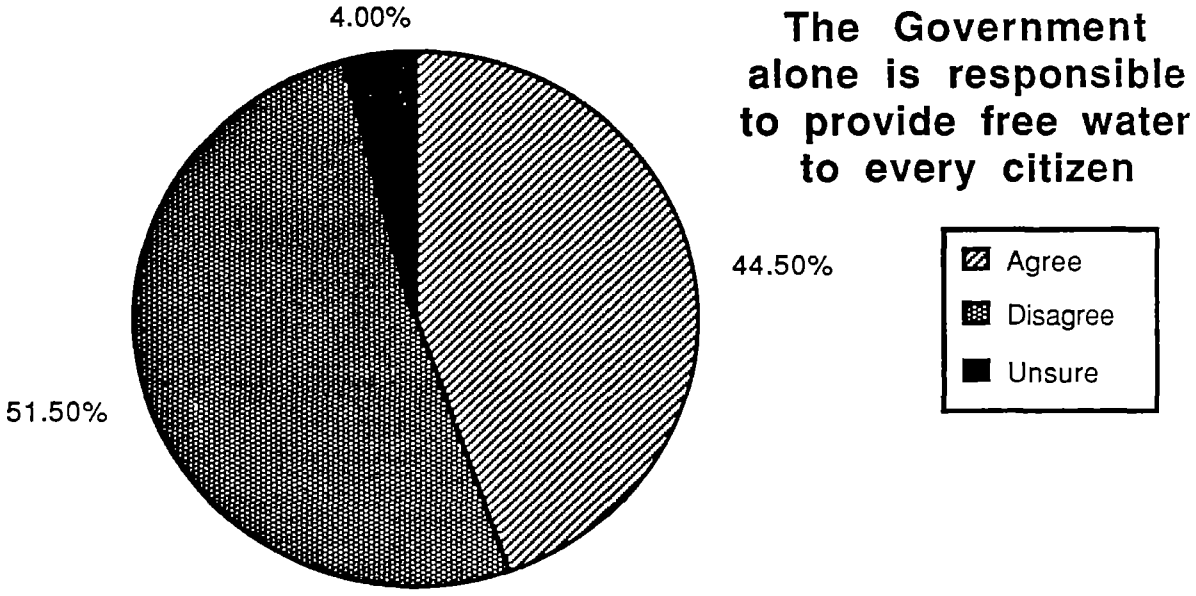
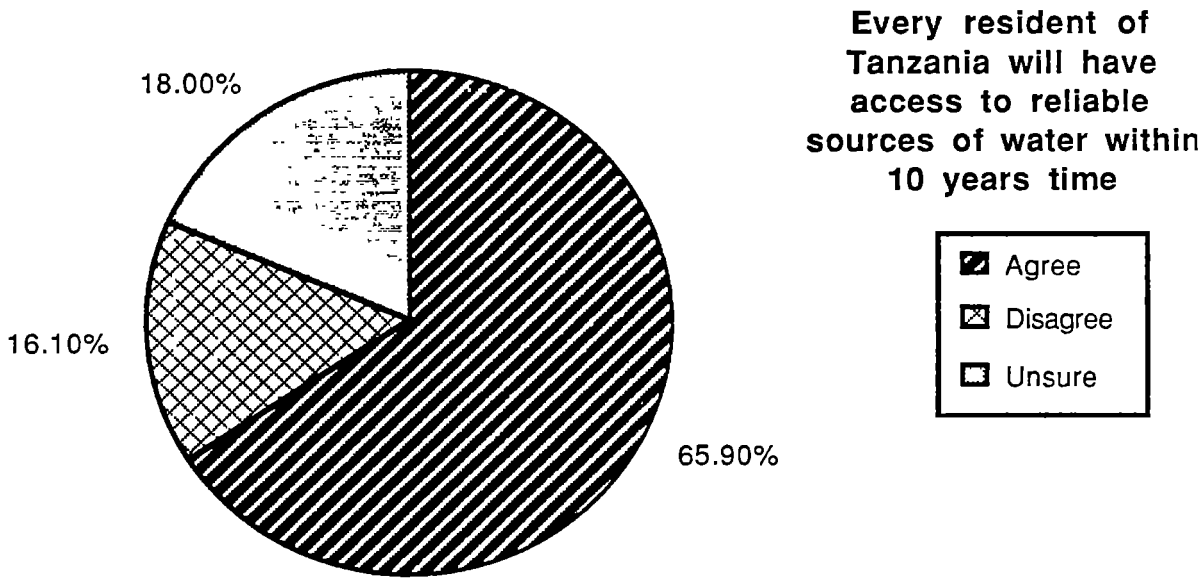

4.00%
The Government alone is responsible to provide free water to every citizen
44.50%
51.50%
Agree
Disagree
Unsure

Figure 11


Every resident of Tanzania will have access to reliable sources of water within 10 years time
18.00%
16.10%
65.90%
Agree
Disagree
Unsure

The enumerator next asked each respondent, "If you got all the water you needed from the domestic tap, what is the most you could pay per bucket?" The respondents' answers are presented in Table A-35. Seventy-eight percent of the respondents indicated that they would buy all their water from the kiosk if the price of water from the kiosk cost Tsh 0.50 per bucket. Only about a third of the respondents, however, indicated that they could afford to buy all their water from a kiosk at a price of Tsh 1.00 per bucket. On the other hand, only 4 percent of the respondents indicated that they could not pay anything.

Table A-38 presents the frequency distribution of the maximum monthly water expenditures by respondents under a pay-by-the-bucket system. The maximum monthly water expenditures are calculated as the product of (1) the answer to the open-ended question quoted in the previous paragraph, (2) the respondent's estimate of the number of buckets the household would purchase per day at this price, and (3) 30 days per month. The mean maximum monthly expenditure for water on a pay-by-the-bucket system on water was Tsh 73. For a typical family with five members and a per capita annual income of Tsh 2,000, an expenditure for water of Tsh 73 per month represents about 9 percent of household income.[6] However, as indicated in the frequency distribution, there is a wide variation in WTP bids across respondents. Sixteen percent of the respondents indicated that they would pay Tsh 20 or less; 19 percent indicated they would pay more than Tsh 100. The answers of 52 percent of the respondents fell within the range of Tsh 20-60 per month.

5.4.2 WTP Bids for a Flat Monthly Fee System

The bidding game for the flat monthly fee resulted in bids which placed respondents into one of the following categories:

Tsh 0-24
Tsh 25-49
Tsh 50-99
Tsh $\geq$ 100

The frequency distribution of their responses is presented in Table A-39. Twenty-one percent of the respondents said that they could not afford to pay Tsh 25 per month. However, almost half of the respondents (48 percent) indicated that they could pay Tsh 50 per month; 31 percent said they could pay Tsh 100 per month.

Following the three Yes/No questions in the bidding game, the enumerator asked the open-ended question, "What is the most your household could afford to pay per month?" The respondents' answers, presented in Table A-40, are substantially lower than the answers to the questions in the bidding game

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[6] Such a percentage of income is consistent with the results of other recent contingent valuation studies and studies of water vending. See Whittington, Lauria, and Mu, 1988, op. cit., and Dale Whittington, Donald Lauria, Daniel A. Okun, and Xinming Mu, Water Vending and Development: Lessons from Two Countries (WASH Technical Report No. 45, May 1988)

presented in Table A-39. The mean WTP bid for a flat monthly fee was Tsh 32. Forty-four percent said they could not afford to pay more than Tsh 20 per month. Only 25 percent indicated that they could afford to pay more than Tsh 30 per month. The responses in Tables A-39 and A-40 obviously appear inconsistent; a partial explanation may be that the translation of the open-ended question into Swahili somehow implies that the respondent should state the maximum price that he or she would like to pay or could easily pay without difficulty.

5.4.3 A Comparison of the WTP Bids for the Two Cost-Recovery Schemes

The comparison of the WTP bids and answers to open-ended questions under the pay-by-the-bucket and flat monthly fee cost recovery mechanisms is not straightforward because of the different amounts of water which would be consumed in each case and different phrasing of the questions themselves. A comparison of the frequency distributions of (i) maximum monthly water expenditures under a pay-by-the-bucket scheme (Table A-38), and (ii) the WTP bids for a flat monthly fee from the bidding game (Table A-39), would suggest that the respondents' willingness to pay for water is not heavily dependent upon the cost-recovery system used.

However, this comparison contrasts answers from (a) the open-ended question for the pay-by-the-bucket system with (b) answers from the bidding game for the flat monthly fee. For both the pay-by-the-bucket and the flat monthly fee systems, the answers to the bidding game questions are significantly higher than to the open-ended questions. Thus, a comparison of (i) the maximum monthly water expenditures under a pay-by-the-bucket system (Table A-38) with (ii) the WTP bids for a flat monthly fee from the open-ended question (Table A-40), suggests that the pay-by-the-bucket system would generate substantially more revenue. For example, with a pay-by-the-bucket system, 84 percent of the respondents said they would spend more than Tsh 20 per month on water; with a flat monthly fee system only 56 percent of the respondents said they could spend more than Tsh 20 per month. With a pay-by-the-bucket system, 32 percent of the respondents said they would spend more than Tsh 60 per month on water; with a flat monthly fee system only 9 percent of the respondents said they could spend more than Tsh 60 per month. This comparison indicates that the revenue potential from the pay-by-the-bucket system is significantly greater than from the flat monthly fee (not yet taking into account the costs of installing and operating the kiosks).

In each interview, after the two bidding games were completed, the enumerator asked the following, straightforward question about the respondent's preferences between the two cost recovery mechanisms: "Would you prefer a pay-by-the-bucket or flat monthly fee system of collecting for the costs of providing water?" Out of 615 responses, 58 percent preferred the pay-by-the-bucket system, and 42 percent preferred the flat monthly fee. While this difference is statistically significant, the WASH team does not consider it to be a very large margin in favor of the pay-by-the-bucket system. It is consistent, however, with the finding that people would pay more per month under a pay-by-the-bucket system than a flat monthly fee.

5.5 Reliability of Results

If the bids described above are an accurate measure of households' preferences for improved water services, they provide a valuable basis for decision-making with regard to the appropriate cost-recovery mechanism and the price or fee to be charged. The first question then which must be answered is whether the bids are, in fact, reliable indicators of the willingness of households to pay for water. Unfortunately there is no way to be completely sure how good this information is, short of installing one of the cost-recovery systems, seeing what in fact happens, and then comparing this with what people earlier said they would be willing to pay. This kind of experimentation is not practical at this time in Newala District: a solution needs to be found as soon as possible to what by any measure is an appalling water situation for most households.

Given the urgency of the problem, the best that one can do is to (1) examine statistically the results of the survey to see if they are consistent, appear reasonable, and make sense theoretically, given what is known about village water demand behavior, and (2) draw upon the judgment of the enumerators and field supervisors to see whether they feel that respondents took the interview seriously and were trying to give meaningful answers. Such analysis and reflection can increase the confidence of policymakers that the information provided by WTP surveys accurately depicts how people feel.

5.5.1 Reliability Tests

The research design for this study incorporated three principal tests for the reliability of the WTP bids.

Order of the Bidding Games

First, as noted in Chapter 4, half of the respondents received questionnaires in which the pay-by-the-bucket bidding game came first, followed by the bidding game for the flat monthly fee. The other half received questionnaires in which the bidding game for the flat monthly fee came first, followed by the pay-by-the-bucket bidding game. If people are giving meaningful responses in the bidding game, their answers should not depend on the order in which the questions were asked. In other words, if the order of the bidding games influenced the final WTP bids, this would be an indication that the bids are not very reliable. The WASH team thus tested statistically to see if the respondents' bids were influenced by the order of the two bidding games, and they were not.

Table A-49 presents the mean WTP bids for the two different orderings of the bidding games. For the open-ended question for pay-by-the-bucket, the WTP bids are almost identical for the two question orders. For the maximum monthly expenditure on water with a pay-by-the-bucket system, the mean of the WTP bids is 13 percent higher when the flat monthly fee bidding game comes first, followed by the pay-by-the-bucket bidding game. For the WTP bids for a flat monthly fee, the mean of the WTP bids is 17 percent lower when the flat monthly fee bidding game comes first. These results increase the confidence of the WASH team in the reliability of the results.

High-Low Starting Points

Second, the WTP bids were examined to see if the respondents gave higher bids when the bidding game was initiated with a high starting point and lower bids when the bidding game was initiated with a low starting point. Tables A-36 and A-37 present the WTP bids per bucket from the bidding game for the high and low starting points; Tables A-41 and A-42 present the same information for the flat monthly fee from the bidding game. From an examination of these frequency distributions it appears that respondents in both cases bid higher when the bidding game started with a high starting point and visa versa. In fact, the effect of the starting point is statistically significant.

This finding of starting-point bias is not unusual in contingent valuation studies, and although the starting point did influence the final WTP bid of many respondents, the magnitude of this change is not so large that it invalidates the WTP bids. In fact there was no difference between the means of the WTP bids for the interviews with high and low starting points for the pay-by-the-bucket bidding game. For the flat monthly fee bidding game the difference was Tsh 8. The results of the multivariate analysis of the determinants of the WTP bids suggest that for the flat monthly fee, the bid from respondents with a high starting point was about Tsh 12 higher than those from respondents with low starting points. (See Appendix III).

Probably the best estimate of the "true" WTP bid is to take the mean of the high and low bids. The frequency distributions of WTP bids for the overall sample is thus somewhat "tighter" than Tables A-34, A-35, A-39, and A-40 suggest. In other words, the low bids tend to be associated with the interviews with low starting points, and the high bids tend to be associated with interviews with high starting points. The overall sample means of the WTP bids, however, would remain essentially unchanged by any correction for starting point bias.

Delayed Answers

The third test for the reliability of the WTP bids was only conducted in Mkongi, and, as described in Chapter 4, involved giving half the respondents an extra day to reflect upon how much they were willing to pay for improved water service. [As shown in Table A-50, the respondents who had an extra day to reflect on the issue gave significantly lower answers to the WTP questions in the bidding game than did those who answered immediately. The mean WTP bid for a flat monthly fee (from the open-ended question) for respondents who answered immediately (i.e. who received opening statement A; see the questionnaire, Appendix I) was Tsh 49; the mean bid of those who deliberated for a day (i.e., received opening statement B) was Tsh 33. Also, the standard deviation of the WTP bids was significantly reduced for those respondents who had the extra day to think. In other words, the WTP bids of this second group were much closer to each other than the WTP bids of the first group.

There are three different hypotheses as to why these answers are lower. The first is that after the respondents had time to seriously and carefully consider what they would have to give up in order to receive improved water services, they were in a better position to give a realistic answer. According to this

view, the answers of the second group are more likely to reflect the "true" willingness to pay.

The second and third hypotheses are that the respondents got together and either reached an explicit agreement on what price to tell the enumerators or were of like mind on the question. An explicit agreement might have involved an attempt on the part of people in the village to act strategically and report lower WTP bids than they were actually prepared to pay, but it could also have involved a realistic assessment of the community's resources and a collective decision on a "fair" price or monthly charge which all would be under a social obligation to pay.

The research design used in this study cannot test any of these hypotheses; it is only possible to document the difference between the WTP bids of the two groups. However, the explanations above would suggest that the WTP bids of the second group are either below the "true" WTP bids, or a better, more stable estimate. In either case, the WASH team believes that the results of this test should increase one's confidence in the general magnitude of the WTP bids and in the overall finding that households are willing to make a substantial cash contribution to the operation and maintenance of the Kitangari Water Scheme. However, the test does serve to emphasize the point that uncertainty still remains in the interpretation of the WTP bids, and that policy makers cannot expect to use the results of this study to make precise predictions on what will happen if either cost-recovery mechanism were installed.

5.5.2 Strategic Bias

In addition to these three tests, two other aspects of the research design bear upon the reliability of the study results. First, as noted in Chapter 3, many economists are skeptical that respondents in contingent valuation surveys will reveal their real preferences because it may not be in their self interest to so. In this study the questionnaire was designed to minimize the threat of such strategic bias on the part of the respondents. This was done by attempting to convince the respondent in the opening statement to the bidding games that even if he or she wanted to act strategically that it was not clear how he or she should behave. The following statement was read to all respondents:

> It is important that you answer the questions as truthfully as you can so that we can know what you can afford to pay for water. If you and other people we interview say that you cannot pay anything, then perhaps it is not possible to improve the reliability of the water system by buying more diesel fuel (for the pumping station). If you say you can pay too much, then you might not be able to afford the water. So please answer the questions honestly.

It was thus far from obvious what an individual's best strategy would be if he wanted to answer strategically.

Second, the specific situation in the area served by the Kitangari Water Scheme minimized the threat of "hypothetical bias." Hypothetical bias may arise for two reasons. First, the individual may not understand the characteristics of the good or service being described by the interviewer. Second, the individual may not bother to answer the interviewer's questions accurately because the interviewer does not obviously control the provision of the goods or services being described.

In the judgment of the WASH team, neither of these concerns are serious threats in this study. In fact, Newala District was a nearly ideal location to minimize the threat of hypothetical bias because the old Makonde system had used kiosks where people paid by the bucket, and there was nothing at all hypothetical about the conditions of service being offered. Moreover, unlike most other contingent valuation studies, this study was actually designed with the specific purpose of trying to determine how to solve the existing water problems in the study area. It was not a hypothetical academic research exercise, and this was made clear to the village secretary, the ten-cell leaders, and the respondents (see the introduction to the questionnaire, Appendix I). The study was fully supported by the District Council, the Ministry of Water, and UNICEF, and the WASH team could truthfully say that the information collected would be used for making recommendations on the design of a cost-recovery system for the Kitangari Water Scheme. Given that water is such a primary concern of households in Newala District, there was little apparent reason for the respondents to take the interview lightly, and, indeed, in the judgment of the WASH team, they did not.

Anthropologists and others have also raised doubts about whether it is possible to come into a village and collect meaningful data using such rapid survey techniques. This is an issue of real concern, but it is important to put it in perspective. Evidence from both developed and developing countries suggests that contingent valuation surveys have yielded much better information than most people initially expected. In this study as well, the judgment of the WASH study team is that respondents were cooperative and took the interview process seriously. Almost everyone who was approached agreed to be interviewed. The magnitude of the WTP bids of respondents in Newala District are not widely unrealistic and are generally consistent with studies from other developing countries.

Moreover, from a pragmatic, decision-making point of view, the value of the information obtained from the contingent valuation survey must be judged with respect to alternative sources of information, and there are in fact almost no other sources of information available that policymakers can use to make a reasoned judgment on the preference of households for different cost-recovery schemes. The results of this contingent valuation survey reflect the stated preferences of a large, representative sample of households in Newala District. There is no priori reason to think that these WTP bids are not indicative of people's real preferences. Given the results of the statistical tests reported in this section and in the absence of any other more reliable information, the WASH study team believes that these WTP bids provide a sound basis for the design and implementation of an effective and financially sound cost-recovery mechanism for the Kitangari Water Scheme.

Chapter 6

CONCLUSIONS AND DISCUSSION OF POLICY OPTIONS

As noted in Chapter 1, the principal objective of this study was to answer the following two questions:

- Are the people served by the Kitangari Water Scheme willing to contribute to the operation and maintenance costs of the system, and, if so, how much are they willing to pay?
- What is the most appropriate cost-recovery mechanism for collecting the money?

6.1 Can Households Pay for Operation and Maintenance Costs?

It is clear from the survey results that households place a high value on improved water service, and are certainly willing to contribute what for them are substantial amounts of cash toward the operation and maintenance costs of the Kitangari scheme. They cannot, however, currently afford to pay for the entire operation and maintenance costs of the system.

6.1.1 Estimated Revenue

Figures 12 and 13 present rough estimates of the revenue which could be collected from a pay-by-the-bucket system and a system of flat monthly fees, at various prices. These estimates are based on the households' answers to questions in the bidding games for the pay-by-the-bucket and the flat monthly fee systems (Tables A-34 and A-39). (As noted in Chapter 5, the WTP bids in response to the open-ended questions were somewhat lower.) For both systems the estimates of total revenues first rise as the price per bucket and the monthly fee increase. After a certain point, however, total revenues start to fall as prices increase because people decrease the amount they purchase from the kiosk (in the case of the pay-by-the-bucket system) or cancel their membership in the monthly plan and return to using traditional sources. Thus, if the price or fee is set too high, the government will lose revenues and the people will lose the benefits of the improved water system.

The total revenue which can be obtained is clearly greater with a pay-by-the-bucket system, but the costs of installing and running the system of kiosks is also much higher. The WASH team has not prepared detailed cost estimates for installing and operating the kiosks, and a careful study needs to be done before a final decision is made on the most appropriate cost-recovery system. As a rough order of magnitude, the WASH team estimates that the annual costs of operating and maintaining a system of kiosks in all the project villages would

Figure 12

Annual Revenue from a Pay-by-the-Bucket System, by Price per Bucket

(From the Bidding Game)

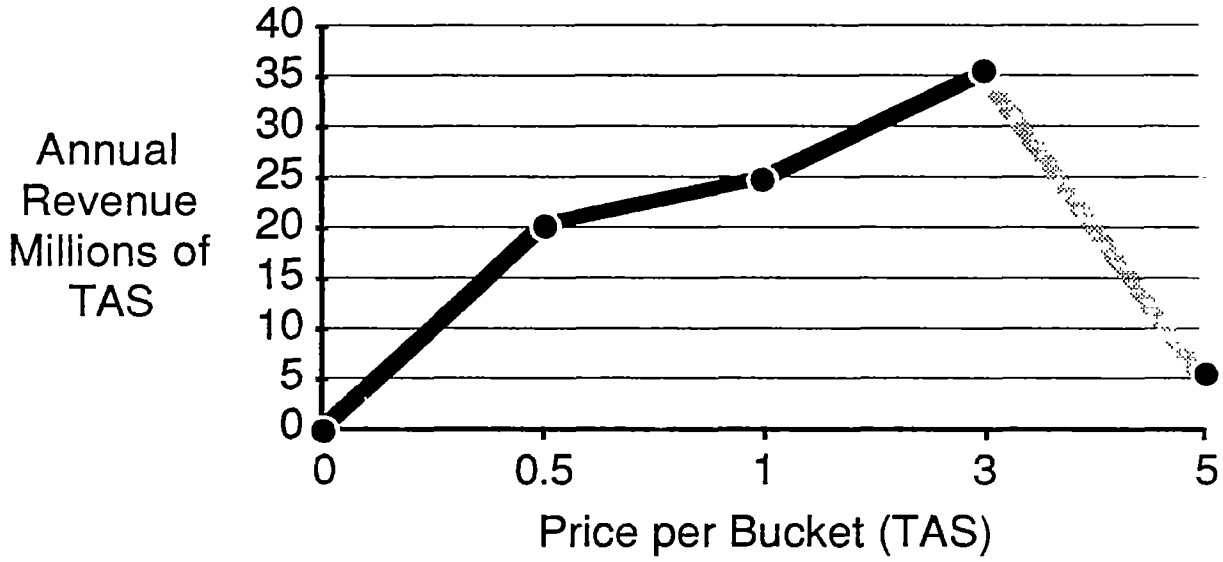
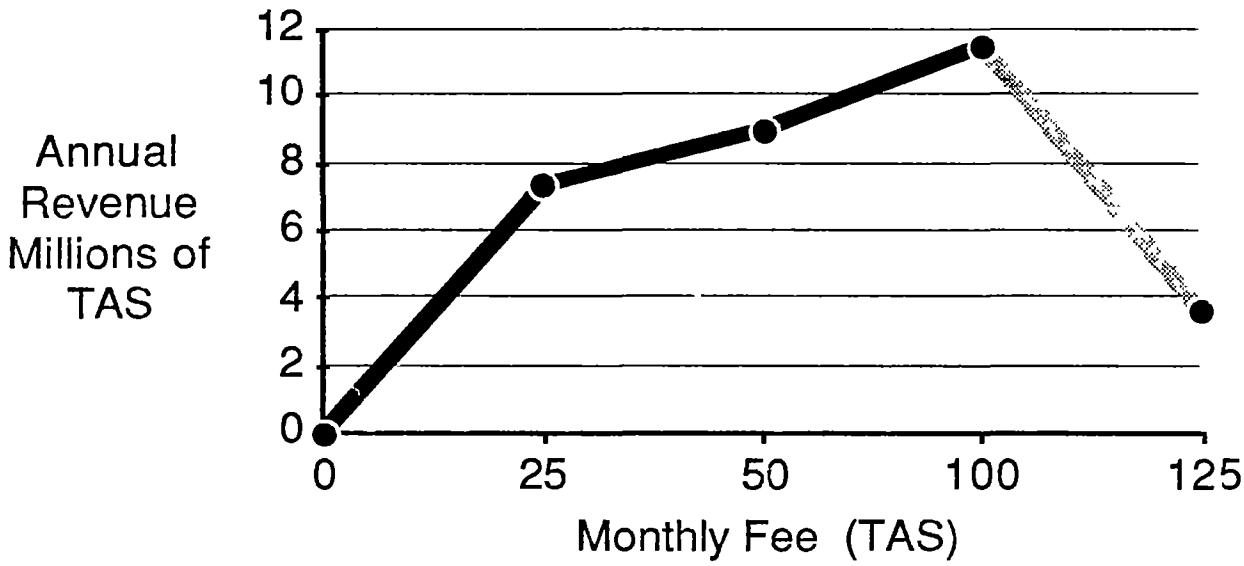


Figure 13

Annual Revenue from a Flat
Monthly Fee System,
by Monthly Fee

(From the Bidding Game)



be about Tsh 6-7 million.[7] This estimate is based on an average of two kiosks in each village served by the Kitangari scheme (note that each kiosk could have several taps without increasing the labor costs of operating the kiosk). These costs could be substantially reduced by operating just one kiosk per village or reducing the hours of operation.

If a system of kiosks were established and the price were set at Tsh 0.50 per bucket, 89 percent of the population say that they would purchase at least some water from a kiosk. The total revenues would be on the order of Tsh 20 million per year, but the net revenues after paying for the costs of the kiosk system would be about Tsh 13-14 million. If a flat fee of Tsh 25 per household per month were charged, 79 percent of the households state that they would pay it. Total annual revenues in this case would be about Tsh 8 million. A system of collecting a flat monthly fee from each household would also entail additional administrative and financial management costs, but these should be significantly less than for a pay-by-the-bucket system. Assuming the costs of administering and managing a flat-monthly fee system are one third of the costs of managing a kiosk system, the net revenues from a flat monthly fee would be about Tsh 6 million per year. Therefore the net revenue from a kiosk pay-by-the-bucket system would probably be about double the net revenue which could be obtained from a cost recovery system based on flat monthly fees.

In the judgment of the WASH team, it would not be advisable to increase either the price per bucket above Tsh 0.50 or the monthly fee above Tsh 25 because the resulting increases in revenue are not very significant, and the number of people who say that they would use the system falls off rapidly as prices and fees increase. On the other hand, if the price per bucket or monthly fee were much lower, the total revenues raised would not be enough to make a significant contribution to the operation costs of the scheme. Figures 14 and 15 illustrate this tradeoff between annual revenues and the percent of households using the water system for the pay-by-the-bucket and flat monthly fee cost-recovery systems.

6.1.2 Operation and Maintenance Costs

Revenues in the range of Tsh 7-14 million will pay for 60-120 percent of the costs of the diesel fuel needed to run the Kitangari scheme (at the existing subsidized diesel prices). They will not come close to paying the full annual operation and maintenance costs of Tsh 40 million. These findings raise serious questions about the long run sustainability of the Kitangari scheme and require careful thought and reflection.

The costs of operating and maintaining the Kitangari scheme are not high by international standards, about US$1.00 per month per household. If the diesel

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[7] Each kiosk is assumed to cost Tsh 20,000; with a capital recovery factor of 0.12, the annual cost would be Tsh 2,400. Each kiosk is assumed to be staffed by two employees so that long hours of operation can be maintained. Each employee is assumed to be paid Tsh 1,000 per month. The added costs of financial management are assumed to be Tsh 1 million annually.

Figure 14

Annual Revenues from a Pay-by-the Bucket System, by Percent of Households Using the System

(From the Bidding Game)

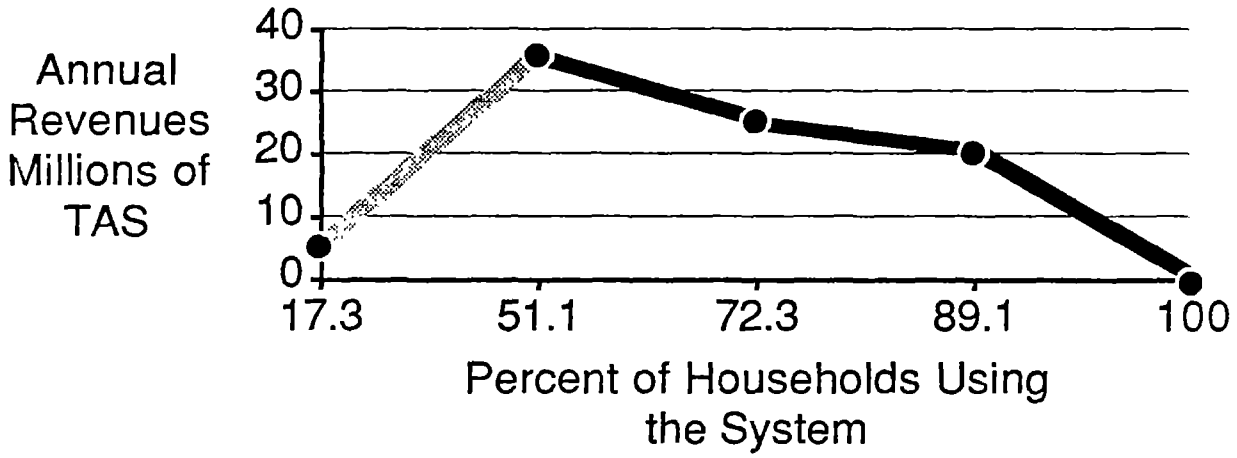
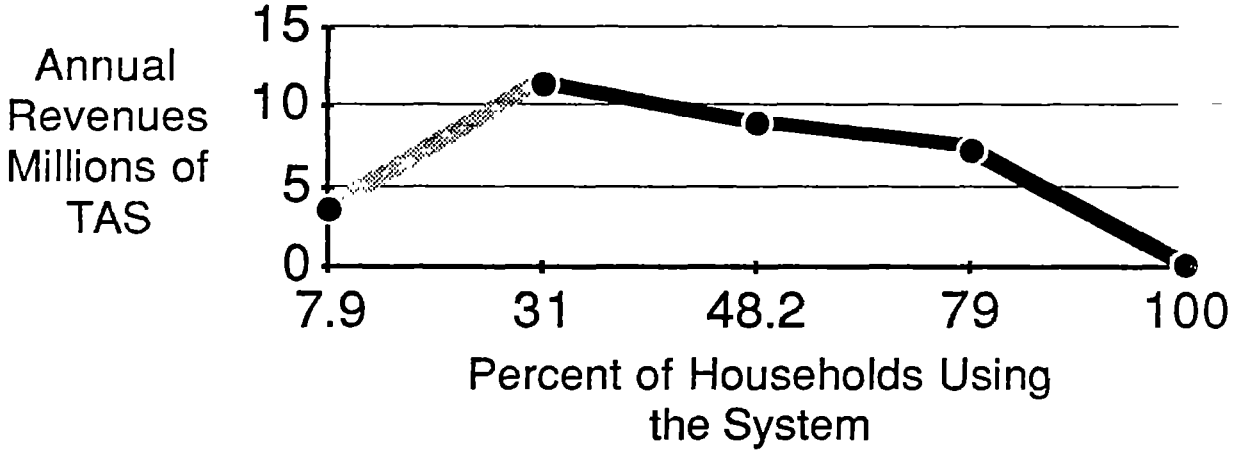


Figure 15

Annual Revenues from a Flat Monthly Fee System, by Percent of Households Using the System

(From the Bidding Game)



fuel were priced at its real resource costs (i.e., if the people had to pay international prices for diesel), this estimate would increase to US$1.30. Moreover, in the long run the capital costs of replacing the system (about US$1.00 per month per household) also will have to be paid. Thus, the real economic costs of providing water to households in the project area are about US$2.30 per month, or US$28 per year.

6.1.3 The Value of Time Savings

For this level of investment, a family would probably save 6 months of a woman's time, compared to a situation in which households had to rely completely on rainwater and traditional sources. This 6 months of labor would no longer have to be spent hauling water and could be devoted to other activities. Simply put, an investment in an improved water system of US$28 per year buys 6 months of a woman's labor. If half of this time were devoted to agricultural production, and this added labor were valued at the current market wage rate of Tsh 30 per day, the value of the time saved would be about US$23 at current exchange rates.[8]

6.1.4 Dynamics of the Structural Adjustment Process

Such estimates of both the costs and the benefits (in terms of time savings) of improved water services are greatly complicated by the structural adjustment process currently underway in Tanzania. The respondents' WTP bids are also probably heavily influenced by their perceptions of the value of the Tanzanian shilling under the old exchange rate regime. The existing daily wage in agriculture of Tsh 30 is equivalent to US$0.31 at current exchange rates. If this is the real long run value of agricultural labor in this region of Tanzania, people cannot afford improved water services or hardly anything else. However, as the prices farmers receive for agricultural products rise, the value of agricultural labor will also rise. Improved water services will remain a high priority for people because of the time savings involved, and people's ability to pay for improved water services will increase.

A cost-recovery system designed for the Kitangari scheme must take into account the dynamics of this structural adjustment process. The fact that people cannot now pay the real economic costs of improved water services is no reason to abandon a strategy of full cost-recovery. On the contrary, it is all the more urgent to establish a cost-recovery mechanism now which will improve the performance of the Kitangari scheme so that the potential time savings for women will be realized, and some of these labor resources can contribute to agricultural production. As the agricultural economy responds to the structural adjustment process and agricultural incomes increase, the price of water will also have to be increased so that the Kitangari system can be sustained in the long run. Any cost-recovery system which is put in place now must be flexible,

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[8] For support for this assumption, see Dale Whittington, Xinming Mu, and Robert Roche, "Calculating the Value of Time Spent Collecting Water: Some Estimates for Ukunda, Kenya," forthcoming in World Development, 1990.

and policymakers must take into account in their design of the cost-recovery system the fact that prices will inevitably have to increase in order for the Kitangari system to be sustainable.

6.2 Pros and Cons of the Two Cost-Recovery Systems

6.2.1 Pay-by-the-Bucket

Advantages

A kiosk system where people pay for water by the bucket when they collect it has many advantages. The first is that such a system should raise significantly more money for the institution responsible for running the system, which should enable it to provide better, more reliable service. The costs of operating and maintaining the kiosks should go down over time as a percentage of the revenue collected because the capital costs will not increase much once the kiosks are built, and it should be possible to increase the price of water faster than the increase in the labor costs of the kiosk attendants. The overhead costs of a kiosk system will thus be less severe in the future.

The second advantage is that a pay-by-the-bucket system is much more popular because people do not have to pay until they receive the water. Understandably, many people do not want to part with their money until they receive what they are paying for. In this respect the pay-by-the-bucket system is politically more feasible than making an advance payment regardless of the quality of the service provided.

The third advantage of the pay-by-the-bucket system is that it provides a strong incentive to the water authority to deliver good service. If the water is not delivered to the villages, the water authority does not receive any revenues. The water authority thus gets prompt feedback if it fails to fulfill its responsibilities.

Fourth, a pay-by-the-bucket system allows people to adjust their water purchases to meet their cash flow situation. When they have money and want to purchase water, they can. If some week they have more pressing needs, they can choose not to buy water. They do not have to commit themselves in advance to a regular fixed monthly payment. Based on the results of the household surveys, we believe that the majority of the people would buy most of their water most of the time from kiosks rather than return to traditional sources, but the pay-by-the-bucket system gives people the freedom to choose.

Fifth, the pay-by-the-bucket system would theoretically reduce wastage because households would do more to conserve water since there is a charge for each bucket collected. However, this incentive is likely to be small because even with a flat monthly fee, the household must still carry water from the public tap to the home.

Disadvantages

First, the administrative costs for running a pay-by-the-bucket scheme are higher. In some places the village leadership or the water authority may decide that these higher administrative costs may require that some public taps be closed. For example, if there are at present three public taps in a village, the village might decide that it does not make financial sense to pay for the salaries of attendants at all three kiosks and that only two would be kept open.

This leads to the second disadvantage of the pay-by-the bucket system. If it is decided that some public taps should be closed, some households might reduce their water consumption. Moreover, the tendency of the pay-by-the-bucket system to reduce water use may actually be a disadvantage if any reduction in water use were to lead to fewer health benefits from the improved water supply. Since there is a charge for every bucket, it is possible that households would reduce not just water wastage, but the use of water for bathing and other purposes with health benefits.

The third disadvantage is that the system of financial controls would have to be considerably more complex than for a flat monthly fee. Meters would have to be installed in order to know how much water was sold so that kiosks receipts could be verified. The handling of the cash by kiosk attendants and others would increase opportunities for fraud and embezzlement.

6.2.2 Flat Monthly Fee

Advantages

The advantages of a flat monthly fee are just the converse of a pay-by-the-bucket scheme. For those households which choose to pay the monthly fee, water consumption may be slightly higher, which may result in more health benefits. The administrative costs of collecting the revenues should be lower than for a pay-by-the-bucket scheme because the fee only needs to be collected once a month and full-time attendants are not required. Receipts would be written when a household makes the monthly payment. However, it is important to emphasize that the administrative costs associated with a monthly flat rate may still be significant because follow-up visits will need to be made to visit households which do not pay, financial records will need to be established, and procedures will need to be developed for handling the money which is collected and for transferring it to the water authority.

Disadvantages

Clearly, two main disadvantages of the flat monthly fee are that long-term potential revenues are lower, and it does not provide the water authority enough incentive to improve and maintain its performance. There are three additional problems with the flat monthly fee. First, households which choose not to pay the monthly fee, and thus continue to use traditional sources, may reduce their water consumption substantially--perhaps to much lower levels than households which reduce their consumption as a result of a pay-by-the-bucket system.

Second, it may prove very difficult to exclude households who have not paid the monthly fee from use of the public taps. If these households cannot be excluded from the public taps, the flat rate monthly fee mechanism may well break down. There will be little incentive for households which are paying to continue to do so if they see their neighbors collecting water for free.

Third, a flat rate monthly fee may appear to be much like the annual development levy, which is very unpopular in Newala District. There is a significant risk that the dissatisfaction with the development levy may spill over onto the collection effort for water and make it unworkable.

6.2.3 Other Considerations

Equity Considerations

With either cost-recovery system there will be some households that will not be able to pay for water, and the village may want to make special provisions for them so that they can have access to the water system. In practice either the pay-by-the-bucket or the fixed monthly fee systems can be flexible enough to incorporate equity considerations. In some kiosk systems in other locations the attendant will often give a free bucket of water to the elderly or the infirm. Such practices are accepted as fair by those households which pay. With a fixed monthly fee, the very poorest households may be exempted or given flexible terms for payment. In both cases, however, the number of exemptions must be kept to a minimum, and the rest of the village should assume the responsibility for payment for water given to the poor so that the perception is not created that the government has the resources to provide free water.

Letting the Villages Choose the Cost-Recovery System

The choice between a pay-by-the-bucket system and a flat monthly fee thus involves many considerations. It is not necessary, however, that all villages in the Kitangari scheme adopt one system or the other. An alternative approach would be to leave the decision on which cost-recovery system to use up to the village itself. The amount of water used by each village would need to be metered, and the village leadership or a village water committee could be billed for this amount. It would be up to the village to decide how the money should be raised. If the village decided that it wanted kiosks, the government authority responsible for the water system would establish such a system and begin charging for water by the bucket. If the village failed to institutionalize a system for collecting the funds, the authority would proceed to install kiosks.

The WASH team believes that there are many advantages to letting each village decide for itself what kind of cost-recovery system should be used. In some villages the problems associated with management of the cash by the village leadership may be insurmountable, and people would prefer to have a group from outside the village be responsible for financial controls. In other villages collection of the fixed monthly fees might pose no problem. In some villages

deciding which public taps to close, if any, might be politically divisive; in others consensus might be easy to achieve. Perhaps most important, if the people themselves choose the cost-recovery system they prefer, they are more likely to support the concept of cost-recovery and to ensure that whatever system they choose works.

6.3 Changes Required in the Institutional Arrangements for Management of the Kitangari Scheme

Whatever cost-recovery system is selected, a new institutional structure is required for the Kitangari scheme if the cost-recovery system is to work effectively. The present arrangement in which the responsibility for the operation and maintenance of the system is divided between the Ministry of Water and the District Engineer does not make sense and will become even more unworkable when a cost-recovery system is instituted.

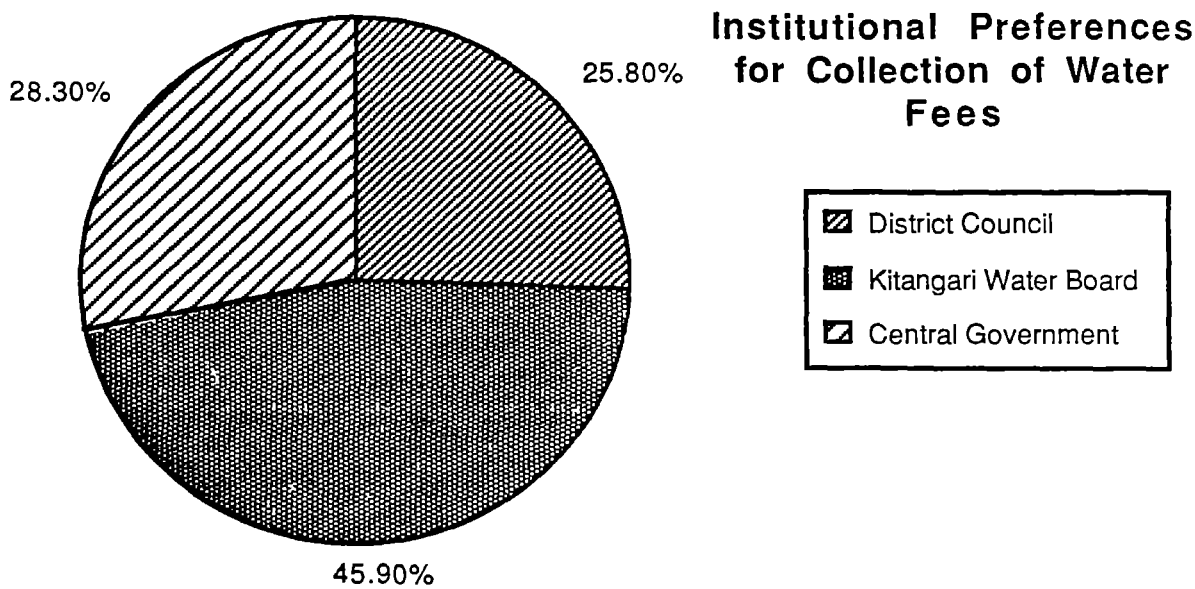
The responsibility for the management of the entire scheme should rest with one organization, which can be held accountable for its performance. If the system does not function, it should be clear where responsibility for such failure lies. The important question is what organization or authority should have the responsibility for the Kitangari scheme. In the household interviews respondents were asked their opinion on this issue. Specifically, they were asked who they would prefer to be responsible for cost recovery: the District Council, the resident Ministry of Water engineer (working for the central government), or a new Kitangari Water Board (organized along the lines of the old Makonde water scheme). Their answers are presented in Figure 16. As shown, almost half of the respondents preferred the Kitangari Water Board. The remainder of the responses were split almost evenly between the District Council and the central government.

The WASH team believes that the respondents' preference for the creation of a new water authority is sound, and that the concept deserves serious study. A new Kitangari Water Board could operate much more like a water utility than either of the other alternatives, and this would have many advantages. Most important, a new Kitangari Water Board could be organized so that it is directly responsible to its clients. This could involve representation on the board of elected leaders of villages in the project area. The board should also include individuals with both technical and financial management expertise.

6.4 October, 1988 Workshop

An earlier draft of this report was the focus of a workshop held in Newala October 12-13, 1988, which was attended by high-level representatives of the national, regional, and district governments, UNICEF, USAID, and the WASH study team. The report formed the basis for a decision by the responsible authorities to begin immediately to establish a cost recovery system based on kiosks where people pay by the bucket for water. A summary of the proceedings of this workshop and a list of participants are presented in Appendix VI.

Figure 16


Institutional Preferences for Collection of Water Fees
28.30%
25.80%
45.90%
District Council
Kitangari Water Board
Central Government

REFERENCES

REFERENCES

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Finnwater Consulting Engineers (1986) Mtwara-Lindi Water Master Plan: Volume 1 (revised April 1986).

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APPENDIX I

Survey Questionnaire

Name of Enumerator: Time Start:

Date: Time Finish:

Village:

Name of the 10-cell leader:

UNICEF/MAJI WATER STUDY, NEWALA DISTRICT: HOUSEHOLD QUESTIONNAIRE

[ENUMERATOR: READ THE FOLLOWING INTRODUCTORY STATEMENT]

My name is _____ and I am working with UNICEF and MAJI on a study of the water situation in Newala district. This village has been selected as one of the villages for our study. We have received permission from the District Executive Director, the District Commissioner, and your Village Secretary to conduct this study. You have been selected as one of the people we would like to interview. The interview will just take a few minutes. Your responses will help provide the village with better water service. Your answers will be completely confidential, and if at any time during the interview you want to stop answering questions, you are free to do so.

Would you be willing to be interviewed? YES / NO

[NOTE: ONLY THE MOST SENIOR MALE OR FEMALE IN THE HOUSEHOLD SHOULD BE INTERVIEWED]

* * *

1. Name of respondent: _____

2. Is the person being interviewed male or female? MALE / FEMALE

3. Is the person being interviewed the head of the household? YES / NO

4. Is this a female-headed household? YES / NO

5. Are you a 10-cell leader? YES / NO

6. How many adults live in this household? No. of adults _____
(ADULTS: 18 YEARS AND OLDER)

7. How many children live in this household? No. of children _____

Part I: Water Sources

[Enumerator: Now I would like to ask you *some questions about the water* situation in this village.]

8. Is the water system working today (i.e., is there water in the pipes)?

YES /NO

IF YES, GO TO QUESTION NO. 10

9. How many days has the system been without water?

No. of days _____

Rainwater Collection

10. Do you have a rainwater collection tank? YES / NO

IF NO, GO TO QUESTION NO. 15

11. Does it work (i.e. does it hold water) YES / NO

IF NO, GO TO QUESTION NO. 16

12. If your neighbor runs out of water, do you sometimes provide your neighbor water from your tank?

YES / NO

IF NO, GO TO QUESTION 16

13. Do you charge something for the water?

YES / NO

IF NO, GO TO QUESTION 16

14. How much do you charge per bucket?

Price per bucket _____

15. [IF RESPONDENT DOES NOT HAVE A RAINWATER COLLECTION TANK, ASK ...]

How much do your neighbors with a tank usually charge for a bucket of water ?

Price per bucket _____

16. How would you judge the quality of water from rainwater collection tanks?

GOOD / POOR

Don't Know _____

Source outside village (Traditional Source, handpump, or reliable taps in another village)

17. Which source of water (other than rainwater tanks) do you use most often when the system does not have water?

Name of source _____

Type of source:
(Check one most often used)

spring ____

open pond _____

traditional well _____

handpump _____

other _____

18. How far away is this traditional source (one way)?

No. of miles _____

or No. of kilometers _____

19. How long does it usually take to walk there (one way)?

No. of hours _____

20. How long do you usually have to wait in the queue there?

No. of hours _____

Never a queue _____

21. How would you judge the quality of the water at this source?

GOOD / POOR

Don't Know _____

Water Vending

22. Do water vendors ever sell water in this village?

YES / NO

IF NO, GO TO QUESTION 25

23. (IF YES, ASK ...) How much do they usually charge per bucket?

Rainy Season (Price per bucket) _____

Dry Season (Price per bucket) _____
(at this time of year)

Don't Know _____

24. How would you judge the quality of water sold by water vendors?

GOOD / POOR

Don't Know _____

Water Consumption

25. When the water system is working, how many buckets do members of your household carry home in a day from the domestic tap?

Rainy Season _____

Dry Season _____

26. When the system is not working, how many buckets do members of your household use?

Rainy Season _____

Dry Season _____

Part II : WILLINGNESS TO PAY FOR WATER QUESTIONS

[ENUMERATOR: READ THE STATEMENT BELOW EXACTLY AS IT IS GIVEN; DO NOT PARAPHRASE.]

Opening Statement A:

As you know, this village is connected to the Kitangari Water Scheme, but the service has been unreliable. The construction costs of the Kitangari Water Scheme were paid by donors. In 1986 these donors then handed the water system over to the central government and the central government now pays for the operation and maintenance of the water system. The main reason that the water supply has been unreliable is that the central government has not had enough money to buy the diesel fuel necessary to run the pumps at all times. When the MAJI engineer runs out of money, he cannot order diesel fuel from Mtwara, and the water stops coming. There is also a shortage of money for repairs and maintenance of the equipment.

Now I'm going to ask you some questions to learn whether your household would be willing to pay money in order to improve the reliability of the water supply scheme serving this village. It is important that you answer the questions as truthfully as you can so that we can really know what you can afford to pay for water. If you and other people we interview say you cannot pay anything, then perhaps it is not possible to improve the reliability of the water system by buying more diseal. If you say you can pay too much, then you might not be able to afford the water. So please answer the questions honestly.

Part II : WILLINGNESS TO PAY FOR WATER QUESTIONS

[ENUMERATOR: READ THE STATEMENT BELOW EXACTLY AS IT IS GIVEN; DO NOT PARAPHRASE.]

Opening Statement B:

As you know, this village is connected to the Kitangari Water Scheme, but the service has been unreliable. The construction costs of the Kitangari Water Scheme were paid by donors. In 1986 these donors then handed the water system over to the central government and the central government now pays for the operation and maintenance of the water system. The main reason that the water supply has been unreliable is that the central government has not had enough money to buy the diesel fuel necessary to run the pumps at all times. When the MAJI engineer runs out of money, he cannot order diesel fuel from Mtwara, and the water stops coming. There is also a shortage of money for repairs and maintenance of the equipment.

I'm going to come back tomorrow to ask you some questions to learn whether your household would be willing to pay money in order to improve the reliability of the water supply scheme serving this village. I want you to think carefully about how much you can afford to pay for water. You can discuss it with other members of your household or even your neighbors, but tomorrow I want you to answer my questions just for your household. I don't want everyone in the village to get together and agree upon one answer. Do you understand?

It is important that you answer the questions tomorrow as truthfully as you can so that we can really know what you can afford to pay for water. If you and other people we interview say you cannot pay anything, then perhaps it is not possible to improve the reliability of the water system by buying more diseal. If you say you can pay a very high price, then you might not be able to afford the water. So please answer the questions honestly.

Financing Alternative No. 1: Pay By the Bucket

[Bidding Game with low starting point]

Financing Alternative No. 1: Pay By the Bucket

[Bidding Game with low starting point]

When the old Makonde water scheme was in operation in this village, people had to pay for their water by the bucket. People got water from domestic taps and paid the tap attendant the money which was used to purchase diesel and to pay for repair and maintenance of the water system.

Suppose government started a new system for collecting money and charged people by the bucket so that money could be available to buy enough diesel fuel for the pumping station all the time and let's suppose that there was an attendant at every domestic tap in the village who would collect that money and assume that water would be available continuously with strong pressure from early in the morning until night.

(a) Now, if the price of water per bucket were 0.50 shillings, would you buy water from the domestic tap?

YES / NO
NOT SURE

[IF NO, GO TO (d)]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets _____

(b) Now, if the price of water per bucket were 1 shilling, would you buy water from the domestic tap?

YES / NO
NOT SURE _____

[IF NO, GO TO (d)]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets _____

(c) Now, if the price of water per bucket were 3 shillings, would you buy water from the domestic tap?

YES / NO
NOT SURE _____

[IF NO, GO TO (d)]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets _____

(d) If you got all the water you needed from the domestic tap, what is the most you could pay per bucket?

Maximum price per bucket _____ shillings

[IF THE RESPONDENT MENTIONS ANY PRICE, GO TO (e)]

[IF THE PRICE IS ZERO, ASK ....]

What are the reasons you would not want to pay for water by the bucket even if the price were very low?

(Check appropriate response)

Cannot afford to pay anything _____

Satisfied with traditional source _____

It's the Government's responsibility to provide free water _____

Other (please specify) _____

[IF THE PRICE GIVEN IN (d) IS ZERO, SKIP (e), (f), (g) and (h)]

(e) If the price of water was _____ (use price of water in (d) above), how many buckets do you think your household would buy per day on average?

No. of buckets per day _____

[ENUMERATOR: TELL RESPONDENT THAT YOU ARE GOING TO CALCULATE HOW MUCH THAT WOULD COST PER MONTH]

(f) If the price of water was _____ (use price of water in (d) above), and your household bought _____ buckets per day, it would cost you _____ per day for water, or _____ shillings per month (multiply by 30).

In order to be able to pay for water, which expenses would you reduce?

Food	_____
Clothing	_____
Beer/Cigarettes	_____
Transportation	_____
School fees	_____
Other (Specify)	_____

[CHECK THE AMOUNT IN (f) AND THEN ASK ...]

(g) Do you really think you can reduce the expenses _____
[INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay
_____ [QUOTE AMOUNT IN (f)] per month?

YES	_____	GO TO NEXT PAGE
NO	_____	Go to (h)
NOT SURE	_____	Go to (h)

(h) If you got all the water you needed from the domestic tap, what is the most you could pay per month?

Maximum amount per month _____ shillings

Financing Alternative No. 1: Pay By the Bucket

[Bidding Game with high starting point]

When the old Makonde water scheme was in operation in this village, people had to pay for their water by the bucket. People got water from domestic taps and paid the tap attendant the money which was used to purchase diesel and to pay for repair and maintenance of the water system.

Suppose government started a new system for collecting money and charged people by the bucket so that money could be available to buy enough diesel fuel for the pumping station all the time and let's suppose that there was an attendant at every domestic tap in the village who would collect that money and assume that water would be available continuously with strong pressure from early in the morning until night.

(a) Now, if the price of water per bucket were 3 shillings, would you buy water from the domestic tap?

YES / NO

NOT SURE

[IF NO, GO TO (b)]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets _____

(b) Now, if the price of water per bucket were 1 shilling, would you buy water from the domestic tap?

YES / NO

NOT SURE _____

[IF NO, GO TO (c)]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets _____

(c) Now, if the price of water per bucket were 0.50 shillings, would you buy water from the domestic tap?

YES / NO

NOT SURE _____

[IF NO, GO TO (d)]

[IF YES, ASK ...] How many buckets would you buy from the domestic tap per day ...

No. of buckets _____

(d) If you got all the water you needed from the domestic tap, what is *the most* you could pay per bucket?

Maximum price per bucket _____ shillings

[IF THE RESPONDENT MENTIONS ANY PRICE, GO TO (e)]

[IF THE PRICE IS ZERO, ASK ....]

What are the reasons you would not want to pay for water by the bucket even if the price were very low?

(Check appropriate response)

Cannot afford to pay anything _____

Satisfied with traditional source _____

It's the Government's responsibility to provide free water _____

Other (please specify) _____

[IF THE PRICE GIVEN IN (d) IS ZERO, SKIP (e), (f), (g) and (h)]

(e) If the price of water was _____ (use price of water in (d) above), how many buckets do you think your household would buy per day on average?

No. of buckets per day _____

[ENUMERATOR: TELL RESPONDENT THAT YOU ARE GOING TO CALCULATE HOW MUCH THAT WOULD COST PER MONTH]

(f) If the price of water was _____ (use price of water in (d) above), and your household bought _____ buckets per day, it would cost you _____ per day for water, or _____ shillings per month (multiply by 30).

In order to be able to pay for water, which expenses would you reduce?

Food	_____
Clothing	_____
Beer/Cigarettes	_____
Transportation	_____
School fees	_____
Other (Specify)	_____

[CHECK THE AMOUNT IN (f) AND THEN ASK ...]

(g) Do you really think you can reduce the expenses _____
[INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay
_____ [QUOTE AMOUNT IN (f)] per month?

YES	_____	GO TO NEXT PAGE
NO	_____	Go to (h)
NOT SURE	_____	Go to (h)

(h) If you got all the water you needed from the domestic tap, what is the most you could pay per month?

Maximum amount per month _____ shillings

Financing Alternative No. 2: Flat Rate for Each Household
[BIDDING GAME WITH LOW STARTING POINT]

Payment of a flat monthly rate to the village treasurer is one way of strengthening the water service to the village. The village treasurer would deposit the money into a special account which the water engineer would use to purchase diesel for providing reliable water supply services. This account would be safe, and the money would not be misused. For example, to withdraw money from this account would require the District Commissioner, the District Executive Director, and the District Water Engineer to authorize the withdrawal by signing the withdrawal certificate. They would ensure that the money withdrawn is used for water suppply services. This step will help in strengthening the water supply service so that each household will be able to draw as much water as it wants.

There are 178 villages in the Kitangari Water Scheme, serving about 200,000 people. Each village would be told its fair share of the costs of the diesel fuel; the village would have to raise this amount from the households there.

(a) Suppose that the Resident Engineer and the District Council calculated that in order to provide reliable service with the existing domestic taps, that each household in all the villages served by the scheme would need to pay 25 shillings per month. Those households that didn't pay would not be allowed to use the domestic taps. Would you choose to pay 25 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 25 TSh /mo	.....	Go to (b)
No - choose to fetch water from traditional source	.....	Go to (d)
Not sure	.....	Go to (d)

(b) Suppose instead of 25 shillings per month that the flat fee for each household was 50 shillings per month. Would you choose to pay 50 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 50 TSh /mo	.....	Go to (c)
No - choose to fetch water from traditional source	.....	Go to (d)
Not sure	.....	Go to (d)

(c) If the flat fee for each household was 100 shillings per month, would you choose to pay this fee, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 100 TSh /mo	.....	Go to (d)
No - choose to fetch water from traditional source	.....	Go to (d)
Not sure	.....	Go to (d)

(d) What is the most your household could afford to pay per month?

Maximum monthly fee _____ shillings

[IF THE RESPONDENT MENTIONS ANY AMOUNT, GO TO (e)]

[IF THE AMOUNT IS ZERO, ASK ....]

What are the reasons you would not want to pay for reliable water even if the amount per month were very low?

(Check appropriate response)

Cannot afford to pay anything _____
Satisfied with traditional source _____
It's the Government's responsibility to provide free water _____
Other (please specify) _____

[IF THE AMOUNT GIVEN IN (d) IS ZERO, SKIP (e), (f), and (g)]

(e) In order to be able to pay for water, which expenses would you reduce?

Food _____
Clothing _____
Beer/Cigarettes _____
Transportation _____
School fees _____
Other (Specify) _____

[CHECK THE AMOUNT IN (d) AND THEN ASK ...]

(f) Do you really think you can reduce the expenses _____ [INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay _____ [QUOTE AMOUNT IN (d)] per month?

YES _____ GO TO NEXT PAGE

NO _____ Go to (g)

NOT SURE _____ Go to (g)

(g) What is the maximum amount you think your household is able to pay per month without problems?

Maximum amount per month _____ shillings

Financing Alternative No. 2: Flat Rate for Each Household

[BIDDING GAME WITH HIGH STARTING POINT]

Payment of a flat monthly rate to the village treasurer is one way of strengthening the water service to the village. The village treasurer would deposit the money into a special account which the water engineer would use to purchase diesel for providing reliable water supply services. This account would be safe, and the money would not be misused. For example, to withdraw money from this account would require the District Commissioner, the District Executive Director, and the District Water Engineer to authorize the withdrawal by signing the withdrawal certificate. They would ensure that the money withdrawn is used for water suppply services. This step will help in strengthening the water supply service so that each household will be able to draw as much water as it wants.

There are 178 villages in the Kitangari Water Scheme, serving about 200,000 people. Each village would be told its fair share of the costs of the diesel fuel; the village would have to raise this amount from the households there.

(a) Suppose that the Resident Engineer and the District Council calculated that in order to provide reliable service with the existing domestic taps, that each household in all the villages served by the scheme would need to pay 100 shillings per month. Those households that didn't pay would not be allowed to use the domestic taps. Would you choose to pay 100 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 100 TSh /mo	.....	Go to (d)
No - choose to fetch water from traditional source	.....	Go to (b)
Not sure	.....	Go to (b)

(b) Suppose instead of 100 shillings per month that the flat fee for each household was 50 shillings per month. Would you choose to pay 50 shillings per month, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 50 TSh /mo	.....	Go to (d)
No - choose to fetch water from traditional source	.....	Go to (c)
Not sure	.....	Go to (c)

(c) If the flat fee for each household was 25 shillings per month, would you choose to pay this fee, or would you choose to fetch water from your traditional sources?

YES - pay the flat fee of 25 TSh /mo	.....	Go to (d)
No - choose to fetch water from traditional source	.....	Go to (d)
Not sure	.....	Go to (d)

(d) What is the most your household could afford to pay per month?

Maximum monthly fee _____ shillings

[IF THE RESPONDENT MENTIONS ANY AMOUNT, GO TO (e)]

[IF THE AMOUNT IS ZERO, ASK ....]

What are the reasons you would not want to pay for reliable water even if the amount per month were very low?

(Check appropriate response)

Cannot afford to pay anything _____
Satisfied with traditional source _____
It's the Government's responsibility to provide free water _____
Other (please specify) _____

[IF THE AMOUNT GIVEN IN (d) IS ZERO, SKIP (e), (f), and (g)]

(e) In order to be able to pay for water, which expenses would you reduce?

Food _____
Clothing _____
Beer/Cigarettes _____
Transportation _____
School fees _____
Other (Specify) _____

[CHECK THE AMOUNT IN (d) AND THEN ASK ...]

(f) Do you really think you can reduce the expenses _____ [INDICATE EXPENSES MENTIONED IN (e)] so as to be able to pay _____ [QUOTE AMOUNT IN (d)] per month?

YES _____ GO TO NEXT PAGE

NO _____ Go to (g)

NOT SURE _____ Go to (g)

(g) What is the maximum amount you think your household is able to pay per month without problems?

Maximum amount per month _____ shillings

Education Level

29. Can you read a newspaper? YES / NO

[IF YES, ASK ...]

Can you read it ... Easily _____

With Some Difficulty _____

30. Have you ever been to school? YES / NO

[IF NO, GO TO QUESTION 32]

31. What level have you completed? (Check appropriate level)

Standard 1-4	_____
Standard 5-7	_____
Secondary form 1-4	_____
Secondary form 5-6	_____
University	_____
Other (specify)	_____

32. Have you attended adult education classes? YES / NO

33. Are you married? YES / NO

[IF NO, GO TO QUESTION 38]

34. Can your husband/wife read a newspaper? YES / NO

[IF YES, ASK ...]

Can he/she read it ... Easily _____

With Some Difficulty _____

35. Has your husband/wife ever been to school? YES / NO

IF NO, GO TO QUESTION 37

36. What level has he/she completed? (Check appropriate level)

Standard 1-4	_____
Standard 5-7	_____
Secondary form 1-4	_____
Secondary form 5-6	_____
University	_____
Other (specify)	_____

37. Has he /she attended adult education classes? YES / NO

Household Assets

[STARTING QUESTION 38-39, FOR THOSE ITEMS BELONGING TO THE HOUSEHOLD, INDICATE BY CHECKING THE APPROPRIATE SPACE]

38. Does this household own any of the following items? (CHECK IF YES)

Hurricane lamp	_____
Bicycle	_____
Radio	_____

39. How many goats does this household own? No. of goats _____

Occupation

40 . Is the head of household a farmer? YES / NO

Characteristics of the House

41. What is the roof of the house made of?

Grass thatch / Corrugated Iron

42. What type of floor does the house have?

Mud _____
Cement _____
No Floor _____

43. What are the walls constructed of?

Mud with sticks/no plaster _____

Mud with sticks/mud plaster _____

Mud with sticks/cement plaster _____

Mud bricks/no plaster _____

Mud bricks/mud plaster _____

Mud bricks/cement plaster _____

Mud bricks/cement plaster/ whitewashed _____

44. How many windows does the house have?

No. of windows _____

45. Does the door of the house have a lock? YES / NO

46. Does the house have a wooden door? YES / NO

Respondent's Attitudes Regarding Government Water Policy

47. Some people are of the opinion that villages should be responsible for meeting the costs of operation and maintenance of their water system. Do you agree or disagree with that opinion?

AGREE _____

DISAGREE _____

UNDECIDED _____

48. Some people believe that it is the responsibility of the government alone to provide water free to every citizen of this country. Do you agree or disagree or disagree with this stand?

AGREE _____

DISAGREE _____

UNDECIDED _____

49. Due to the current government efforts of providing water to villages, some people expect that in 10 years time, every resident of Tanzania will have access to reliable sources of water, and this will be to every village of this country. Do you agree or disagree with this line of thought?

AGREE _____

DISAGREE _____

UNDECIDED _____

For the Enumerator Only

50. Was the person who responded to the questions irritated or nervous?

YES / NO

51. Do you think he/she made an effort to tell the truth? YES / NO

52. How would you rate the overall quality of this interview?

GOOD / FAIR / POOR

DO YOU HAVE ANY COMMENTS YOU WOULD LIKE TO MAKE ABOUT THE RESPONDENT'S ANSWERS TO THIS QUESTIONNAIRE? IF SO, PLEASE RECORD THEM BELOW.

Respondent's Preferences for ALternative Institutional/Management Arrangements

[ENUMERATOR: READ CAREFULLY]

Now, I would like you to express your views regarding the arrangements which you think would be suitable in collecting funds for running and maintaining the water system. I will explain three alternatives which could be used. In all three alternatives the village will be involved in collecting funds and in starting the accounts, which will be managed by the village itself.

For the first alternative, every month the District Council will collect the money which will have been contributed by the village in that period. The District Executive Director, together with the District Water Engineer, will be involved in the purchase of diesel and spare parts.

The second alternative will involve the formation of a new Kitangari Water Board. All the villages will have a representative to that Board. The Board will carry out its activities as was the case with the old Makonde Water Supply System 30 years ago. The new Board would collect a water levy from all the villages participating in the water scheme every month, and the Board would be invovled directly in the purchase of diesel and spare parts for the water system.

The third alternative would involve the central government in collecting the water payments every month. The District Water Engineer would in this case be involved in collecting the funds and in purchasing diesel and spare parts.

53. Now, do you believe that if the village government collects the water levy, it will submit the funds so collected to the organs responsible for the operation of the system without the money collected being lost?

YES / NO

54. Are you in favor of the District Council being involved in receiving the payments for water from the villages and in purchasing diesel and spare parts for the water system? YES / NO

55. Would you have faith in a new Kitangari Water Board which would be responsibile for operating the water system and in collecting a water levy such as was done thirty years ago?

YES / NO

56. Would you be satisfied with a system whereby the office of the resident water engineer on behalf of the central government would be involved in collecting payments for water and in strengthening water supply services?

YES / NO

57. Which alternative would you prefer most?

Option 1 _____
Option 2 _____
Option 3 _____

JINA LA ANAYEHOJI _____ **MUDA WA KUANZA** _____

TAREHE _____ **MUDA WA KUMALIZA** _____

KIJIJI _____

JINA LA MJUMBE WA NYUMBA KUMI: _____

UTAFITI WA MAJI WILAYA YA NEWALA UNAOFANYWA NA UNICEF/MAJI

MAHOJIANO YA KAYA

(ANAYEHOJI ASOME KWA UANGALIFU UTANGULIZI UFUATAO)

Jina langu ni Ndugu _____,ninashirikiana na UNICEF na MAJI katika kufanya utafiti unaohusu hali ya maji katika wilaya ya Newala. Kijiji hiki ni moja ya vijiji vilivyochaguliwa katika utafiti huu. Tumepata ruhusa kutoka kwa Mkuu wa Wilaya, Mkurugenzi Mtendaji wa Wilaya pamoja na Katibu wa Kijiji kufanya utafiti huu katika kijiji hiki. Wewe ni miongoni mwa watu waliochaguliwa kuhojiwa. Mahojiano yatachukua muda mfupi tu. Ushirikiano wako utasaidia sana katika kutatua tatizo la maji hapa kijijini. Mahojiano haya yatakuwa ni siri na wakati wowote ukijisikia hutaki kujibu maswali unao uhuru kufanya hivyo.

Je ungependa kuhojiwa? NDIYO/HAPANA.

(NB: MASWALI HAYA NI KWA WATU WAZIMA TU MWANAMKE AU MWANAUME)

1. Jina la anayehojiwa: _____

2. MWANAUME_____

   MWANAMKE_____

3. Je wewe ni Mkuu wa nyumba? NDIYO / HAPANA

4. Je nyumba hii inaongozwa na Mwanamke? NDIYO / HAPANA

5. Je wewe ni mjumbe wa nyumba 10? NDIYO / HAPANA

6. Je ni watu wazima wangapi wanaishi katika nyumba hii?

   IDADI YA WATU WAZIMA _____

   (WATU WAZIMA NI WALE WENYE UMRI WA MIAKA 18 AU ZAIDI)

7. Kuna watoto wangapi katika nyumba hii?

   IDADI YA WATOTO _____

SEHEMU YA KWANZA: VYANZO VYA MAJI

(ANAYEHOJI: Sasa ningependa kukuuliza maswali kuhusu hali ya maji katika kijiji hiki).

8. Je leo bombani maji yanatoka? NDIYO / HAPANA

KAMA NDIYO ENDELEA SWALI NAMBA 10.

9. Ni siku ngapi zimepita tangu maji yameacha kutoka?

IDADI YA SIKU _____

UKUSANYAJI WA MAJI YA MVUA

10. Je una kisima cha kuhifadhi maji ya mvua? NDIYO / HAPANA

KAMA HAPANA ENDELEA SWALI NAMBA 15

11. Kisima hicho kinafanya kazi? (yaani kinahifadhi maji?)

NDIYO /HAPANA

KAMA HAPANA ENDELEA SWALI NAMBA 16

12. Majirani zako wakiishiwa maji wanaweza kupata maji kutoka kwenye kisima chako?

NDIYO / HAPANA

KAMA HAPANA ENDELEA SWALI NAMBA 16

13. Je watu wakichota maji kwenye kisima chako wanalipa chochote?

NDIYO / HAPANA.

KAMA HAPANA ENDELEA SWALI NAMBA 16

14. Wanakulipa kiasi gani kwa ndoo moja? KIASI:_____

15. (KAMA ANAYEHOJIWA HANA KISIMA ULIZA.....)

Ni kiasi gani cha fedha unalipa kwa ndoo kama ukienda kuchota maji kwa jirani yako mwenye kisima?

BEI YA NDOO MOJA:_____

16. Unaonaje usafi wa maji ya kwenye visima vya maji ya mvua?

NZURI / MBAYA / SIJUI.

VYANZO VYA MAJI NJE YA KIJIJI (VYANZO VYA ASILI,VISIMA VIFUPI VYENYE PAMPU ZA MIKONO, MABOMBA YANAYOAMINIKA YALIYOPO VIJIJI VINGINE

17. Kama mabomba yamekauka na visima vya maji ya mvua vikiisha maji mnapata wapi maji ?

JINA LA MAHALI_____

Ni aina gani ya chanzo cha maji? _____

(WEKA ALAMA KWA CHANZO KINACHOTUMIKA MARA KWA MARA)

CHEMCHEMI _____
BWAWA _____
KISIMA CHA ASILI _____
KISIMA CHA PAMPU YA MKONO _____
VYANZO VINGINE _____

18. Kuna umbali gani kutoka hapa kijijini kwa kwenda tu?

IDADI YA MAILI _____

AU

IDADI YA KILOMETA _____

19. Inakuchukua muda gani kutembea hadi yanakopatikana maji hayo, kwa kwenda tu?

IDADI YA SAA _____

20. Inakuchukua muda gani kungoja kwenye foleni?

IDADI YA SAA _____

HAKUNA FOLENI _____

21. Vipi usafi wa maji hayo? NZURI / MBAYA / SIJUI.

UUZAJI WA MAJI

22. Kuna watu wanaouza maji katika kijiji hiki? NDIYO / HAPANA

KAMA HAPANA ENDELEA SWALI NAMBA 25.

23. (KAMA NDIYO ULIZA) Wanatoza kiasi gani kwa ndoo moja?

Wakati wa masika (kifuku) bei ya ndoo _____

Wakati wa kiangazi bei ya ndoo _____

(Wakati huu)

SIJUI _____

24. Unaonaje kuhusu usafi wa maji hayo? NZURI / MBAYA / SIJUI.

MATUMIZI YA MAJI

25. Wakati mabomba yanatoa maji watu wa nyumba yako wanachota maji ndoo ngapi kutoka bombani ...

wakati wa Masika (kifuku)? _____

wakati wa Kiangazi? _____

26. Wakati mabomba hayatoi maji watu wa nyumba yako wanatumia maji ndoo ngapi ...

wakati wa Masika (kifuku)? _____

wakati wa Kiangazi? _____

MASWALI YANAYOHUSU KUKUBALI KULIPA

ANAYEHOJI: SOMA MAELEZO YAFUATAYO KAMA YALIVYOTOLEWA: USIONGEZE MANENO YAKO.

UTANGULIZI A

Kama unavyofahamu kijiji hiki kimeunganishiwa maji kwenye mradi wa maji Kitangari, lakini huduma hii imekuwa hairidhishi. Ujenzi wa mradi wa maji wa Kitangari uligharamiwa na wahisani. Mnamo mwaka 1986 mradi huu ulikabidhiwa kwa serikali kuu, ambayo sasa hivi inagharamia uendeshaji na matengenezo ya mradi huu. Sababu kubwa ya mradi huu kuwa na huduma hafifu zinatokana na serikali kuwa na uwezo mdogo kifedha hivyo kushindwa kununua dizeli ya kutosha kuendesha mitambo kwa wakati wote. Mhandisi wa Maji akikosa fedha za kununua dizeli kutoka Mtwara mitambo inasimama na maji yanaacha kutoka . Pia ukosefu wa fedha unasababisha kukosekana kwa vipuri ambavyo vinahitajika kwa matengenezo ya mitambo.

Sasa nitaomba nikuulize maswali ili nielewe kama ungependa kulipa fedha za kuchangia gharama hizo ili kufanikisha huduma ya maji iwe ya uhakika katika kijiji hiki. Tafadhali jaribu kutoa majibu ya ukweli ili yatuwezeshe kujua uwezo wako wa kulipia maji. Kama wewe na wengine nitakaowahoji mtasema kuwa hamna uwezo wa kulipa chochote, basi labda itakuwa vigumu kuimarisha huduma ya maji kwa kununua mafuta ya dizeli. Na iwapo utasema una uwezo wa kulipa kwa kiwango kikubwa sana, basi huenda kikakushinda kutoa. Katika hali hiyo basi tafadhali nakuomba uwe mwaminifu na mkweli katika kujibu.

MASWALI YANAYOHUSU KUKUBALI KULIPA

ANAYEHOJI: SOMA MAELEZO YAFUATAYO KAMA YALIVYOTOLEWA: USIONGEZE MANENO YAKO.

UTANGULIZI B

Kama unavyofahamu kijiji hiki kimeunganishiwa maji kwenye mradi wa maji Kitangari, lakini huduma hii imekuwa hairidhishi. Ujenzi wa mradi wa maji wa Kitangari uligharamiwa na wahisani. Mnamo mwaka 1986 mradi huu ulikabidhiwa kwa serikali kuu, ambayo sasa hivi inagharamia uendeshaji na matengenezo ya mradi huu. Sababu kubwa ya mradi huu kuwa na huduma hafifu zinatokana na serikali kuwa na uwezo mdogo kifedha hivyo kushindwa kununua dizeli ya kutosha kuendesha mitambo kwa wakati wote. Mhandisi wa Maji akikosa fedha za kununua dizeli kutoka Mtwara mitambo inasimama na maji yanaacha kutoka . Pia ukosefu wa fedha unasababisha kukosekana kwa vipuri ambavyo vinahitajika kwa matengenezo ya mitambo.

Hapo kesho nitarudi kukuuliza maswali kidogo ili nipate kujua kama Kaya yako itakuwa radhi kulipia maji ili kuimarisha huduma ya maji katika kijiji hiki. Ningependa swala la ni kiasi gani Kaya yako inaweza kukimudu ulifikirie kwa undani na kwa makini. Uko huru kujadili swala hili na wanakaya wenzako au majirani; lakini la muhimu zaidi ni kwamba mpaka hapo kesho wewe binafsi utaweza kunijibu maswali juu ya Kaya yako. Nisingependa uwepo ushirikishwaji wa Kijiji kingine kikutane na kutoa uamuzi wa pamoja. Je, umeelewa?

Tafadhali naomba uelewe kuwa ni muhimu sana majibu yako yawe ya ukweli nitakapo kuhoji kesho, ili tuweze kujua uwezo wako wa kulipia maji. Kama wewe na wengine nitakaowahoji mtasema kuwa hamna uwezo wa kulipa chochote basi labda itakuwa vigumu kuimarisha upatikanaji wa maji kwa kununua mafuta ya dizeli. Na iwapo utasema una uwezo wa kulipa kwa kiwango kikubwa sana, basi huenda kikakushinda kutoa. Katika hali hiyo basi, tafadhali nakuomba uwe mwaminifu na mkweli katika kujibu.

UWEZEKANO WAKULIPIA NA 1 - KULIPIA KWA NDOO

(MAJADILIANO YA BEI UKIANZA NA BEI KUBWA)

Wakati ule mradi wa zamani wa Makonde ulipokuwa unafanya kazi, watu katika kijiji hiki walikuwa wanalipia maji kwa kila ndoo. Watu walikuwa wanapata maji yao kwenye vituo vya maji na wanamlipa mhudumu wa kituo fedha ambazo zilitumika kununua dizeli na kufanyia matengenezo ya mradi.

Ikiwa serikali itaanzisha mtindo wa zamani wa kuchangisha fedha kwa kila ndoo ili kuiwezesha kununua dizeli ya kutosha kusukuma maji kila wakati na ikiwa kutakuwa na mhudumu katika kila kituo cha maji hapa kijijini atakayekusanya fedha hizo na ikiwa maji yatapatikana saa zote kuanzia asubuhi hadi usiku.

(a) Sasa kama bei ya maji kwa ndoo itakuwa shilingi 3, je, utanunua maji kutoka kwenye bomba?

NDIYO / HAPANA

SINA UHAKIKA

[KAMA HAPANA, ENDELEA NA KIFUNGU (b)]

KAMA NDIYO ULIZA, utanunua ndoo ngapi kwa siku kutoka kwenye bomba?

IDADI YA NDOO _____

(b) Sasa kama bei ya maji kwa ndoo itakuwa shilingi 1, je, utanunua maji kutoka kwenye bomba?

NDIYO / HAPANA

SINA UHAKIKA

[KAMA HAPANA, ENDELEA NA KIFUNGU (c)]

KAMA NDIYO ULIZA, utanunua ndoo ngapi kwa siku kutoka kwenye bomba?

IDADI YA NDOO _____

(c) Sasa kama bei ya maji kwa ndoo itakuwa senti 50, je, utanunua maji kutoka kwenye bomba?

NDIYO / HAPANA

SINA UHAKIKA

[KAMA HAPANA, ENDELEA NA KIFUNGU (d)]

KAMA NDIYO ULIZA, utanunua ndoo ngapi kwa siku kutoka kwenye bomba?

IDADI YA NDOO _____

(d) Kama ungechota maji yote unayohitaji kwa siku kutoka kwenye bomba ni kiwango gani cha juu kabisa kwa kila ndoo ambacho utamudu kulipa?

BEI YA JUU KWA NDOO MOJA, SHILINGI _____

[KAMA AKITAJA KIASI CHA FEDHA, NENDA (e)]

[KAMA BEI, NI SUFURI, ULIZA.....]

Ni sababu zipi ambazo zinakufanya ukatae kulipia maji hata kama kiwango cha bei kwa ndoo ni kidogo sana?

[WEKA ALAMA 'V' KWENYE JIBU SAHIHI]

UWEZO WA KULIPA CHOCHOTE HAKUNA _____

KURIDHISHWA NA VYANZO VYA ASILI _____

NI JUKUMU LA SERIKALI KUTOA HUDUMA YA MAJI BURE _____

MENGINEYO (TAJA) _____

[KAMA BEI NI SUFURI RUKA (e), (f), (g), NA (h)]

(e) Kama bei ya maji ni Shilingi_____[TUMIA BEI YA KIFUNGU (d) HAPO JUU] Unafikiri kwa wastani kaya yako itanunua ndoo ngapi kwa siku?

IDADI YA NDOO KWA SIKU MOJA _____

[ANAYEHOJI: MWELEZE MHOJIWA KWAMBA UNAFANYA HESABU ZA GHARAMA YA MAJI KWA MWEZI].

(f) Kama bei ya maji ni Shilingi _____ [TUMIA BEI YA KIFUNGU (d) HAPO JUU], Na kaya yako itanunua ndoo _____ kwa siku, itakugharimu Shilingi _____ kwa siku, au kwa mwezi itakugharimu Shilingi_____ [ZIDISHA MARA 30].

Ili uwe na uwezo wa kulipa maji ni matumizi yapi utayapunguza?
[WEKA ALAMA V]

CHAKULA_____
MAVAZI_____
VINYWAJI/UVUTAJI SIGARA_____
USAFIRI_____
ADA ZA SHULE_____
MENGINEYO (TAJA) _____

ANGALIA BEI YA KIFUNGU (f), HALAFU ULIZA:

(g) Je, unadhani unaweza kweli kupunguza matumizi _____ [TAJA MATUMIZI ALIYOONYESHA KATIKA KIFUNGU (e)] ili uweze kulipa shilingi _____ [WEKA BEI YA KIFUNGU (f)] kwa mwezi?

NDIYO_____[ENDELEA UKURASA UNAOFUATA]

HAPANA_____ [ENDELEA NA (h)]

HAKUNA UHAKIKA _____ [ENDELEA NA (h)]

(h) Kama ungechota maji yote unayohitaji kwa siku kutoka kwenye bomba ni kiwango gani cha juu kabisa kwa mwezi ambacho utamudu kulipa?

SHILINGI KWA MWEZI _____

UWEZEKANO WA KULIPIA NAMBA 1- KULIPA KWA NDOO

(MAJADILIANO YA BEI UKIANZA NA BEI NDOGO)

Wakati ule mradi wa zamani wa Makonde ulipokuwa unafanya kazi, watu katika kijiji hiki walikuwa wanalipia maji kwa kila ndoo. Watu walikuwa wanapata maji yao kwenye vituo vya maji na wanamlipa mhudumu wa kituo fedha ambazo zilitumika kununua dizeli na kufanyia matengenezo ya mradi.

Ikiwa serikali itaanzisha mtindo wa zamani wa kuchangisha fedha kwa kila ndoo ili kuiwezesha kununua dizeli ya kutosha kusukuma maji kila wakati na ikiwa kutakuwa na mhudumu katika kila kituo cha maji hapa kijijini atakayekusanya fedha hizo na ikiwa maji yatapatikana saa zote kuanzia asubuhi hadi usiku.

(a) Sasa kama bei ya maji kwa ndoo itakuwa senti 50, je, utanunua maji kutoka kwenye bomba?

NDIYO / HAPANA

SINA UHAKIKA

[KAMA HAPANA, ENDELEA NA KIFUNGU (d)]

KAMA NDIYO ULIZA, utanunua ndoo ngapi kwa siku kutoka kwenye bomba?

IDADI YA NDOO _____

(b) Sasa kama bei ya maji kwa ndoo itakuwa shilingi 1, je, utanunua maji kutoka kwenye bomba?

NDIYO / HAPANA

SINA UHAKIKA

[KAMA HAPANA, ENDELEA NA KIFUNGU (d)]

KAMA NDIYO ULIZA, utanunua ndoo ngapi kwa siku kutoka kwenye bomba?

IDADI YA NDOO _____

(c) Sasa kama bei ya maji kwa ndoo itakuwa shilingi 3, je, utanunua maji kutoka kwenye bomba?

NDIYO / HAPANA

SINA UHAKIKA

[KAMA HAPANA, ENDELEA NA KIFUNGU (d)]

KAMA NDIYO ULIZA, utanunua ndoo ngapi kwa siku kutoka kwenye bomba?

IDADI YA NDOO _____

(d) Kama ungechota maji yote unayohitaji kwa siku kutoka kwenye bomba ni kiwango gani cha juu kabisa kwa kila ndoo ambacho utamudu kulipa?

BEI YA JUU KWA NDOO MOJA, SHILINGI _____

[KAMA AKITAJA KIASI CHA FEDHA, NENDA (e)]

[KAMA BEI, NI SUFURI, ULIZA.....]

Ni sababu zipi ambazo zinakufanya ukatae kulipia maji hata kama kiwango cha bei kwa ndoo ni kidogo sana?

[WEKA ALAMA 'V' KWENYE JIBU SAHIHI]

UWEZO WA KULIPA CHOCHOTE HAKUNA _____

KURIDHISHWA NA VYANZO VYA ASILI _____

NI JUKUMU LA SERIKALI KUTOA HUDUMA YA MAJI BURE _____

MENGINEYO (TAJA) _____

[KAMA BEI NI SUFURI RUKA (e), (f), (g), NA (h)]

(e) Kama bei ya maji ni Shilingi_____[TUMIA BEI YA KIFUNGU (d) HAPO JUU] Unafikiri kwa wastani kaya yako itanunua ndoo ngapi kwa siku?

IDADI YA NDOO KWA SIKU MOJA _____

[ANAYEHOJI: MWELEZE MHOJIWA KWAMBA UNAFANYA HESABU ZA GHARAMA YA MAJI KWA MWEZI].

(f) Kama bei ya maji ni Shilingi _____ [TUMIA BEI YA KIFUNGU (d) HAPO JUU], Na kaya yako itanunua ndoo _____ kwa siku, itakugharimu Shilingi _____ kwa siku, au kwa mwezi itakugharimu Shilingi_____ [ZIDISHA MARA 30].

Ili uwe na uwezo wa kulipa maji ni matumizi yapi utayapunguza?
[WEKA ALAMA V]

CHAKULA_____
MAVAZI_____
VINYWAJI/UVUTAJI SIGARA_____
USAFIRI_____
ADA ZA SHULE_____
MENGINEYO (TAJA) _____

ANGALIA BEI YA KIFUNGU (f), HALAFU ULIZA:

(g) Je, unadhani unaweza kweli kupunguza matumizi _____
[TAJA MATUMIZI ALIYOONYESHA KATIKA KIFUNGU (e)] ili uweze kulipa
shilingi _____ [WEKA BEI YA KIFUNGU (f)] kwa mwezi?

NDIYO_____[ENDELEA UKURASA UNAOFUATA]

HAPANA_____ [ENDELEA NA (h)]

HAKUNA UHAKIKA _____ [ENDELEA NA (h)]

(h) Kama ungechota maji yote unayohitaji kwa siku kutoka kwenye bomba ni kiwango gani cha juu kabisa kwa mwezi ambacho utamudu kulipa?

SHILINGI KWA MWEZI _____

UWEZEKANO WA KULIPIA NAMBA 2 KIWANGO MAALUM KWA KILA KAYA

[MAJADILIANO YA VIWANGO UKIANZA NA KIWANGO CHA JUU]

Kuchangisha fedha kwa kulipa kiwango maalum kwa mhasibu wa kijiji ni njia mojawapo ya, kuimarisha mfuko wa huduma ya maji. Mhasibu wa kijiji ataziweka kwenye akaunti maalum ambayo mhandisi wa maji anaweza kuitumia kununulia mafuta ya dizeli ili kutoa huduma ya maji inayoaminika. Akaunti hii itakuwa na usalama na fedha hizo haziwezi kutumika vibaya kwa sababu - kwa mfano kutoa fedha katika akaunti hii ni lazima Mkuu wa Wilaya na Mkurugenzi Mtendaji wa Wilaya na Mhandisi wa Maji waidhinishe kwa kutia sahihi, na kuhakikisha kuwa fedha hizo zinatumika kwa ajili ya maji. Hii itasaidia kuimarisha huduma ya maji na kila kaya itaweza kuchota kiasi chochote cha maji inachotaka.

Kuna vijiji 178 vinavyohudumiwa na mradi wa maji wa Kitangari, ambapo jumla ya watu 200,000 (laki mbili) wanapata huduma ya maji. Kila kijiji kitaelezwa mgao wa mchango wake kwa ajili ya mafuta ya dizeli, kwa hiyo kila kijiji itabidi kuchangia mfuko huo kwa kupitia kaya zake.

(a) Ikiwa Mhandisi Mkazi na Halmashauri ya Wilaya wamefanya hesabu za matumizi na kufikia jawabu kuwa ili huduma iwe ya kuaminika, kila kaya ichangie Shilingi 100 kwa mwezi. Na zile kaya ambazo zitakataa hazitapata huduma ya maji ya bomba. Je, ni lipi utakalolichagua: kulipa Shilingi 100 kwa mwezi ili upate maji ya bomba , au kutolipa, uchote maji katika vyanzo vya asili?

NDIYO: KULIPA Sh 100 KWA MWEZI - [ENDELEA NA KIFUNGU (d) CHINI]

HAPANA - KUCHOTA KWENYE VYANZO VYA ASILI [ENDELEA KIFUNGU (b) CHINI]

HAKUNA UHAKIKA - ENDELEA NA KIFUNGU (b) CHINI]

(b) Na je, badala ya Shilingi 100, kiwango kikiwa ni Shilingi 50 kwa mwezi, ni lipi utakalolichagua: kulipa Shilingi 50 kwa mwezi ili upate maji ya bomba au kutolipa, uchote maji katika vyanzo vya asili?

NDIYO - KULIPA SHILINGI 50 KWA MWEZI [ENDELEA NA KIFUNGU (d) CHINI]

HAPANA - KUCHOTA MAJI KATIKA VYANZO VYA ASILI [ENDELEA NA KIFUNGU (c), CHINI]

HAKUNA UHAKIKA - [ENDELEA NA KIFUNGU (c), CHINI]

(c) Kama kiwango maalumu kwa kila kaya kitakuwa shilingi 25 kwa mwezi,utachagua kulipa kiwango hicho au utachagua kuchota maji katika vyanzo vya asili?

NDIYO-KULIPA SHILINGI 25 KWA MWEZI [ENDELEA NA KIFUNGU (d) CHINI]

HAPANA -KUCHOTA MAJI KWENYE VYANZO VYA ASILI [ENDELEA NA KIFUNGU (d) CHINI]

HAKUNA UHAKIKA -[ENDELEA NA KIFUNGU (d) CHINI]

(d) Ni kiwango kipi cha juu unaweza kulipia maji kwa mwezi?

SHILINGI_____

[KAMA AKITAJA KIASI CHA FEDHA, NENDA (e)]

[KAMA BEI NI SUFURI ULIZA .....]

Ni sababu zipi ambazo zinakufanya ukatae kulipia maji ya kuaminika hata kama kiwango cha malipo kwa mwezi ni kidogo sana?

[WEKA ALAMA'V'KWENYE JIBU SAHIHI]

UWEZO WA KULIPA CHOCHOTE HAKUNA _____
KURIDHISHWA NA VYANZO VYA ASILI _____
NI JUKUMU LA SERIKALI KUTOA HUDUMA YA MAJI BURE _____

MENGINEYO (TAJA) _____

[KAMA BEI NI SUFURI RUKA (e), (f), NA (g) NENDA UKURASA UNAOFUATA]

(e) Ili uwe na uwezo wa kulipa maji ni matumizi yapi utayapunguza?

[WEKA ALAMA V]

CHAKULA_____
MAVAZI_____
VINYWAJI/UVUTAJI SIGARA_____
USAFIRI_____
ADA ZA SHULE_____
MENGINEYO (Taja)_____

[ANGALIA BEI YA KIFUNGU (d)]

(f) Je, unadhani unaweza kweli kupunguza matumizi _____ [TAJA MATUMIZI ALIYOONYESHA KATIKA KIFUNGU (e)] ili uweze kulipa shilingi _____ [WEKA BEI YA KIFUNGU (d)] kwa mwezi?

NDIYO_____[ENDELEA UKURASA UNAOFUATA]

HAPANA_____ [ENDELEA NA (g)]

HAKUNA UHAKIKA _____ [ENDELEA NA (g)]

(g) Je, ni kiwango gani cha juu kabisa unafikiri nyumba yako inaweza kulipa kwa mwezi bila matatizo.

KIWANGO KIKUBWA KABISA KWA MWEZI _____

UWEZEKANO WA KULIPIA NAMBA 2 KIWANGO MAALUM KWA KILA KAYA

[MAJADILIANO YA VIWANGO UKIANZA NA KIWANGO CHA CHINI]

Kuchangisha fedha kwa kulipa kiwango maalum kwa mhasibu wa kijiji ni njia mojawapo ya, kuimarisha mfuko wa huduma ya maji. Mhasibu wa kijiji ataziweka kwenye akaunti maalum ambayo mhandisi wa maji anaweza kuitumia kununulia mafuta ya dizeli ili kutoa huduma ya maji inayoaminika. Akaunti hii itakuwa na usalama na fedha hizo haziwezi kutumika vibaya kwa sababu - kwa mfano kutoa fedha katika akaunti hii ni lazima Mkuu wa Wilaya na Mkurugenzi Mtendaji wa Wilaya na Mhandisi wa Maji waidhinishe kwa kutia sahihi, na kuhakikisha kuwa fedha hizo zinatumika kwa ajili ya maji. Hii itasaidia kuimarisha huduma ya maji na kila kaya itaweza kuchota kiasi chochote cha maji inachotaka.

Kuna vijiji 178 vinavyohudumiwa na mradi wa maji wa Kitangari, ambapo jumla ya watu 200,000 (laki mbili) wanapata huduma ya maji. Kila kijiji kitaelezwa mgao wa mchango wake kwa ajili ya mafuta ya dizeli, kwa hiyo kila kijiji itabidi kuchangia mfuko huo kwa kupitia kaya zake.

(a) Ikiwa Mhandisi Mkazi na Halmashauri ya Wilaya wamefanya hesabu za matumizi na kufikia jawabu kuwa ili huduma iwe ya kuaminika, kila kaya ichangie Shilingi 25 kwa mwezi. Na zile kaya ambazo zitakataa hazitapata huduma ya maji ya bomba. Je, ni lipi utakalolichagua: kulipa Shilingi 25 kwa mwezi ili upate maji ya bomba , au kutolipa, uchote maji katika vyanzo vya asili?

NDIYO: KULIPA Sh 25 KWA MWEZI - [ENDELEA NA KIFUNGU (b) CHINI]

HAPANA - KUCHOTA KWENYE VYANZO VYA ASILI [ENDELEA KIFUNGU (d) CHINI]

HAKUNA UHAKIKA - ENDELEA NA KIFUNGU (d) CHINI]

(b) Na je, badala ya Shilingi 25, kiwango kikiwa ni Shilingi 50 kwa mwezi, ni lipi utakalolichagua: kulipa Shilingi 50 kwa mwezi ili upate maji ya bomba au kutolipa, uchote maji katika vyanzo vya asili?

NDIYO - KULIPA SHILINGI 50 KWA MWEZI [ENDELEA NA KIFUNGU (c) CHINI]

HAPANA - KUCHOTA MAJI KATIKA VYANZO VYA ASILI [ENDELEA NA KIFUNGU (d), CHINI]

HAKUNA UHAKIKA - [ENDELEA NA KIFUNGU (d) CHINI]

(c) Kama kiwango maalumu kwa kila kaya kitakuwa shilingi 100 kwa mwezi, utachagua kulipa kiwango hicho au utachagua kuchota maji katika vyanzo vya asili?

NDIYO-KULIPA SHILINGI 100 KWA MWEZI [ENDELEA NA KIFUNGU (d) CHINI]

HAPANA -KUCHOTA MAJI KWENYE VYANZO VYA ASILI [ENDELEA NA KIFUNGU (d) CHINI]

HAKUNA UHAKIKA - [ENDELEA NA KIFUNGU (d) CHINI]

(d) Ni kiwango kipi cha juu unaweza kulipia maji kwa mwezi?

SHILINGI_____

[KAMA AKITAJA KIASI CHA FEDHA, NENDA (e)]

[KAMA BEI NI SUFURI ULIZA .....]

Ni sababu zipi ambazo zinakufanya ukatae kulipia maji ya kuaminika hata kama kiwango cha malipo kwa mwezi ni kidogo sana?

[WEKA ALAMA'V'KWENYE JIBU SAHIHI]

UWEZO WA KULIPA CHOCHOTE HAKUNA _____
KURIDHISHWA NA VYANZO VYA ASILI _____
NI JUKUMU LA SERIKALI KUTOA HUDUMA YA MAJI BURE _____

MENGINEYO (TAJA) _____

[KAMA BEI NI SUFURI RUKA (e), (f), NA (g) NENDA UKURASA UNAOFUATA]

(e) Ili uwe na uwezo wa kulipa maji ni matumizi yapi utayapunguza?

[WEKA ALAMA V]

CHAKULA_____
MAVAZI_____
VINYWAJI/UVUTAJI SIGARA_____
USAFIRI_____
ADA ZA SHULE_____
MENGINEYO (Taja)_____

[ANGALIA BEI YA KIFUNGU (d)]

(f) Je, unadhani unaweza kweli kupunguza matumizi _____ [TAJA MATUMIZI ALIYOONYESHA KATIKA KIFUNGU (e)] ili uweze kulipa shilingi _____ [WEKA BEI YA KIFUNGU (d)] kwa mwezi?

NDIYO_____[ENDELEA UKURASA UNAOFUATA]

HAPANA_____ [ENDELEA NA (g)]

HAKUNA UHAKIKA _____ [ENDELEA NA (g)]

(g) Je, ni kiwango gani cha juu kabisa unafikiri nyumba yako inaweza kulipa kwa mwezi bila matatizo.

KIWANGO KIKUBWA KABISA KWA MWEZI _____

KIWANGO CHA ELIMU:

29. Je, unaweza kusoma gazeti? NDIYO / HAPANA

[KAMA NDIYO, ULIZA]

Je, unasoma kwa .... urahisi _____
ugumu _____

30. Je, umesoma shule? NDIYO / HAPANA

[KAMA HAPANA ENDELEA SWALI NAMBA 32]

31. Ni kiwango gani cha Elimu ulichonacho?
[TIA 'V' MAHALI PANAPOHUSIKA]

DARASA 1 - 4 : _____
DARASA 5 - 7 : _____
DARASA LA 8 : _____
KIDATO CHA 1 - 4 : _____
KIDATO CHA 5 - 6 : _____
CHUO KIKUU : _____
VINGINEVYO (Taja): _____

32. Je, umehudhuria kisomo cha watu wazima? NDIYO / HAPANA

33. Je, umeoa / olewa? NDIYO / HAPANA

[KAMA HAPANA ENDELEA SWALI NAMBA 38]

34. Mumeo / Mkeo anaweza kusoma gazeti? NDIYO / HAPANA

[KAMA NDIYO, ULIZA]

Je, anasoma kwa .... urahisi _____

ugumu _____

35. Je, mumeo / mkeo amesoma shule? NDIYO / HAPANA

[KAMA HAPANA, ENDELEA SWALI NAMBA 37]

36. Ni kiwango gani cha elimu alichonacho?

[TIA 'V' MAHALI PANAPOHUSIKA]

DARASA 1 - 4 : _____
DARASA 5 - 7 : _____
DARASA LA 8 : _____
KIDATO CHA 1 - 4 : _____
KIDATO CHA 5 - 6 : _____
CHUO KIKUU : _____
VINGINEVYO (Taja): _____

37. Je, amehudhuria kisomo cha watu wazima? NDIYO / HAPANA

RASLIMALI ZA KAYA

[KUANZIA SWALI NAMBA 38 - 39, NI VITU VILE TU AMBAVYO NI MALI YA KAYA] TIA 'V' PANAPOHUSIKA.

38. Je, katika nyumba hii kuna vitu vifuatavyo?

Taa ya chemli _____

Baiskeli _____

Redio _____

39. Nyumba hii ina mbuzi wangapi? IDADI YA MBUZI _____

KAZI

40. Je, mkuu wa nyumba hii ni mkulima? NDIYO / HAPANA

VIFAA VILIVYOTUMIKA KUJENGA NYUMBA

41. Paa limeezekwa kwa:

NYASI_____

MABATI_____

42. Sakafu imesakafiwa na:

SARUJI _____

UDONGO _____

HAIKUSAKAFIWA _____

43. Kuta zimejengwa kwa:

MITI / BILA LIPU _____

MITI / IMEPIGWA LIPU YA UDONGO _____

MITI / IMEPIGWA LIPU YA SEMENTI _____

MATOFALI MABICHI BILA LIPU _____

MATOFALI MABICHI / LIPU YA UDONGO _____

MATOFALI MABICHI / LIPU YA SEMENTI _____

MATOFALI MABICHI / LIPU YA SEMENTI / IMEPIGWA CHOKAA _____

44. Nyumba yako ina madirisha mangapi?

IDADI YA MADIRISHA_____

45. Je, nyumba yako ina kufuli? NDIYO / HAPANA

46. Je, nyumba yako ina mlango wa mbao? NDIYO / HAPANA

MTAZAMO WA MHOJIWA JUU YA SERA YA SERIKALI IHUSUYO MAJI

47. Kuna baadhi ya watu wanasema kwamba vijiji lazima viwe na jukumu la kulipia gharama za uendeshaji na matengenezo ya mfumo wa maji, je unakubaliana au hukubaliani na usemi huu?

NAKUBALI _____
SIKUBALI _____
SIJUI _____

48. Watu wengine wanaamini kwamba ni jukumu la serikali pekee kutoa huduma ya maji bure kwa kila mwananchi na mkazi hapa nchini, je unakubaliana au hukubaliani na usemi huu?

NAKUBALI _____
SIKUBALI _____
SIJUI _____

49. Kutokana na juhudi za serikali kutoa huduma ya maji vijijini watu wengine wanategemea kuwa katika kipindi cha miaka 10 ijayo, kila mkazi wa Tanzania atakuwa na huduma ya maji ya kuaminika. Na hii itakuwa katika kila kijiji, je unakubaliana au hukubaliani na usemi huu?

NAKUBALI _____
SIKUBALI _____
SIJUI _____

KWA ANAYEHOJI TU

50. Mhojiwa katika mazungumzo alikuwa amekerwa?

NDIYO / HAPANA

51. Unadhani amefanya juhudi yeyote kukueleza ukweli?

NDIYO / HAPANA

52. Unayathamini vipi mahojiano haya?

MAZURI / YANARIDHISHA / HAYARIDHISHI

KAMA UNA MAONI YEYOTE KUHUSU FOMU HII YA MASWALI, YAANDIKE HAPA CHINI.

MAPENDEKEZO YA WANANCHI WALIOHOJIWA KUHUSU MFUMO WA MENEJIMENTI

ANAYEHOJI: SOMA KWA UANGALIFU

Sasa ningependa utoe maoni yako kuhusu mfumo ambao unafikiri ungefaa kutumika katika kukusanya fedha za kuendesha mitambo na kufanyia matengenezo. Nitaelezea njia tatu ambazo zinaweza kutumika. Katika njia zote hizo kijiji kitahusika katika kukusanya fedha hizo na kuanzisha mfuko wa maji ambao utaendeshwa na kijiji chenyewe.

Katika utaratibu wa kwanza kila mwezi Halmashauri ya Wilaya itakusanya fedha zote zitakazochangwa na vijiji kwa kipindi hicho na Mkurugenzi Mtendaji wa Wilaya, pamoja na mhandisi wa maji wa wilaya watahusika katika ununuzi wa dizeli na vipuli.

Utaratibu wa pili ni ule ambao bodi mpya ya maji ya Kitangari itaundwa na vijiji vyote vitakuwa na mwakilishi katika bodi hiyo. Bodi hiyo itaendesha shughuli zake kama ilvyokuwa zamani wakati mradi wa zamani wa maji Makonde ulipokuwa unafanya kazi miaka 30 iliyopita. Bodi hiyo itakusanya malipo ya maji kutoka vijiji vyote vya mradi kila mwezi,na itahusika moja kwa moja na ununuzi wa dizeli na vipuli kwa ajili ya mitambo ya kusukuma maji.

Utaratibu wa tatu kila mwezi serikali kuu itakusanya malipo ya maji na mhandisi mkazi wa maji atahusika moja kwa moja na ukusanyaji wa fedha hizo pamoja na ununuzi wa dizeli na vipuri.

53. Je una imani kuwa serikali ya kijiji ikikusanya fedha za malipo ya maji itaziwasilisha kwenye vyombo vinavyohusika na uendeshaji wa mitambo bila fedha hizo kupotea?

NDIYO / HAPANA

54. Je utapendelea Halmashauri ya wilaya ihusike katika kupokea fedha za malipo ya maji kutoka vijijini na pia ihusike na ununuzi wa dizeli na vipuri vya mitambo ya kusukuma maji?

NDIYO / HAPANA

55. Je kama ingeundwa bodi mpya ya maji ya Kitangari na ikafanya kazi za kuendesha huduma ya maji na ikakusanya malipo yote ya maji kama ilivyokuwa miaka 30 iliyopita je utakuwa na imani nayo?

NDIYO / HAPANA

56. Je kama ofisi ya Mhandisi mkazi wa maji kwa niaba ya serikali kuu itahusika na ukusanyaji wa malipo ya maji na shughuli zote za uimarishaji wa huduma hii utaridhika na mfumo huu?

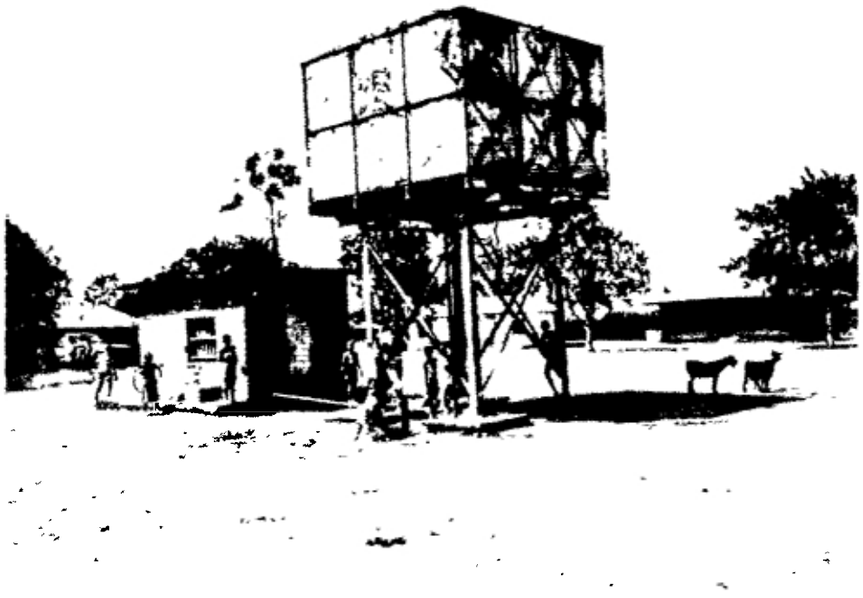
NDIYO / HAPANA

57. Je, ni utaratibu upi ungependelea zaidi?

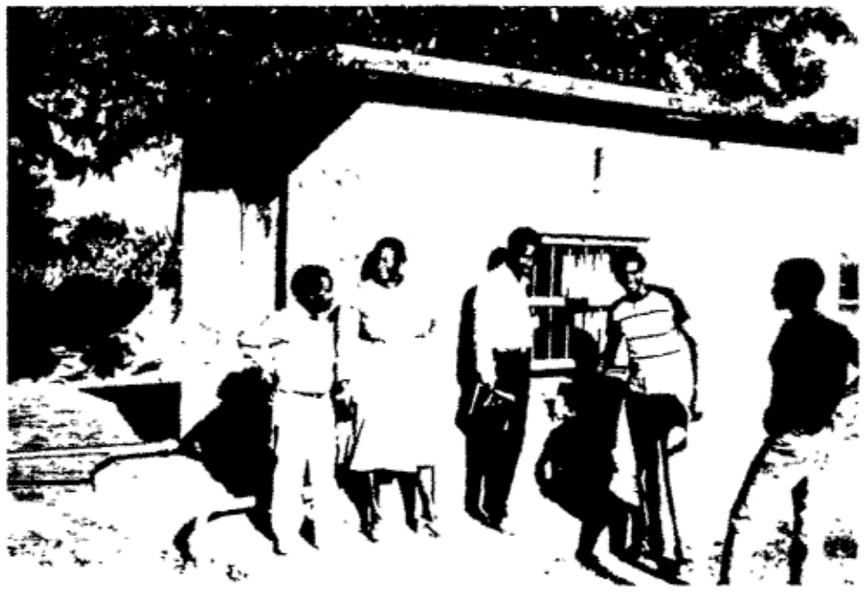
UTARATIBU WA KWANZA _____
UTARATIBU WA PILI _____
UTARATIBU WA TATU _____

APPENDIX II

Photographs



Photograph 1: Water tank and abandoned water kiosk (part of old Makonde water scheme) in Mkongi.



Photograph 2: Abandoned water kiosk in Mnyambe. (Attendant would sit behind barred window and collect money for each bucket sold. Tap is directly below window.)

Photograph 3: Rainwater collection tank in Mkongi

Photograph 4: Rainwater collection tank surrounded by stick fence to keep out animals.

Photograph 5: Rainwater collection tank. (Surface covered with water lilies to reduce evaporation losses.)

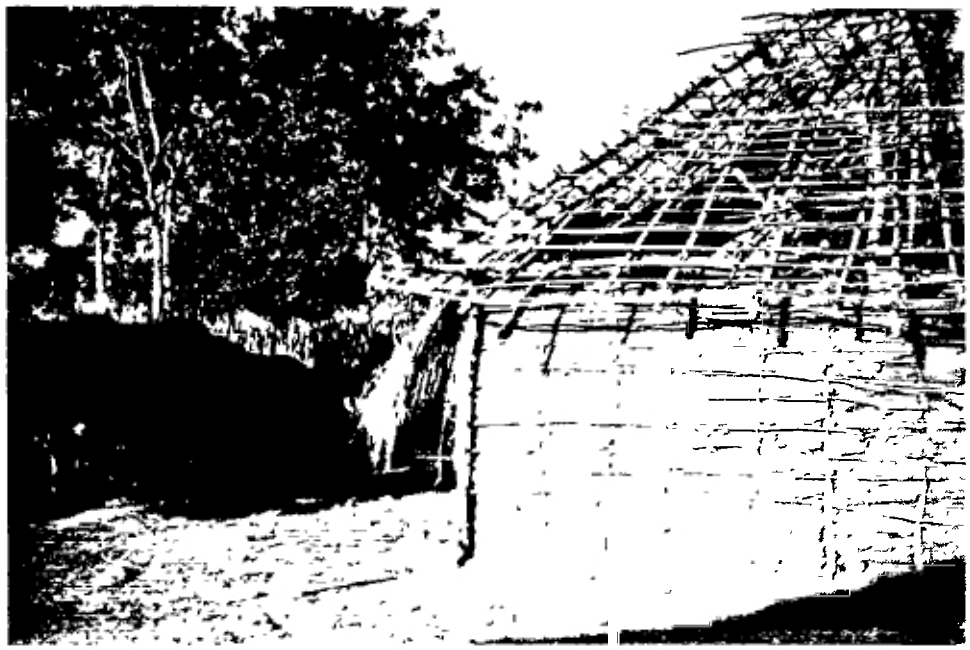
Photograph 6: Women carrying water along street in study area.

Photograph 7: Two children collecting water from public tap in Mkongi. Note leaves in water container to prevent spilling.

Photograph 8: Crowd of a few hundred people queuing for water at storage tank in study area (during period when piped system was not working).

Photograph 9: Women in Mtopwa collecting water from melons.

Photograph 10: Typical dwelling in study area—thatch roof, mud-stick construction, cane door, no windows.



Photograph 11: Mud and stick house under construction; materials for thatched roof in rear.

Photograph 12: Enumerator conducting interview with woman respondent outside the home of her ten-cell leader.

APPENDIX III

A STATISTICAL ANALYSIS OF FACTORS WHICH AFFECT HOUSEHOLDS' WILLINGNESS-TO-PAY BIDS

APPENDIX III

A STATISTICAL ANALYSIS OF FACTORS WHICH AFFECT HOUSEHOLDS' WILLINGNESS-TO-PAY BIDS

To examine which socioeconomic and other factors affected the willingness of households to pay for improved water services, a series of multivariate analyses was carried out in which independent variables were regressed on the WTP bids. The objective of these analyses was to see whether households' WTP bids were related to the factors suggested by economic theory. The results of this analysis can be used to better understand how preferences for improved water service may change over time as the socioeconomic characteristics of the population change. In addition, if the WTP bids are related to the factors suggested by economic demand theory, it is more likely that the respondents gave meaningful answers to the questions.

The results of one of these regression models is presented in Table III-1, in which the dependent variable is the household's WTP bid, using the flat monthly fee from the bidding game.[1] The R^2 value for the model indicates that only a small part of the variation in the WTP bids can be explained by the dependent variables, but this is typical of such cross-section models. The overall model is highly significant. In this model and models with other WTP bids as dependent variables, the signs of almost all the independent variables are as hypothesized, and almost all of the independent variables are statistically significant at a high confidence level. The justification for including the independent variables in the model, how each was measured, and their effect on the WTP bids are discussed below.

On the basis of economic theory, one would hypothesize that the WTP bid would be ...

* positively related to household wealth

To measure household wealth, an estimate of the value of each household's assets was calculated by multiplying the number of assets the household owned by the approximate market value of each asset. The mean value of this wealth index for households in the sample was Tsh 8300. The results of the regression model indicate that as household assets increased, the household's WTP bid also increased, as hypothesized by economic theory. This effect is statistically

---

[1] Since a bidding game was used to obtain these estimates of WTP, the observed dependent variable is not the maximum amount the household would be willing to pay, but rather an interval within which the "true" willingness to pay falls. Linear regression is actually not an appropriate technique for dealing with such an ordinal dependent variable; in this situation the correct approach is to use an ordered probit model (see Whittington, Briscoe, Mu, and Barron, 1989). However, based on the WASH experience to date, the use of the mid-points of the intervals as a dependent variable in an ordinary least squares model seems to yield results which are consistent with those obtained from an ordered probit model, and the parameters are much easier to interpret.

highly significant, but it is not large in magnitude. An increase of Tsh 1000 in household assets is estimated to increase the average household's willingness to pay by Tsh 0.40 per month.

* positively related to the respondent's level of education

One might expect that the higher the respondent's level of education, the more likely the household members would be to understand the health benefits of an improved water source, and thus the more the household would be willing to pay for improved service. To test this hypothesis, a categorical variable was constructed from the responses to the question about whether the respondent could read a newspaper easily: (1) "Cannot read a newspaper at all" or "Can read a newspaper with difficulty" [=0], and (2) "Can read a newspaper easily" [=1]. The results support this hypothesis, and suggest that respondents who could read a newspaper easily bid Tsh 10 per month more than those who could not read a newspaper at all or could only read with difficulty.

* higher for female than for male respondents

Since women collect the majority of water, an improved water service would matter more to them, and thus one would expect that they would be willing to pay more. On the other hand, if the intra-household politics are such that the woman controls very little of the money, then she may be willing to pay less than a male even though she stands to benefit the most. The sex of respondent was set equal to zero for a male and to one for a female. The results indicate that the sex of the respondent is a statistically significant and important determinate of his or her WTP bid. On average, female respondents were willing to pay about Tsh 7 per month more than male respondents for improved water service.

* positively related to the distance the respondent must walk to the alternative water source when the system is not working

In parts of other countries, and indeed in other parts of Tanzania, the distance from a household to the traditional source can vary significantly from household to household in a village. In Newala district, however, the distance to the traditional source does not vary much for households in a single village; it does vary, however, from one village to another. The model thus includes a village-specific variable to determine whether the WTP bids of households in one village differ from the bids of households in other villages, after controlling for other factors.[2]

However, the distance to the traditional source is not the only variable which may differ among villages. In particular, the reliability of the Kitangari scheme in a specific village would be expected to affect the respondents' bids, i.e., respondents in villages with poor reliability would be expected to bid higher than respondents in a village with low reliability. In terms of the study villages, Nanda has the most reliable water supply; Mkongi has the least

[2] That is, dummy variables are included for five of the six villages.

reliable supply. This would suggest that respondents in Nanda would bid the least while respondents in Mkongi would bid the most.

The village-specific variables cannot distinguish between these two factors (i.e., distance to the alternative source and reliability of the water system). In practice, Nanda has the lowest travel time to the traditional source and the most reliable supply, so in this case the two effects cannot cancel each other out. Mkonga and Juhudi have the longest travel and waiting times, but have a more reliable supply than Mkongi. The reliability of the Kitangari scheme in Mnyambe is about the same as in Mkonga and Juhudi, but the travel and waiting times are significantly less.

Using Nanda as the base case against which other villages are measured, the model results indicate that three of five of the village-specific (i.e., dummy) variables are statistically significant. The parameter estimates for all five of the village-specific variables included in the model are positive, which suggests that households in each of the villages would pay more for water than households in Nanda. This is consistent with the fact that Nandi has both the lowest travel time to the traditional source and the most reliable supply from the Kitangari scheme. After controlling for all the other factors, respondents in Mkongi are willing to pay Tsh 11 more per month for water than households in other villages. This is consistent with the fact that Mkongi has the least reliable water supply.

* quality of water at the existing source

If a respondent felt that the quality of water at the traditional source was of good quality, then one would hypothesize that he would be willing to pay less for an improved source than if he believed the quality of water at the traditional source was poor. In the multivariate analysis, the household was assigned a value of zero if the respondent felt the quality of water was "poor" and a value of one if he felt it was "good". The sign of this dummy variable is thus expected to the negative. The results supported this expectation. Respondents who believed that the quality of water at the traditional source was good bid about Tsh 6 less per month than those who believed it was poor, and the variable was statistically significant at the 10 percent confidence level.

* availability of rainwater collection tank

If a household had a functioning rainwater collection tank, one would expect that the household would have less need for water from a public tap and would thus be willing to pay less than a household without a rainwater collection tank. The regression model of the determinants of WTP bids thus included a dummy variable to indicate whether or not a household had a functioning rainwater collection tank. As expected, households with functioning rainwater collection tanks bid less (about Tsh 6 per month) than households without such tanks.

The WTP bids may also be influenced by the following aspects of the questionnaire design ...

* high or low starting point

If starting point bias exists, respondents will tend to bid higher when the bidding games start with a high starting point, and lower when they start with a low starting point. The variable for starting point was assigned a value of zero if the bidding games which the respondent received were initiated with low starting points, and a value of one for high starting points. The results indicate that this variable is positive and highly significant, which means that the starting point did affect the WTP bids. On average respondents who received bidding games with a high starting point bid Tsh 12 per month more than those who received bidding games with a low starting point.

* question order

On the basis of economic theory, the order of the two types of bidding games (i.e., pay-by-the-bucket and flat monthly fee) should not influence the respondents' bids; if it does, this raises serious questions about the validity of the information collected. The results show that the variable for question order was not, in fact, statistically significant, nor was the parameter estimate large.

* time available to reflect on their WTP bids

If households have well-defined preferences and respondents can articulate them in response to the questions in a bidding game, it should not matter whether respondents have an extra day to reflect on how much they are willing to pay for water. If the respondent answered the bidding game questions immediately (Opening Statement A), the variable for opening statement was assigned a value of zero. If the respondent had a day to think about his answers, the variable was assigned a value of one. The results indicate that the opening statement variable was highly significant, and that after controlling for other factors, respondents who had a day to reflect bid Tsh 21 per month lower than did respondents who answered immediately.

A political and psychological interpretation of respondents' behavior might suggest that the WTP bids would be ...

* related to the household's perceived entitlement to water

If a respondent believes water should be provided free, one would expect that he would be willing to pay less for water than someone who had given up on government promises of free water. Table A-51 presents a detailed breakdown of respondents' attitudes toward government policy in the water sector. The sample of respondents was divided into the following four groups:

(1) Respondents who ... (a) agreed that villages should be responsible for the operation and maintenance costs of their water system, and (b) disagreed that the government alone is responsible for providing free water to every citizen, and (c) disagreed that every resident of Tanzania will have access to a reliable source of water within 10 years;

(2) Respondents who ... (a) agreed that villages should be responsible for the operation and maintenance costs of their water system, and (b) disagreed that the government alone is responsible for providing free water to every citizen;

(3) Respondents who ... (b) agreed that the government alone is responsible for providing free water to every citizen, and (c) agreed that every resident of Tanzania will have access to a reliable source of water within 10 years;

(4) Respondents who ... (a) disagreed that villages should be responsible for the operation and maintenance costs of their water system, and (b) agreed that the government alone is responsible for providing free water to every citizen, and (c) agreed that every resident of Tanzania will have access to a reliable source of water within 10 years;

One would hypothesize that those individuals in group (1) are the least inclined to expect any help from the government in solving their water problems, or to believe in the policies of the welfare state, and thus would be willing to pay the most for improved water service. Those individuals in group (2) would be only slightly less jaded about the role of the government. Individuals in group (3) are still optimistic about the ability of the government to deliver subsidized services. Individuals in group (4) are expected to be the strongest believers in the government provision of services and the promises of the welfare state, and are thus expected to pay the least. As shown in Table A-51, the order of the mean bids of these four groups was precisely as hypothesized for all three types of WTP bids shown (i.e., WTP per bucket, maximum monthly expenditure under a pay-by-the-bucket system, and WTP a flat monthly fee).

In the multivariate analysis a dummy variable was used to characterize households' attitudes about government policy in the water sector. Respondents in groups (3) and (4) above were assigned a value of zero and thus represented the base case. Respondents in groups (1) and (2) were assigned a value of one. One would hypothesize that the sign of the dummy variable would be positive because respondents in groups (1) and (2) no longer expect free water from the government and should be ready to bid more for water. In fact, the multivariate results show that this attitude variable is positive and statistically significant. After controlling for other factors, respondents in groups (1) and (2) were willing to pay Tsh 6 more per month for improved service than those in groups (3) and (4).

Table III-1

Results of Ordinary Least Squares Regression Model of Determinants of WTP Bids
(Flat Monthly Fee from Bidding Game)

Dependent Variable: Mid-point of Interval in Bidding Game within which Respondent's WTP Bid Falls

Parameter Estimates

Independent Variables	Parameter Estimate	Standard Error	t for H0: Parameter=0	Prob > /T/
Intercept	33.5	5.12	6.54	0.00
Question Order	-3.3	2.63	-1.25	0.21
Starting Point	11.8	2.61	4.52	0.00
Opening Statement	-21.0	4.80	-4.39	0.00
Sex of Respondent	7.4	3.16	2.34	0.02
Attitude	6.0	2.69	2.22	0.03
Literacy	10.4	2.67	3.88	0.00
Household Assets	0.0004	0.0001	3.28	0.00
Water Quality	-5.9	3.21	-1.85	0.07
Rainwater Tank	-5.6	3.67	-1.52	0.13
Village Dummy Variables (Nanda is the base village)				
Mtopwa	17.1	5.12	3.34	0.00
Mnyambi	6.5	5.54	1.17	0.24
Mkonga	10.9	5.30	2.05	0.04
Juhudi	6.4	5.25	1.22	0.22
Mkongi	33.6	5.43	6.19	0.00

Degrees of Freedom	572
F Value	7.76
Probability >F	0.0001
R-Square	0.16
Adjusted R-Square	0.14

APPENDIX IV

Statistical Tables

SOCIOECONOMIC DATA

Table A-1

Household Size

No. of Family Members	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1-2	107	13.2	107	13.1
3-4	295	36.1	402	49.1
5-6	206	25.2	608	74.3
7-8	108	13.2	716	87.5
9-10	65	7.9	781	95.5
10+	37	4.5	818	100.0

No. of Missing Responses = 11

Minimum = 1
Maximum = 22
Mean = 5.20
Standard Deviation = 2.82

Table A-2

Number of Adults Per Household

No. of Adults	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1-2	523	63.5	523	63.5
3-4	245	29.8	768	93.3
5-6	44	5.3	812	98.7
7-8	8	1.0	820	99.6
9-10	1	0.1	821	99.8
10+	2	0.2	823	100.0

No. of Missing Responses = 6

Table A-3

Number of Children Per Household

No. of Children	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	112	13.7	112	13.7
1-2	339	41.4	451	55.1
3-4	222	27.1	673	82.2
5-6	110	13.4	783	95.6
7-8	24	2.9	807	98.5
9-10	5	0.6	812	99.1
10+	7	0.9	819	100.0

No. of Missing Responses = 10

Table A-4

Literacy of Respondents

Can Read a Newspaper	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Easily	344	42.0	344	42.0
With Some Difficulty	144	17.6	488	59.6
Not at All	331	40.4	819	100.0

No. of Missing Responses = 10

Table A-5

Attitudes toward Government Water Sector Policy

Statement Posed to Respondents		Frequency	Percent
Some people are of the opinion that villages should be responsible for meeting the costs of their water system. Do you agree or disagree with this opinion?	AGREE	678	82
	DISAGREE	110	13
	UNDECIDED	40	5
		828	100
Some people believe that it is the responsibility of the government alone to provide water free to every citizen of this country. Do you agree or disagree with this stand?	AGREE	367	45
	DISAGREE	424	51
	UNDECIDED	33	4
		824	100
Due to the current government efforts of providing water to villages, some people expect that in 10 years time, every resident of Tanzania will have access to reliable sources of water, and this will be to every village of this country. Do you agree or disagree with this line of thought?	AGREE	546	66
	DISAGREE	133	16
	UNDECIDED	149	18
		828	100

Table A-6

Type of Housing

Housing Characteristic of Respondent	Frequency	Percent
1. Type of Roof:		
a. Thatch	615	75
b. Corrugated Iron	207	25
Total	822	100
2. Type of Floor:		
a. Mud	30	4
b. Cement	309	38
c. No Floor	465	58
Total	804	100
3. Type of Walls:		
a. Mud/No Plaster	428	52
b. Mud/Mud Plaster	336	41
c. Mud/Cement Plaster	28	4
d. Mud Bricks/No Plaster	19	2
e. Mud Bricks/Mud Plaster	8	1
f. Mud Bricks/Cement Plaster	2	0
Total	821	100
4. No. of Windows:		
0	459	57
1	19	2
2	146	18
3	38	5
4	117	15
$\geq$ 5	28	3
Total	807	100
5. Does Door Have a Lock?		
Yes	681	84
No	132	16
Total	813	100

Table A-7

Ownership of Selected Assets

Assets	Percent Owning
1. Lamp	18
2. Bicycle	17
3. Radio	14
4. No. of Goats ...	
0	58
1	7
2	10
3	6
4	4
5	4
6-9	7
10+	4

Table A-8

Household Ownership of Rainwater Collection Tanks

	Frequency	Percent
Households with rainwater collection tanks	305	37
Households without rainwater collection tanks	520	63
Total	825	100

Status of Tank (Does it hold water?)

	Frequency	Percent
Tank works	157	51
Tank does not work	148	49
Total	305	100

No. of Missing Responses = 4

Table A-9

Household Ownership of Rainwater Collection Tanks, by Village

Village	Household Has Tank		Household Does Not Have Tank	Total
	Tank Works	Tank Does Not Work		
Mtopwa				
Frequency	6	30	103	139
Row Pct.	4	22	74	
Mkongi				
Frequency	89	57	92	238
Row Pct.	37	24	39	
Mkonga				
Frequency	30	25	73	
Row Pct.	23	20	57	128
Juhudi				
Frequency	19	20	75	
Row Pct.	19	17	64	117
Mnyambe				
Frequency	4	6	89	
Row Pct.	4	6	90	
Nanda				
Frequency	6	10	88	
Row Pct.	6	10	85	
TOTAL				
Frequency	157	148	520	825
Percent	19	18	63	100

No. of Missing Responses = 4

WATER CONSUMPTION

Table A-10

Household Water Consumption During the Rainy Season
When the System Is Working

No. of Buckets Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	62	8	62	8
1	51	6	113	14
2	158	19	271	33
3	163	20	434	53
4-5	258	32	692	85
6-7	73	9	765	94
8+	53	7	818	100

No. of Missing Responses = 11

Table A-11

Household Water Consumption During the Rainy Season
When the System Is Not Working

No. of Buckets Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	64	8	64	8
1	52	6	116	14
2	239	29	355	44
3	181	22	536	66
4-5	187	23	723	89
6-7	54	7	777	95
8+	39	5	816	100

No. of Missing Responses = 13

Table A-12

Household Water Consumption During the Dry Season
When the System Is Working

No. of Buckets Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	1	0	1	0
1	129	16	130	16
2	204	25	334	41
3	159	19	493	60
4-5	204	25	697	85
6-7	75	9	772	94
8+	51	6	823	100

No. of Missing Responses = 6

Table A-13

Household Water Consumption During the Dry Season
When the System Is Working, by Household Size

Household Size		No. of Buckets Per Day 1	2	3	4-5	6-7	8+	Total
1-2	Frequency	35	31	12	22	4	2	106
	Percent	4	4	1	3	0	0	13
	Row Pct.	33	29	11	21	4	2	
	Col. Pct.	27	16	8	11	5	4	
3-4	Frequency	43	92	66	57	19	15	292
	Percent	5	11	8	7	2	2	36
	Row Pct.	15	32	23	20	7	5	
	Col. Pct.	33	46	42	29	25	30	
5-6	Frequency	32	52	40	52	15	14	205
	Percent	4	6	5	6	2	2	25
	Row Pct.	16	25	20	25	7	7	
	Col. Pct	25	26	25	26	20	28	
7-8	Frequency	13	16	20	32	17	9	108
	Percent	2	2	2	4	2	1	13
	Row Pct.	12	15	19	30	16	8	
	Col. Pct.	10	8	13	16	23	18	
9-10	Frequency	6	4	12	24	14	5	65
	Percent	1	0	1	3	2	1	8
	Row Pct.	9	6	18	37	22	8	
	Col. Pct.	5	2	8	12	19	10	
10+	Frequency	0	5	7	13	6	5	36
	Percent	0	1	1	2	1	1	4
	Row Pct.	0	14	19	36	17	14	
	Col. Pct.	0	3	4	7	8	10	
Total	Frequency	129	200	157	200	75	50	812
	Percent	16	25	19	25	9	6	100

No. of Missing Responses = 17

Table A-14

Household Water Consumption During the Dry Season
When the System Is Not Working

No. of Buckets Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	1	0	1	0.1
1	540	65	541	65
2	165	20	706	85
3	68	8	774	94
4-5	40	5	814	98
6-7	7	1	821	99
8+	7	1	828	100

No. of Missing Responses = 1

Table A-15

Summary Statistics on Household Water Consumption

Village		No. of Observations	Minimum (No. of Buckets) Per Day	Maximum (No. of Buckets) Per Day	Mean (No. of Buckets) Per Day	Std. Dev.
Mtopwa	Rainy Season; System Works	137	0	12	4	2
	Dry Season; System Works	138	1	20	5	3
	Rainy Season; System Does Not Work	138	0	12	3	2
	Dry Season; System Does Not Work	139	1	10	2	2
Mkongi	Rainy Season; System Works	236	0	10	3	2
	Dry Season; System Works	235	1	15	4	2
	Rainy Season; System Does Not Work	238	1	10	3	2
	Dry Season; System Does Not Work	238	0	10	2	1
Mkonga	Rainy Season; System Works	126	0	10	4	2
	Dry Season; System Works	127	1	10	3	2
	Rainy Season; System Does Not Work	127	0	10	3	2
	Dry Season; System Does Not Work	128	1	5	1	1
Juhudi	Rainy Season; System Works	115	0	10	3	2
	Dry Season; System Works	118	0	20	3	2
	Rainy Season; System Does Not Work	117	0	10	3	2
	Dry Season; System Does Not Work	118	0	7	1	1
Mnyambe	Rainy Season; System Works	100	0	10	4	2
	Dry Season; System Works	101	1	15	3	2
	Rainy Season; System Does Not Work	92	1	12	3	2
	Dry Season; System Does Not Work	101	1	8	1	1
Nanda	Rainy Season; System Works	104	0	10	4	2
	Dry Season; System Works	104	1	10	4	2
	Rainy Season; System Does Not Work	104	0	10	3	2
	Dry Season; System Does Not Work	104	1	8	2	1
Total	Rainy Season; System Works	818	0	12	4	2
	Dry Season; System Works	823	0	20	4	2
	Rainy Season; System Does Not Work	816	0	12	3	2
	Dry Season; System Does Not Work	828	0	10	2	1

Table A-16

Per Capita Water Consumption During the Rainy Season When the System Is Working

Liters Per Capita Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	61	7.6	61	7.6
< 4	33	4.1	94	11.6
4.01-8	105	13.0	199	24.7
8.01-12	124	15.4	323	40.0
12.01-16	147	18.2	470	58.2
16.01-20	146	18.1	616	76.3
20.01-40	163	20.2	779	96.5
> 40	28	3.5	807	100.0

No. of Missing Responses = 22

Table A-17

Per Capita Water Consumption
During the Rainy Season When the System Is Not Working

Liters Per Capita Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	60	7.5	60	7.5
< 4	26	3.2	86	10.7
4.01-8	140	17.4	226	28.1
8.01-12	167	20.7	393	48.8
12.01-16	145	18.0	538	66.8
16.01-20	141	17.5	679	84.3
20.01-40	98	12.2	777	96.5
> 40	28	3.5	805	100.0

No. of Missing Responses = 24

Table A-18

Per Capita Water Consumption
During the Dry Season When the System Is Working

Liters Per Capita Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
< 4	62	7.6	62	7.6
4.01-8	155	19.1	217	26.7
8.01-12	166	20.4	383	47.2
12.01-16	147	18.1	530	65.3
16.01-20	130	16.0	660	81.3
20.01-40	114	14.0	774	95.3
> 40	38	4.7	812	100.0

No. of Missing Responses = 17

Table A-19

Per Capita Water Consumption During the Dry Season
When the System Is Working, by Village

Liters Per Capita Per Day		Mtopwa	Mkongi	Mkonga	Juhudi	Mnyambe	Nanda	Total
< 4	Frequency	5	16	14	13	13	1	62
	Percent	1	2	2	2	2	0	8
	Row Percent	8	26	23	21	21	2	
	Column Percent	4	7	11	11	13	1	
4.01-8	Frequency	15	41	34	22	25	18	155
	Percent	2	5	4	3	3	2	19
	Row Percent	10	26	22	14	16	12	
	Column Percent	11	18	27	19	25	18	
8.01-12	Frequency	25	54	24	25	21	17	166
	Percent	3	7	3	3	3	2	20
	Row Percent	15	33	14	15	13	10	
	Column Percent	18	23	19	22	21	17	
12.01-16	Frequency	27	37	22	22	17	22	147
	Percent	3	5	3	3	2	3	18
	Row Percent	18	25	15	15	12	15	
	Column Percent	20	16	18	19	17	22	
16.01-20	Frequency	19	36	18	20	14	23	130
	Percent	2	4	2	2	2	3	16
	Row Percent	15	28	14	15	11	18	
	Column Percent	14	15	15	17	14	23	
20.01-40	Frequency	37	33	8	12	8	16	114
	Percent	5	4	1	1	1	2	14
	Row Percent	32	29	7	11	7	14	
	Column Percent	27	14	6	10	8	16	
>40	Frequency	9	17	4	1	3	4	38
	Percent	1	2	0	0	0	0	5
	Row Percent	24	45	11	3	8	11	
	Column Percent	7	7	3	1	3	4	
Total	Frequency	137	234	124	115	101	101	812
	Percent	17	29	15	14	12	12	100

No. of Missing Responses = 17

Table A-20

Per Capita Water Consumption During the Dry Season
When the System Is Working, by Household Size

Liters Per Capita Per Day		Household Size (No. of Members) 1-2	3-4	5-6	7-8	9-10	11+	Total
< 4	Frequency	0	0	32	14	8	8	62
	Percent	0	0	4	2	1	1	8
	Row Percent	0	0	52	23	13	13	
	Column Percent	0	0	16	13	12	22	
4.01-8	Frequency	0	43	52	27	18	15	155
	Percent	0	5	6	3	2	2	19
	Row Percent	0	28	34	17	12	10	
	Column Percent	0	15	25	25	28	42	
8.01-12	Frequency	22	50	40	23	22	9	166
	Percent	3	6	5	3	3	1	20
	Row Percent	13	30	24	14	13	5	
	Column Percent	21	17	20	21	34	25	
12.01-16	Frequency	0	78	26	27	13	3	147
	Percent	0	10	3	3	2	0	18
	Row Percent	0	53	18	18	9	2	
	Column Percent	0	27	13	25	20	8	
16.01-20	Frequency	39	48	35	8	0	0	130
	Percent	5	6	4	1	0	0	16
	Row Percent	30	37	27	6	0	0	
	Column Percent	37	16	17	7	0	0	
20.01-40	Frequency	24	59	18	8	4	1	114
	Percent	3	7	2	1	0	0	14
	Row Percent	21	52	16	7	4	1	
	Column Percent	23	20	9	7	6	3	
>40	Frequency	21	14	2	1	0	0	38
	Percent	3	2	0	0	0	0	5
	Row Percent	55	37	5	3	0	0	
	Column Percent	20	5	1	1	0	0	
Total	Frequency	106	292	205	108	65	36	812
	Percent	13	36	25	13	8	4	100

No. of Missing Responses = 17

Table A-21

Per Capita Water Consumption
During the Dry Season When the System Is Not Working

Liters Per Capita Per Day	Frequency	Percent	Cumulative Frequency	Cumulative Percent
< 4	265	32.4	265	32.4
4.01-8	294	36.0	559	68.4
8.01-12	129	15.8	688	84.2
12.01-16	55	6.7	743	90.9
16.01-20	55	6.7	798	97.7
20.01-40	16	2.0	814	99.6
> 40	3	0.4	817	100.0

No. of Missing Responses = 12

Table A-22

Per Capita Water Consumption during the Dry Season
When the System Is Not Working, by Village

Liters Per Capita Per Day		Mtopwa	Mkongi	Mkonga	Juhudi	Mnyambe	Nanda	Total
< 4	Frequency	39	71	52	38	39	26	265
	Percent	5	9	6	5	5	3	32
	Row Percent	15	27	20	14	15	10	
	Column Percent	28	30	42	33	39	26	
4.01-8	Frequency	50	75	45	46	37	41	294
	Percent	6	9	6	6	5	5	36
	Row Percent	17	26	15	16	13	14	
	Column Percent	36	32	36	40	37	41	
8.01-12	Frequency	23	42	14	23	13	14	129
	Percent	3	5	2	3	2	2	16
	Row Percent	18	33	11	18	10	11	
	Column Percent	17	18	11	20	13	14	
12.01-16	Frequency	10	24	5	5	4	7	55
	Percent	1	3	1	1	0	1	7
	Row Percent	18	44	9	9	7	13	
	Column Percent	7	10	4	4	4	7	
16.01-20	Frequency	9	18	9	3	6	10	55
	Percent	1	2	1	0	1	1	7
	Row Percent	16	33	16	5	11	18	
	Column Percent	7	8	7	3	6	10	
20.01-40	Frequency	7	5	0	0	2	2	16
	Percent	1	1	0	0	0	0	2
	Row Percent	44	31	0	0	13	13	
	Column Percent	5	2	0	0	2	2	
>40	Frequency	0	2	0	0	0	1	3
	Percent	0	0	0	0	0	0	0
	Row Percent	0	67	0	0	0	33	
	Column Percent	0	1	0	0	0	1	
Total	Frequency	138	237	125	115	101	101	817
	Percent	17	29	15	14	12	12	100

No. of Missing Responses = 12

Table 23

Per Capita Water Consumption During the Dry Season When the System Is Not Working, by Household Size

Liters per Capita per Day		Household Size (No. of Members) 1-2	3-4	5-6	7-8	9-10	11+	Total
< 4	Frequency	1	0	140	57	39	28	265
	Percent	0	0	17	7	5	3	32
	Row Percent	0	0	53	22	15	11	
	Column Percent	1	0	68	53	60	76	
4.01-8	Frequency	2	194	38	32	20	8	294
	Percent	0	24	5	4	2	1	36
	Row Percent	1	66	13	11	7	3	
	Column Percent	2	66	18	30	31	22	
8.01-12	Frequency	63	32	15	14	4	1	129
	Percent	8	4	2	2	0	0	16
	Row Percent	49	25	12	11	3	1	
	Column Percent	60	11	7	13	6	3	
12.01-16	Frequency	1	45	7	1	1	0	55
	Percent	0	6	1	0	0	0	7
	Row Percent	2	82	13	2	2	0	
	Column Percent	1	15	3	1	2	0	
16.01-20	Frequency	32	16	4	2	1	0	55
	Percent	4	2	0	0	0	0	7
	Row Percent	58	29	7	4	2	0	
	Column Percent	30	5	2	2	2	0	
20.01-40	Frequency	5	7	2	2	0	0	16
	Percent	1	1	0	0	0	0	2
	Row Percent	31	44	13	13	0	0	
	Column Percent	5	2	1	2	0	0	
>40	Frequency	2	1	0	0	0	0	3
	Percent	0	0	0	0	0	0	0
	Row Percent	67	33	0	0	0	0	
	Column Percent	2	0	0	0	0	0	
Total	Frequency	106	295	206	108	65	37	817
	Percent	13	36	25	13	8	5	100

No. of Missing Responses = 12

Table A-24

Summary Statistics on Per Capita Water Consumption

Village		No. of Observations	Minimum (liters per day)	Maximum (liters per day)	Mean liters per day)	Std. Dev.
Mtopwa	Rainy Season; System Works	136	0	100	16.8	13.2
	Dry Season; System Works	37	2.9	140	21.2	16.8
	Rainy Season; System Does Not Work	137	0	60	14.0	11.0
	Dry Season; System Does Not Work	138	1.3	40	8.4	6.8
Mkongi	Rainy Season; System Works	235	0	100	15.9	14.3
	Dry Season; System Works	234	2.0	200	18.3	18.9
	Rainy Season; System Does Not Work	237	0	66.7	14.9	11.9
	Dry Season; System Does Not Work	237	1.2	66.7	8.7	7.9
Mkonga	Rainy Season; System Works	123	0	80	17.9	13.5
	Dry Season; System Works	124	2.2	100	14.3	15.2
	Rainy Season; System Does Not Work	124	0	66.7	13.8	10.9
	Dry Season; System Does Not Work	125	1.5	20	6.7	4.6
Juhudi	Rainy Season; System Works	112	0	80	18.0	13.1
	Dry Season; System Works	115	2.0	80	13.9	9.9
	Rainy Season; System Does Not Work	114	0	100	17.0	14.9
	Dry Season; System Does Not Work	115	1.3	20	6.4	3.9
Mnyambe	Rainy Season; System Works	100	0	100	17.4	14.1
	Dry Season; System Works	101	1.8	60	12.9	10.0
	Rainy Season; System Does Not Work	92	1.8	50	15.0	9.0
	Dry Season; System Does Not Work	101	0.9	40	7.0	5.8
Nanda	Rainy Season; System Works	101	0	100	18.6	14.2
	Dry Season; System Works	101	2.9	100	18.8	15.1
	Rainy Season; System Does Not Work	101	0	100	18.2	17.4
	Dry Season; System Does Not Work	101	2.0	100	9.3	11.0
Total	Rainy Season; System Works	807	0	100	17.2	13.8
	Dry Season; System Works	812	1.8	200	16.9	15.7
	Rainy Season; System Does Not Work	805	0	100	15.3	12.7
	Dry Season; System Does Not Work	817	0.9	100	7.9	7.2

Table A-25

Perceptions of the Quality of Water
from Various Sources

(Total Sample)

Quality		Rainwater	Water Sources Other than the Water System	Vended Water
Good	Frequency	207	220	45
	Column Percent	27	27	22
Poor	Frequency	567	585	158
	Column Percent	73	73	78
Don't Know	Frequency	2	1	
	Column Percent	0	0	
No. of Missing Responses		53	23	626

COLLECTING WATER: WALKING AND WAITING TIME

Table A-26

Estimate of Time Required to Walk (One Way) from House to Traditional Water Source

No. of Hours	Frequency	Percent	Cumulative Frequency	Cumulative Percent
<2	33	4	33	4
2-4	404	50	437	54
4-6	268	33	705	87
6+	105	13	810	100

No. of Missing Responses = 19

Table A-27

Estimate of Time Required to Walk (One Way) from House to Traditional Water Source, by Village

No. of Hours		Mtopwa	Mkongi	Mkonga	Juhudi	Mnyambe	Nanda	Total
< 2	Frequency	4	6	2	0	10	11	33
	Column Percent	3	3	2	0	10	11	4
2-4	Frequency	79	97	37	38	70	83	404
	Column Percent	57	42	30	33	71	82	50
4-6	Frequency	40	84	64	55	18	7	268
	Column Percent	29	36	51	47	18	7	33
6+	Frequency	15	44	22	23	1	0	105
	Column Percent	11	19	18	20	1	0	13
Total	Frequency	138	231	125	116	99	101	810
	Percent	17	29	15	14	12	12	100

No. of Missing Responses = 19

Table A-28

Estimate of Waiting Time at Traditional Water Source

No. of Hours	Frequency	Percent	Cumulative Frequency	Cumulative Percent
no waiting	251	32	251	32
<1	192	24	443	56
1-2	181	23	624	79
2-3	87	11	711	90
3-4	53	7	764	97
4+	28	3	792	100

No. of Missing Responses = 37

Table A-29

Estimate of Waiting Time at
Traditional Water Source, by Village

No. of Hours		Mtopwa	Mkongi	Mkonga	Juhudi	Mnyambe	Nanda	Total
no waiting	Frequency	51	73	22	9	58	38	251
	Column Percent	37	31	18	9	60	38	32
< 1	Frequency	31	62	20	25	27	27	192
	Column Percent	22	27	16	25	28	27	24
1-2	Frequency	34	53	32	39	6	17	181
	Column Percent	25	23	26	39	6	17	23
2-3	Frequency	10	28	27	13	2	7	87
	Column Percent	7	12	22	13	2	7	11
3-4	Frequency	8	7	16	12	1	9	53
	Column Percent	6	3	13	12	1	9	7
4+	Frequency	4	9	7	2	3	3	28
	Column Percent	3	4	6	2	3	3	4
Total	Frequency	138	232	124	100	97	101	792
	Percent	17	29	16	13	12	13	100

No. of Missing Responses = 37

Table A-30

Walking and Waiting Time, by Village

Village	No. of Observations		Mean (hr.)	Minimum (hr.)	Maximum (hr.)	Std. Dev.
Mtopwa	138	Walking Time	3.58	1.0	9.0	1.46
	138	Waiting Time	1.23	0	6.0	1.41
Mkongi	231	Walking Time	4.00	1.0	9.0	1.53
	232	Waiting Time	1.34	0	6.0	1.41
Mkonga	125	Walking Time	4.28	1.0	8.0	1.47
	124	Waiting Time	2.14	0	6.0	1.49
Juhudi	116	Walking Time	4.22	2.0	8.0	1.31
	100	Waiting Time	2.00	0	6.0	1.26
Mnyambe	99	Walking Time	2.78	1.0	8.0	1.07
	97	Waiting Time	0.59	0	6.0	1.13
Nanda	101	Walking Time	2.51	0.3	5.0	0.82
	101	Waiting Time	1.24	0	5.0	1.44
Total	810	Walking Time	3.67	0.3	9.0	1.49
	792	Waiting Time	1.42	0	6.0	1.45

COSTS OF WATER PURCHASED FROM COLLECTION TANKS OR VENDORS

Table A-31

Price of Water Purchased from Neighbor's Rainwater Collection Tank, by Village

Village		Price per Bucket (in TAS) 0	1-4	5-9	10-14	15-19	20+	Total
Mtopwa	Frequency	6	51	26	16	2	0	101
	Percent	1	9	4	3	0	0	17
	Row Percent	6	51	26	16	2	0	
	Column Percent	32	44	21	9	3	0	
Mkongi	Frequency	3	32	44	33	4	2	118
	Percent	1	5	7	6	1	0	20
	Row Percent	3	27	37	28	3	2	
	Column Percent	16	28	35	18	6	2	
Mkonga	Frequency	0	0	9	22	27	36	94
	Percent	0	0	2	4	5	6	16
	Row Percent	0	0	10	23	29	38	
	Column Percent	0	0	7	12	43	44	
Juhudi	Frequency	0	4	6	40	13	30	93
	Percent	0	1	1	7	2	5	16
	Row Percent	0	4	6	43	14	32	
	Column Percent	0	3	5	22	21	37	
Mnyambe	Frequency	0	0	4	67	13	13	97
	Percent	0	0	1	11	2	2	16
	Row Percent	0	0	4	69	13	13	
	Column Percent	0	0	3	36	21	16	
Nanda	Frequency	10	28	35	8	4	1	86
	Percent	2	5	6	1	1	0	15
	Row Percent	12	33	41	9	5	1	
	Column Percent	53	24	28	4	6	1	
Total	Frequency	19	115	124	186	63	82	589
	Percent	3	20	21	32	11	14	100

No. of Missing Responses = 240

Table A-32

Summary Statistics on the Price of Water Sold from Rainwater Collection Tanks and Vendors, by Village

Village	Price of Water Sold...	No. of Observations	Minimum (TAS per Bucket)	Maximum (TAS per Bucket)	Mean (TAS per Bucket)	Std. Dev.
Mtopwa	From Rainwater Tanks	101	0	15	4	3
	By Vendors in Rainy Season	15	1	5	3	2
	By Vendors in Dry Season	36	1	15	7	4
Mkongi	From Rainwater Tanks	118	0	25	6	4
	By Vendors in Rainy Season	33	1	10	4	2
	By Vendors in Dry Season	64	1	25	9	5
Mkonga	From Rainwater Tanks	94	5	30	15	6
	By Vendors in Rainy Season	18	4	20	7	4
	By Vendors in Dry Season	37	10	25	16	5
Juhudi	From Rainwater Tanks	93	1	25	13	5
	By Vendors in Rainy Season	16	3	15	7	3
	By Vendors in Dry Season	28	4	20	15	5
Mnyambe	From Rainwater Tanks	97	5	30	12	5
	By Vendors in Rainy Season	17	3	10	5	1
	By Vendors in Dry Season	47	5	40	17	9
Nanda	From Rainwater Tanks	86	0	20	5	4
	By Vendors in Rainy Season	10	1	5	5	1
	By Vendors in Dry Season	14	2	15	9	3
Total	From Rainwater Tanks	589	0	30	9	6
	By Vendors in Rainy Season	109	1	20	5	3
	By Vendors in Dry Season	226	1.0	40	12	7

WILLINGNESS TO PAY BIDS

Table A-33

Means of WTP Bids, by Village
(in TAS)

	Mtopwa	Mkongi	Mkonga	Juhudi	Mnyambe	Nanda	Total Sample
No. of Observations	124	97	115	113	89	95	
Mean WTP Bid*							
(i) WTP bid per bucket	0.90	1.24	0.69	0.56	0.80	0.44	0.79
(ii) Maximum monthly expenditures with pay-by-the-bucket system	80	113	63	52	84	41	73
(iii) WTP Flat monthly fee	39	49	28	27	24	21	32

* (from open-ended questions)

Table A-34

Willingness-to-Pay Bids Per Bucket,
from Bidding Game

WTP Bid (TAS per bucket)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0-0.49	81	11	81	11
0.5-0.99	125	17	206	28
1.0-2.99	157	21	363	49
3.0+	380	51	743	100

No. of Missing Responses = 86

Table A-35

Willingness-to-Pay Bids Per Bucket
(From open-ended question: If you got all the water you needed from the domestic tap, what is the most you could pay per bucket?)

WTP Bid (TAS per bucket)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	28	4	28	4
0.01-0.49	137	18	165	22
0.50-0.99	344	46	509	69
1.00-2.99	185	25	694	93
3.00+	49	7	743	100

No. of Missing Responses = 86

Table A-36

Willingness-to-Pay Bids Per Bucket,
from Bidding Game with Low Starting Point

WTP Bid (TAS per bucket)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0-0.49	50	13	50	13
0.5-0.99	73	19	123	32
1.0-2.99	85	22	208	55
3.0+	174	46	382	100

Table A-37

Willingness-to-Pay Bids Per Bucket,
from Bidding Game with High Starting Point

WTP Bid (TAS per bucket)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0-0.49	31	9	31	9
0.5-0.99	52	14	83	23
1.0-2.99	72	20	155	43
3.0+	206	57	361	100

Table A-38

Maximum Monthly Water Expenditure
Under a Pay-by-the-Bucket Scheme*

Expenditure on Water (TAS per month)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1-10	37	5	37	5
11-20	78	11	115	16
21-30	161	23	276	39
31-60	209	29	485	68
61-100	93	13	578	81
101-200	94	13	672	94
201+	42	6	714	100

No. of Missing Responses = 115

*Calculated as the product of (i) WTP bid, shillings per bucket, from open-ended question, and (ii) respondent's estimate of the number of buckets household would purchase per day at this price.

Table A-39

Willingness-to-Pay Bids for a Flat Monthly Fee,
from Bidding Game

WTP Bid (TAS per month)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0-24	156	21	156	21
25-49	229	31	385	52
50-99	128	17	513	69
100+	230	31	743	100

No. of Missing Responses = 86

Table A-40

Willingness-to-Pay Bids for a Flat Monthly Fee,
(From open-ended question: What is the most
your household could afford to pay per month?)

WTP Bid (TAS per month)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	56	8	56	8
1-10	120	16	176	24
11-20	150	20	326	44
21-30	228	31	554	75
31-60	120	16	674	91
61-100	55	7	729	98
101+	12	2	741	100

No. of Missing Responses = 88

Table A-41

Willingness-to-Pay Bids for a Flat Monthly Fee,
from Bidding Game with Low Starting Point

WTP Bid (TAS per month)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0-24	84	22	84	22
25-49	142	37	226	59
50-99	74	19	300	79
100+	82	22	382	100

Table A-42

Willingness-to-Pay for a Flat Monthly Fee,
from Bidding Game with High Starting Point

WTP Bid (TAS per month)	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0-24	72	20	72	20
25-49	87	24	159	44
50-99	54	15	213	59
100+	148	41	361	100

Table A-43

Willingness to Pay Per Bucket, by Sex

WTP Bid Per Bucket (in TAS)		Male	Female	Total
0-0.49	Frequency	55	23	78
	Percent	8	3	11
	Row Percent	71	29	
	Column Percent	10	12	
0.5-0.99	Frequency	88	35	123
	Percent	12	5	17
	Row Percent	72	28	
	Column Percent	17	18	
1.0-2.99	Frequency	116	36	152
	Percent	16	5	21
	Row Percent	76	24	
	Column Percent	22	18	
3.0+	Frequency	272	102	374
	Percent	37	14	51
	Row Percent	73	27	
	Column Percent	51	52	
Total	Frequency	531	196	727
	Percent	73	27	100

No. of Missing Responses = 102

Table A-44

Willingness to Pay Per Bucket, by Level of Education

WTP Bid Per Bucket (in TAS)		Level of Schooling Achieved			
		Standard 1-4	Standard 5-7	Standard 8	Total
0-0.49	Frequency	18	18	1	37
	Percent	4	4	0	9
	Row Percent	49	49	3	
	Column Percent	9	9	7	
0.5-0.99	Frequency	34	26	2	62
	Percent	8	6	1	15
	Row Percent	55	42	3	
	Column Percent	17	13	14	
1.0-2.99	Frequency	34	51	2	87
	Percent	8	12	1	21
	Row Percent	39	59	2	
	Column Percent	17	26	14	
3.0+	Frequency	110	103	9	222
	Percent	27	25	2	54
	Row Percent	50	46	4	
	Column Percent	56	52	64	
Total	Frequency	196	198	14	408
	Percent	48	49	3	100

No. of Missing Responses = 421

Table A-45

Willingness to Pay by the Bucket,
by Estimated Value of Household Assets

WTP Bid Per Bucket (in TAS)		Value of Household Assets* (in TAS) 0	1-5,000	5,001-10,000	10,001-20,000	20,001-30,000	30,001+	Total
0-0.49	Frequency	38	18	13	6	3	2	80
	Percent	5	2	2	1	0	0	11
	Row Percent	48	23	16	8	4	3	
	Column Percent	13	11	16	6	5	5	
0.5-0.99	Frequency	50	32	17	13	7	5	124
	Percent	7	4	2	2	1	1	17
	Row Percent	40	26	14	10	6	4	
	Column Percent	18	20	21	13	12	13	
1.0-2.99	Frequency	62	37	15	24	11	6	155
	Percent	9	5	2	3	2	1	21
	Row Percent	40	24	10	15	7	4	
	Column Percent	22	23	18	24	18	15	
3.0+	Frequency	135	76	37	9	39	27	373
	Percent	18	10	5	8	5	4	51
	Row Percent	36	20	10	16	10	7	
	Column Percent	47	47	45	58	65	68	
Total	Frequency	285	163	82	102	60	40	732
	Percent	39	22	11	14	8	5	100

No. of Missing Responses = 97

* Value of Household Assets = No. of goats (TAS 2,000) + Radio (TAS 5,000) + Bike (TAS 15,000) + Lamp (TAS 1,000)

Table A-46

Maximum Monthly Household Water Expenditure,
by Estimated Value of Household Assets

Mo. Water Expenditure (in TAS)		Value of Household Assets (in TAS)						
		0	1-5000	5001-10000	10001-20000	20001-30000	30001+	Total
1-10	Frequency	16	4	2	2	1	0	25
	Percent	2	1	0.5	0.5	0	0	4
	Row Pct.	64	16	8	8	4	0	
	Col. Pct.	6	3	3	2	2	0	
11-20	Frequency	29	13	6	6	3	2	59
	Percent	4	2	1	1	0	0	8
	Row Pct.	49	22	10	10	5	3	
	Col. Pct.	11	8	8	6	5	5	
21-30	Frequency	81	44	15	10	11	3	164
	Percent	12	6	2	1	2	0	23
	Row Pct.	49	27	9	6	7	2	
	Col. Pct.	30	28	19	10	19	8	
31-60	Frequency	70	45	29	38	13	13	208
	Percent	10	6	4	5	2	2	30
	Row Pct.	34	22	14	18	6	6	
	Col. Pct.	26	29	37	38	22	33	
61-100	Frequency	27	18	11	22	13	8	99
	Percent	4	3	2	3	2	1	14
	Row Pct.	27	18	11	22	13	8	
	Col. Pct.	10	11	14	22	22	21	
101-200	Frequency	40	23	8	16	8	9	104
	Percent	6	3	1	2	1	1	15
	Row Pct.	38	22	8	15	8	9	
	Col. Pct.	15	15	10	16	14	23	
201+	Frequency	8	10	8	6	9	4	45
	Percent	1	1	1	1	1	1	6
	Row Pct.	18	22	18	13	20	9	
	Col. Pct.	3	6	10	6	16	10	
Total	Frequency	271	157	79	100	58	39	704
	Percent	38	22	11	14	8	6	100

No. of Missing Responses = 125

Table A-47

Willingness to Pay a Flat Monthly Fee, by Sex

WTP Bid Per Month (in TAS)		Male	Female	Total
0-24	Frequency	106	45	151
	Percent	15	6	21
	Row Percent	70	30	
	Column Percent	20	23	
25-49	Frequency	161	62	223
	Percent	22	9	31
	Row Percent	72	28	
	Column Percent	30	31	
50-99	Frequency	98	28	126
	Percent	13	4	17
	Row Percent	78	22	
	Column Percent	18	14	
100+	Frequency	166	61	227
	Percent	23	8	31
	Row Percent	73	27	
	Column Percent	31	31	
Total	Frequency	531	196	727
	Percent	73	27	100

No. of Missing Responses = 102

Table A-48

Willingness to Pay a Flat Monthly Fee, by Estimated Value of Household Assets

WTP Bid Per Bucket (in TAS)		Value of Household Assets* (in TAS) 0	1-5,000	5,001-10,000	10,001-20,000	20,001-30,000	30,001+	Total
Sh 0-24	Frequency	75	34	18	14	8	5	154
	Percent	10	5	2	2	1	1	21
	Row Percent	49	22	12	9	5	3	
	Column Percent	26	21	22	14	13	13	
Sh 25-49	Frequency	95	51	25	29	16	9	225
	Percent	13	7	3	4	2	1	31
	Row Percent	42	23	11	13	7	4	
	Column Percent	33	31	30	28	27	23	
Sh 50-99	Frequency	47	27	12	20	10	9	125
	Percent	6	4	2	3	1	1	17
	Row Percent	38	22	10	16	8	7	
	Column Percent	16	17	15	20	17	23	
Sh 100+	Frequency	68	51	27	39	26	17	228
	Percent	9	7	4	5	4	2	31
	Row Percent	30	22	12	17	11	7	
	Column Percent	24	31	33	38	43	43	
Total	Frequency	285	163	82	102	60	40	732
	Percent	39	22	11	14	8	5	100

No. of Missing Responses = 97

Table A-49

Summary Statistics of WTB Bids, by Question Order of Bidding Games

Question Order (No. of Observations)	WTP Bid (From Open-Ended Questions)	No. of Observations	Minimum (TAS)	Maximum (TAS)	Mean (TAS)	Std. Dev.
Pay-by-the-bucket first; flat monthly fee second (369)	(i) WTP bid per bucket	369	0	10	0.79	0.93
	(ii) Maximum monthly expenditures with pay-by-the-bucket	359	1.0	450	69	67
	(iii) WTP flat monthly fee	367	0	450	35	38
Flat monthly fee first; pay-by-the-bucket second (374)	(i) WTP bid per bucket	374	0	5	0.80	0.85
	(ii) Maximum monthly expenditures with pay-by-the-bucket	355	3.0	560	78	82
	(iii) WTP Flat monthly fee	374	0	300	29	31

Table A-50

Summary of WTP Bids in Mkongi, by Opening Statements

Opening Statement (No. of Observations)	WTP Bid (From Open-Ended Questions)	No. of Observations	Minimum (TAS)	Maximum (TAS)	Mean (TAS)	Std. Dev.
A	(i) WTP bid per bucket	97	0.1	5	1.24	1.10
(97)	(ii) Maximum monthly expenditures with pay-by-the-bucket	97	12	480	113	99
	(iii) WTP Flat monthly fee	97	1	450	49	57
B	(i) WTP bid per bucket	110	0.2	5	0.93	0.83
(110)	(ii) Maximum monthly expenditures with pay-by-the-bucket	110	5	300	78	69
	(iii) WTP Flat monthly fee	109	0	100	33	28
Total	(i) WTP bid per bucket	207	0.1	5	1.08	0.97
(207)	(ii) Maximum monthly expenditures with pay-by-the-bucket	207	5	480	94	86
	(iii) WTP Flat monthly fee	206	0	450	40	45

Table A-51

Summary of WTP Bids, by Respondents' Attitudes toward Government Water Sector Policy

Respondent's Attitude (No. of Observations)	WTP Bid (From Open-Ended Questions)	No. of Observations	Minimum (TAS)	Maximum (TAS)	Mean (TAS)	Std. Dev. (TAS)
Respondents who ...						
(a) agree village should be be responsible for O&M	(i) WTP bid per bucket	57	0.1	5	0.94	0.89
(b) disagree gov't should provide free water	(ii) Maximum monthly expenditures with pay-by-the-bucket	57	10.0	300	91	70
(c) disagree every village will have water in 10 years (62)	(iii) WTP Flat monthly fee	56	5.0	300	47	52
Respondents who ...						
(b) agree village should be responsible for O&M	(i) WTP bid per bucket	285	0	10	0.89	1.0
(c) disagree gov't should provide free water (317)	(ii) Maximum monthly expenditures with pay-by-the-bucket	284	1.0	560	79	78
	(iii) WTP Flat monthly fee	284	0	200	35	29
Respondents who...						
(b) agree gov't should provide free water	(i) WTP bid per bucket	207	0	5	0.75	0.71
(c) agree every village will have water in 10 years (237)	(ii) Maximum monthly expenditures with pay-by-the-bucket	206	3.0	450	66	70
	(iii) WTP Flat monthly fee	207	0	450	31	39
Respondents who...						
(a) disagree village should be be responsible for O&M	(i) WTP bid per bucket	42	0	3	0.49	0.67
(b) agree gov't should provide free water	(ii) Maximum monthly expenditures with pay-by-the-bucket	37	3.0	300	55	66
(c) agree every village will have water in 10 years (47)	(iii) WTP Flat monthly fee	42	0	150	22	28

APPENDIX V

WASH Team Itinerary

APPENDIX V : ITINERARY OF THE WASH TEAM

Date	Activity
July 10	WASH consultant Dale WHittington arrives in Dar es Salaam; holds meeting with John Sigda on preparation for field work in Mtwara region.
July 11	Whittington, Sigda, Meena (MAJI), and Ruhiye travel to Mtwara.
July 12	Team holds meetings with regional government officials in Mtwara; travels to Newala town.
July 13	Meetings with Newala district officials; team makes first reconnaisance trip to look at possible study sites; Sigda departs on other business.
July 14	Whittington, Meena, and Ruhiye tour villages in Newala district in order to select sites for study, and hold meetings with village officials; Whittington begins drafting English version of WTP questionnaire.
July 15	Additional reconnaisance of possible study sites and meetings with village officials.
July 16	Whittington, Meena, and Ruhiye travel from Newala to Mtwara; Whittington finishes drafting English version of questionnaire; Meena, Ruhiye, and Whittington work on translation of questionnaire into Swahili, and enter the Swahili questionnaire into microcomputer.
July 17	WASH consultants Mujwahuzi and McMahon arrive in Mtwara; Mujwahuzi, Meena, and Ruhiye continue translation and entry of questionnaire.
July 18	Translation and entry of Swahili questionnaire is completed; stencils are cut of Swahili questionnaire and copies are made for pretest.
July 19	Study team (Whittington, Mujwahuzi, Meena, Ruhiye, and McMahon) travel from Mtwara to Newala, and hold first training session with enumerators.
July 20	Training of enumerators continues in morning; in the afternoon pretest is conducted in village of Lengo.
July 21	Meeting with enumerators to discuss the pretest; study team begins drafting revised questionnaire and makes final decisions on site selection.

Appendix V : Itinerary of the WASH Team

July 22 — Whittington and Meena travel to Mtwara to supervise duplication of final version of Swahili questionnaire; Mujwahuzi and Ruhiye meet with village leaders in Mtopwa to obtain permission to conduct the survey and to prepare sample of ten-cell leaders; McMahon begins the preparation of the dBase III programs for data entry.

July 23 — Whittington and Meena finish supervision of the duplication of questionnaire and return to Newala; survey is administered in Mtopwa in the afternoon.

July 24 — Whittington and Ruhiye hold discussions with village leaders in Mkongi and arrange for field work; sample of ten-cell leaders is selected in Mkongi Mujwahuzi, Meena, and McMahon supervise completion of survey in Mtopwa; McMahon begins data entry of Mtopwa questionnaires; study team begins analysis of data collected in Mtopwa.

July 25 — National holiday; study team holds team planning meeting and arranges schedule for the remainder of the field work; team finalizes the English translation of the Swahili questionnaire; McMahon completes entry of data from Mtopwa and prepares summary of results; Whittington and Mujwahuzi travel to Mtwara.

July 26 — Meena, Ruhiye, and McMahon supervise administration of survey in Mkongi; Whittington and Mujwahuzi supervise duplication of additional copies of the questionnaire in Mtwara and then return to Dar es Salaam.

July 27 — Meena, Ruhiye, and McMahon supervise administration of questionnaire in Mkongi; Whittington briefs USAID Mission Director Joe Stepanik on preliminary study results.

July 28 — Meena, Ruhiye,and McMahon supervise final day of field work in Mkongi; Whittington, Sigda, and Mujwahuzi meet to discuss plans for report preparation; Whittington begins drafting portions of the report.

July 29 — Meena, Ruhiye, and McMahon supervise administration of questionnaire in Mkonga.

July 30 — Meena, Ruhiye, and McMahon supervise administration of questionnaire in Juhudi; Whittington, Sigda, and Mujwahuzi meet in Dar es Salaam to discuss

Appendix V : Itinerary of the WASH Team

	preparations for workshop in Newala on the results of the study.
July 31	Day off for enumerators; McMahon enters some data from questionnaires and prepares materials for briefing for District Commissioner and USAID. Whittington departs Dar es Salaam.
August 1	Meena, Ruhiye, and McMahon supervise administration of questionnaire in Mnyambe.
August 2	Meena, Ruhiye, and McMahon supervise administration of questionnaire in Nanda.
August 3	Meena, Ruhiye, and McMahon brief District Commissioner on preliminary study findings and travel from Newala to Mtwara.
August 4	Meena, Ruhiye, and McMahon return to Dar es Salaam.
August 5	McMahon briefs Paula Tavrow on the preliminary study findings and packs questionnaires for shipping.
August 6	McMahon departs Dar es Salaam.

APPENDIX VI

Report on October 1988 Workshop on Cost Recovery in Newala District

PROGRAMME FOR WORKSHOP ON OPERATION AND MAINTENANCE COST RECOVERY FOR KITANGARI WATER SUPPLY, NEWALA DISTRICT,

12-13 OCTOBER, 1988

PARTICIPANTS

1.	Capt. G.H. Mkuchika	District Commissioner, Newala
2.	Mr. Seif Athman	Reg.CSD Coordinator, Mtwara
3.	Mr. M.B.E. Mtunzi	Regional Water Engineer, Mtwara
4.	Mr. A.M. Rugashumba	S.P.E.E. (Operations), MAJI Hq.
5.	Prof. Mark Mujwahuzi	IRA c/o University of DSM
6.	Mr. Erkki Tiainen	FINNWATER, Mtwara
7.	Ms. L.T. Boma	Katibu/H/Umma (W), Newala
8.	Mr. S.A. Marando	Chief Accountant, MAJI Hq.
9.	Mr. A.I. Shayo	Engineer, RWE's Office Mtwara
10.	Mr. D.R.M. Ruhiye	Central Bureau of Statistics, DSM
11.	Mr. H. Meena	Planning Officer, MAJI Hq.
12.	Mr. G. Nyembela	SHIHATA
13.	Mr. Joel Strauss	USAID
14.	Mr. Joseph Stepanek	USAID
15.	Mr. M.E.N. Busuna	Planning Unit, RDD Mtwara
16.	Mr. S. Bakari	Reg. Comm. Dev. Officer, Mtwara
17.	Mr. K. Ndolela	SHIHATA, Mtwara
18.	Mr. T.H. Mtonga	Region Agriculture Office
19.	Mr. S.A. Nalinga	Member of Parliament, Newala
20.	Mr. C.S. Lai	Mwenyekiti wa Halmashauri (W), Newala
21.	Mr. P.O. Jenga	DED, Newala
22.	Mr. S.U. Mwainyekule	DPLO, Newala
23.	Mr. S.S. Nandonde	Member of Parliament, Tandahimba
24.	Mr. Halinga	Katibu wa CCM (W), Newala
25.	Mr. S.A. Mkuvenda	Mratibu wa CSD (W), Newala
26.	Mr. J.M. Sigda	UNICEF, Dar es Salaam
27.	Mr. W.K.M.M. Samaya	District Water Engineer, Newala

- Cost recovery for operating and maintaining the Kitangari scheme is vitally important because there are no other water sources and because the central government has not been able to operate the scheme satisfactorily.

- The willingness-to-pay report's findings were accepted by the District, Regional and Ministry of Water participants.

- The District Council has requested that the now defunct Makonde Water Corporation be revived and begin operating and maintaining all the schemes on the Makonde Plateau as well as collecting revenues.

- A steering committee has been appointed, chaired by the Newala District Executive Director, and a plan of action agreed upon.

P R O C E E D I N G S

12 NOVEMBER, 1988

The District Commissioner, Capt. Mkuchika officially opened the workshop as the Chairman of the meeting. He opened by apologizing to the participants especially those who came from outside Mtwara Region that many facilities were not available in Newala but they should try and bear with the situation. He began explaining the history of Newala's water problems by saying that geography was the main cause, i.e., the Makonde Plateau has no surface water. Due to this geographical factor, Newala was one of the first districts to establish a native authority in order to solve their severe water problems in 1954. Thus the Makonde Water Supply Corporation was formed and the native authority managed to get a loan from the British Government to build a water supply for the district.

The Mkunya-Makote Pumping Stations were built and started providing water to the villages and district headquarters. Problems began again in 1969 when the operation and maintenance of the Makonde Water Supply was taken over by the Central Government. People no longer paid for their water nor to maintain the system. Funds were insufficient and there was little foreign exchange, so the system began to deteriorate.

Thus, the District Commissioner explained that the workshop's purpose was to discuss the research report on "willingness-to-pay" for the operation and maintenance of the Kitangari scheme. The research was done here during July and August when people were paying as much as Tshs. 50/= per bucket. The elders council recently advised the District Government to re-establish the Makonde Water Cooperation. The District Commissioner then opened the meeting.

Mr. Sigda's presentation followed. The District Commissioner invited Mr. Sigda to give the summary of the report's findings.

Mr. Sigda began by explaining the background to this study The need for the study first arose two years ago during his first visits to the region when he observed that many women were waiting for water in long queues in Kitangari scheme villages. Why was this happening?

It became increasingly apparent that water continued to be a severe problem particularly after the Health and Nutrition campaign in November 1987. It showed that Newala had the highest percentage of young children with severe malnutrition in the region. This malnutrition is directly caused by the very long distances which women must travel in search of water. This meant mothers had little or no time to feed and care for their children.

After inquiring, it became clear that the scheme was not functioning regularly, as it had been designed. Delays in purchasing and transporting fuel were very common and unnecessarily so. The CSD Regional Coordinator and other government officials began to seek an immediate solution. Consequently, UNICEF, after assessing its own ability to contribute, proposed that the USAID Mission to Tanzania fund an experienced study team from the WASH (Water and Sanitation for Health) project to come to Newala and to help investigate possibilities for village-based cost recovery. The USAID Mission agreed to assist and the team arrived in Tanzania in July, 1988.

The study under discussion had three objectives:

1. to determine if beneficiaries were willing to contribute towards meeting operation and maintenance costs;

2. to determine how much they could contribute; and

3. to determine what type of cost recovery system they prefer.

The results clearly showed that villagers are indeed willing to contribute to meeting the running costs. 82% of the 829 people interviewed felt that villagers should be responsible for operating and maintaining their water supplies. The study also established that villagers were both willing and able to pay at least the fuel and fuel transport costs. Nearly 90% said they could afford to buy all the water needed if it were sold at 50 cents per 20 litres. 72% said they could do so if the cost were 1 shilling. The study also shows that 45% of the respondents preferred a system like the Makonde Water Corporation to operate and maintain the system and to collect revenues.

The remainder were roughly equally divided in preference between the central government and the district government.

He explained that if the Kitangari Scheme functioned as planned, roughly 240,000 more man-months per year would be freed up for child care, agricultural production and other activities.

Mr. Sigda then invited Mr. Meena to describe the study's approach.

Mr. Meena described how the team developed the survey questionnaire, pre-tested it, revised it with the help of the enumerators and then began to apply it in six villages. The villages were chosen so that some came from areas with good water supply reliability, others with moderate reliability and others with poor reliability. The questionnaire was divided into three sections:

1. Household water use and practices;

2. Two bidding games;

3. Household socio-economic status and people's attitudes towards government water policies.

He then described the different bidding games and how they were conducted. Mr. Ruhiye described the sampling techniques used, particularly with regards to minimizing biases.

Mr. Sigda elaborated further by explaining that this survey technique had been developed to assess people's ideas on the value of goods not available in markets: for example, clean air, clean water, etc. This approach had already proven very useful for water supply operation and maintenance cost recovery in other developing countries: for instance, Nigeria and Haiti.

Mr. Sigda then summarised the results of the survey. Regarding the problems faced by villagers, between January and July 1988, the Kitangari scheme did not pump for two and a half months (72 days) and during the 1988 dry season (May-July) it did not pump for 36 days.

The impacts were quite severe on the majority of women. Per capita water consumption dropped from 18 litres/day when the system worked to 8 litres/day when it did not function. One third of the respondents said they used only 4 litres/day per person, regarded as the bare minimum for life. He also noted that the World Health Organization had set the minimum water required for good health to be 30 litres/day/person. The time spent in travelling, queue and walking home averaged between 7 - 11 hours during the dry season.

For those who did not want to or could not spend so much time there were two options: to buy from rainwater tank owners or to buy from vendors. The average price per 20 litre bucket from rainwater tanks was 9/= while that from vendors was 12/=.

Towards solving these problems, the study clearly showed that villagers were willing and able to cover at least the fuel costs. The great majority also believed it was their responsibility to cover the operation and maintenance costs. Women were willing to pay substantially more than men, and people who could read a newspaper easily also were willing to pay more than those who could not easily read a newspaper; Nearly 60% preferred paying by the bucket.

After Mr. Sigda's presentation on the findings of the study the District Commissioner agreed with the findings and proposals of the research and said that the Makonde Water Corporation should be revived in order to carry out the cost recovery.

The District Party Chairman agreed with the findings but he insisted on the formation of a corporation similar to the Makonde Water Corporation. One Member of Parliament wanted to know the role of government and donors in implementing the scheme.

To answer his question the District Commissioner said that government will have to give a subsidy to the corporation whenever the need arises. He gave his opinion that the money collected in this approach might not be enough to meet the total cost and hence the need for government subsidy. He said that the role of donors is considered as the role of the government since it is the Central Government which looks for donors.

The Head of Operation Section, MAJI wanted to know whether the rates of 1/= per bucket has any relation with the prevailing rate which has been approved by the government and is used elsewhere in the country? To answer this question it was pointed out that the water problem in Newala should be treated differently from any other place. This is because the cost of producing the water is very high, especially if one considers the pumping required from below the escarpment - Mkunya, up to the booster station, Makote, and then onto the plateau which requires enormous inputs.

One Member of Parliament reminded the members that during the time when the Makonde Water Corporation was in existence people in Newala used to pay three types of taxes i.e.:

1. the Head tax;
2. a share to Makonde Water Cooperation (10/=)
3. the fee of purchasing water by bucket.

This experience has been different from any other place and during that time people used to get sufficient water, and the corporation had no financial problems.

It was pointed out that the aim of cost recovery is to enable the people to contribute towards operation and maintenance, and if the money collected won't be sufficient to cover the total costs the government will have to subsidize.

One member suggested that this workshop should not be too concerned over costs, and that the workshop concentrate on the cost recovery systems and options and take the proposals to the central government. If the central government agrees with the proposals then the determination of costs of producing the water would be approached.

The DWE wanted to know whether the cost recovery system in question is being proposed for Newala or the entire country. He was told that these discussions concerns Newala District only, and the cost recovery system being designed is for Newala District

The Workshop then broke for lunch

Prof. Mark Mujwahuzi was called upon to make his presentation on the proposed system of cost recovery to be used in the Kitangari Water Supply Scheme.

In summary the following were the main proposals on how to raise the revenue. The speaker observed that the WASH alternatives of revenue generation have been overtaken by the District leadership decision on selling Kitangari water by the bucket. Therefore there was no need for the workshop to dwell on other alternatives such as payment by the flat rate. The speaker observed that the workshop should concentrate on the issues of how to operationalize the system of pay-by-the bucket.

Since the theme of this topic was cost recovery for operation and maintenance the speaker wanted the workshop to resolve the question of whether the revenue to be collected through the sale of water is intended to cover the total cost of operation and maintenance or it is simply a contribution towards meeting such costs of the scheme.

The other point raised concerned the participation of the beneficiaries in the running of Kitangari scheme. This point was raised after observing that the management of Kitangari scheme should be in the hands of an independent body working under the authority of the District Council. It was therefore proposed that to enhance the country's policy of participation of the beneficiaries in development projects water committees should be formed both at village and ward levels. Each village water committee in a ward would send a representative to a ward water committee and a representative from ward water committee would sit on the Kitangari Management Body.

At scheme level it was proposed that the body to be formed should have at least two major departments:

- the finance department; and
- the technical department.

These departments would have working relationship with both the District Council and the Ministry of Water. The main interrelationship with MAJI would be advisory and support in technical matters that are beyond the capability of the managing body and the district.

On the issues of revenue collection the speaker wondered whether it would not be possible for the villages in Kitangari scheme to have other revenue generating projects which would in addition to money raised through sale of water, contribute additional funds for the operation and maintenance of the project. Furthermore, it was stressed that in collecting revenue through sale of water concrete plans should be made that the intended beneficiaries do get satisfactory service and at the same time ensure that the collected revenue is not lost to the project.

After the presentation discussions followed. The District Commissioner put the question to the participants: The issue is to contribute to the costs or pay the full costs? In answer to this question it was intimated that the policy as regards other social sectors points to contribution by beneficiaries. Clarifying further, the Regional Water Engineer said that the technology used in a water scheme will be a determining factor on whether people should contribute or meet total costs of Operation and Maintenance. That is, if the technology is complicated and the cost of running the scheme is high the beneficiaries will be expected to contribute to the costs. Whereas if the scheme is small the technology is simple and the costs are low, then the beneficiaries are expected to meet the total costs.

On the question of organization structure the new water policy requires every town should have a water body which will operate under the council. The idea of having body to manage the water business was regarded as appropriate and it was recommended that these boards should be under the councils.

On the question of water committees it was pointed out that the water policy requires to have such organization at village, district, and regional level. The policy requires the formation of the water fund. Therefore, wherever a village water committee is formed it has automatically to start a water fund.

It was stressed that it will be necessary to develop a good strategy of revenue collection. Otherwise the cost of collecting revenue could be very high.

The method for revenue collection was recommended to be through the sale of water from kiosks. If that is the case, kiosks have to be built or rehabilitated to ensure that water is properly distributed and revenue collected is kept safe. Since there have been kiosks in some villages which are now served by Kitangari Water Scheme, it was recommended that these kiosks should be rehabilitated.

Although the workshop was organized to discuss the draft report on Kitangari Water Supply Scheme it was pointed out that the question of sale of water which has been recommended for this scheme should apply to other schemes in Newala District. It was observed that application of the approach of selling water will not bring any difficulties, since the residents of Newala District have prior experience in buying water.

Very heated discussions followed on the question of the formation of an organization which is expected to run the project. The debate centred on the name of that body. It was not clear whether the new organization should be called "A BOARD", an "AUTHORITY" or "A CORPORATION". After a lengthy discussion the district leadership clarified the issue by saying that what they want to be formed in Newala should be much like the "Makonde Water Corporation". They added jokingly that they don't care what you call it as long as its intrinsic functioning does not depart significantly from that of the earlier corporation. It was further pointed out that although the workshop talked about the formation of a new water body as a matter of fact the Makonde Water Corporation was legally still alive.

What happened in between is that its activities were taken over by MAJI although the Act establishing it had never been repealed.

The workshop members deliberated at length on how water had been sold during the Makonde Water Corporation era and how problems of sales, revenue safely and employment were solved. It was concluded that if the sale strategy is adopted, there is a wealth of experience on this strategy in the district that could beneficial to the new cost recovery scheme.

On the formation of the new body in likeness to the Makonde Water Corporation a question of contradiction was raised. It was pointed out that the Makonde Water Corporation operated on a total cost recovery basis. Now, will the proposed body operate on the same principles? In answer to that question the District leadership insisted that the likeness between the proposed body and the Makonde Water Corporation will be in the structure but not in the total strategy of cost recovery. Therefore the district will continue asking for subsidy as needed from the Central Government for Kitangari. It was also pointed out that capital investment in machinery, technology will continue to be made by Central Government.

Some participants wanted to know the percentage of costs of running Kitangari which will be met by the District and the beneficiaries. Answer could not be given during the workshop, but it was pointed out that the percentage contribution would be known after the proposed organization gets into action.

As regards formation of committees, it was noted that such social committees have already been formed in the villagess What remains is to draw the attention to water activities. Thus, a village water committee will be a sub-committee of the village health and social welfare committee.

A question was raised on the relationship between the village water committee and the proposed body to run the Kitangari Water Scheme. It was pointed out that the committee will establish communication link with the managing body of Kitangari and will also act as a watch dog for the project in the village. And they will also ensure that there is good water service in the village.

The question as to whether villages can start other projects which can generate revenue for water projects was answered by saying that there is no possibility for the success of such undertakings now. Following on this observation it was pointed out by the District leadership that no village in the District is now able to assume responsibility for paying for water. Therefore, the District finds it appropriate to sell water to the village people by the bucket.

It is understood that some 14 villages in Mtwara District get water from Kitangari project. The question of how these villages will pay for water, will be discussed between Newala and Mtwara Districts leader.

Lastly, the Chairman appointed a group of experts to draw up a plan of action for the next several months. The group, which included the RWE. E. Tiainen (Finnwater), DPLO, RCDO, Head of Operations - MAJI HQ, Mr. Meena, and J. Sigda (UNICEF), was to meet the following morning at 08:00am. Their draft would be discussed beginning at 11:00am. The workshop was closed for the day.

13 OCTOBER, 1988

The Chairman opened the meeting at 11:26AM by inviting the Secretary of the planning group to brief the workshop on their recommendations for the work plan.

The Secretary explained that they prepared the work plan by trying to point out the important activities to be undertaken, the individuals who would be responsible in implementing them and the time schedule.

It was pointed out that the following would be done:

1. To compile a database for all the villages being served by the scheme. In doing so the number of registered villages should be established, the population data should be obtained, preferably the 1988 census data, number of DPs which are working and which are not working, distances to DPs, the number of institutions like dispensaries, Rural Health Centres, schools, etc. Sketchmaps of the villages should be drawn to show the DPs, institutions, residential areas etc.

   To measure the water consumption by using water metres in order to establish patterns of water usage.

2. The data should be analyzed and water demand analysis for 5 - 10 years should be established.

3 An engineering survey of the scheme should be conducted in order to establish the discrepancies between designed capacity and actual performance. This will help in making cost recovery more effective.

4. To establish ways of strengthening the village management skills. This will involve:-

   - assessment of needs;
   - curriculum development;
   - training of trainers;
   - actual training.

5. To plan for Makonde Water Corporation. Prof. Mujwahuzi with the Ministry of Water would plan the structure of the corporation - including staffing levels and job descriptions

6. To establish the current operation and maintenance costs for the:

   a. Pumping stations;
   b. Distribution lines;
   c. Administrative costs.

7. Overall coordination. A Steering Committee with members from the district authorities the Ministry of Water, and donor agencies.

After Mr. Sigda's presentation, the Chairman opened discussion on the proposed plan of action.

It was pointed out that the data base discussed in the report concerns Kitangari only while the problem in question concerns the whole of Makonde Plateau. This needed clarification.

In answer, it was suggested that the data should be collected to cover the whole plateau. However, the data should be collected separately starting with the Kitangari scheme and also do the same for Mkunya-Makote, Mahuta, Mbwinji etc. The data should be obtained separately because they may be used at different times. The suggestion was unanimously agreed upon.

Concerning metering the villages it was suggested that data for seasonal variation of water usage in dry and rainy seasons are needed urgently.

The question of who should pay for water used in institutions like dispensaries, Rural Health Centres, schools, etc. posed a problem since this could not be fairly left to the village where the institution is situated. It was suggested that the district council should pay for the water used in the institutions. However, the water used by employees should be paid by themselves.

It was explained that the engineering study of the scheme is aimed at discovering the problems which hinder the efficient operation of the scheme. It was pointed out that the scheme is not operating as planned. There are queues at the DPs and to fill a bucket of water takes up to 4 minutes and this needs a study to establish shortfalls of the scheme and propose remedies to government as soon as possible.

Workshop participants wanted to know whether there are plans to electrify the Kitangari scheme so that the operational costs might be minimised.

It was pointed out that the question was not considered when the scheme was constructed, and it has not been taken into account. However, it was suggested that [illegible] analysis should be done to compare the costs for using diesel and those of installing and using electricity.

It was noted that there are some villages in Kitangari scheme where the Old Makonde pipeline is still used, and therefore it was suggested that this should be studied to see if there are pipe blockages due to deposits and if there is a need to replace the pipes.

As regards to training, it was pointed out that on the job training for technicians should be emphasized at the scheme since nowadays the scheme has a very big shortage of technical staff.

It was suggested that the FINNWATER expatriates should transfer their skills in the new machines at Kitangari to the local staff. It was also noted that some technical staff do not like to stay at Kitangari and some have quit their job. It was suggested that the Kitangari site should to developed to encourage people to live there by establishing recreation centre, market, canteen, etc.

It was pointed out that the problem of technical staff is a serious problem faced by the Ministry of Water. There are few engineers at ministerial level to the project levels, and the Ministry is trying to solve the problem by recruiting more engineers. There are also problems in technical equipment like radios, vehicles etc.

Regarding the Steering Committee it was agreed that the District Executive Director will be the Chairman and the Resident Engineer would be the Secretary. Other members include:

the UNICEF Project Officer WES, Project Coordinator for FINNWATER, Director of Operation and Maintenance Ministry of Finance,

the CSD Coordinator Mtwara, The District Planning Officer, Regional Community Development Officer, The District Community Development Officer, and the Regional Water Engineer.

The time schedule:- it was agreed that the engineering study should be completed on May 1989. The draft of organizational structure of the corporation should ready in 6 months time. The administrative costs should be available in December, 1988. The Steering Committee should have its first sitting in January, 1989.

TRIP REPORT
MTWARA REGION
12-16 OCTOBER, 1988

16 October, 1988

I. OBJECTIVES

To participate in the Kitangari Water Scheme Operation and Maintenance Cost Recovery Workshop.

To visit the Makong'ondera Rock Catchment site and discuss progress and immediate plan of action with regional and district officials.

II. SUMMARY

A. Operation and Maintenance Workshop

The workshop was held as scheduled on 12-13 October 1988. Participation, especially from Newala District government and party leaders, was very good. The main points agreed were:

- The region and district participants accepted the results of the willingness-to-pay for operation and maintenance cost recovery study.
- The District Council has agreed to revive the defunct Makonde Water Corporation and invest it with all responsibilities for collecting revenues, operating and maintaining the scheme.
- A coordinating group was established with the task of overseeing the development and establishment of the Makonde Water Corporation. The group includes representatives from the district council, the region, the Ministry of Water, UNICEF, and FINNIDA/FINNWATER.
- A plan of action was drawn up and agreed to (see attached proceedings).

B. Makong'ondera Rock Catchment

On Friday, 14/10/1988, I travelled to the site together with Mr. A Shayo, Design Engineer - Maji (M); Mr. Nambuta, District Water Engineer (Masasi); Mr. Selemani, Masasi District CSD Coordinator; and Mrs. Manooa, Masasi District Secretary for Social Services. After briefing the DED and the District Council chairman, we drove to Makong'ondera, collecting the Likokona Ward Secretary en route.

At the village we learned that they had not yet excavated to bedrock as we had agreed on 2/10/88. The Maji technician on-site, Mr. Waziri, explained that there were two major problems: no sledge hammers nor pry bars and poor community participation. They had removed a good quantity of stone from the proposed dam wall site, but had not yet reached bedrock. The Katibu wa Huduma za Umma called a meeting of the entire village government to discuss these problems. Eventually it was agreed that the tools would be brought from Mtwara on Tuesday, 18/10/1988, by Mr. Waziri and that the village government would better organize the villagers so that at least 20 people would work on the site each day. It was also agreed that the village would pay FINNWATER the subsidized price of 1000/= for a pump repair kit for their four shallow wells. The wells, while not sufficient for the village's needs, will provide sufficient water for the dam wall construction. I will follow up on the procurement status of the three project SCFs.

Mr. Shayo and I agreed to the final design for the dam wall: it will be an arc wall roughly 8 meters in height. The first two meters will be made of concrete with stone masonry fronting and 12mm iron bars cemented into the crevasse walls. The next two to three meters will be a sandcrete block wall, at least three blocks wide, reinforced with 10-12 mm roundbars. The final reach will be a sandcrete block wall one block thick capped with a reinforced concrete beam. This design will help reduce on-site labour because not only can the blocks be made close to the shallow wells, but it will reduce the amount of concrete required when compared with a gravity wall design. Mr. Shayo will work out the drawings and bill of materials when he returns to Mtwara from redesigning the Mkunya pumping station.

Meanwhile, Professor Mujwahuzi, D. Ruhiye and H. Meena were unable to complete the follow-up on the willingness-to-pay study because the Newala district officials refused them transport. It seems that the DED took the CSD vehicle (blue TX plates) to DSM to collect materials for the councillors' election even after he had been informed by the Regional CSD Coordinator that this was forbidden by the terms of the vehicle loan agreement.

On Saturday we returned to Mtwara, where I met with the Regional CSD Coordinator and Regional Water Engineer to inform them about the requirements for the Makong'ondera rock catchment scheme.

On Sunday, 16/10/1988, we returned to Dar es Salaam.

cc: LW, RM, LA

File: DAR WAT P.29

File: DAR WAT P.6


WASH