

MALAWI: CLEAN WATER FOR
THE RURAL POOR

by J. Gus Liebenow



Water-borne diseases regularly afflict 85 percent of the world's rural population who lack safe water. In Malawi the successful Mulanje water project demonstrates the importance of community involvement and self-help in overcoming this obstacle in the path of agricultural development.

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The United Nations campaign to make the decade of the 1980s the "Clean Water Decade" is not only one of the most ambitious development undertakings of the world organization, but it is also one of the most crucial in terms of overcoming the conditions of rural poverty in Africa and elsewhere. Approximately half the globe's population is without dependable sources of safe water. Only 15 percent of the world's rural population have adequate sanitation facilities to protect water purity. These two problems are particularly acute for sub-Saharan Africa, where the overwhelming majority of the population lives in scattered villages and isolated rural homesteads. The lack of safe water sources and satisfactory sanitation directly and indirectly affects many facets of human existence. The UN has chosen to focus on the link between safe water and good health and has designated the United Nations Development Program (UNDP) to coordinate the activities of various other UN and related agencies—including the UN International Children's Emergency Fund (UNICEF), the World Health Organization (WHO), the International Labor Organization (ILO), the World Bank (IBRD), and others.

The concomitance of clean water and health is demonstrated by WHO statistics showing that over 80 percent of the diseases afflicting mankind are water-related. These include, of course, the more obvious illnesses (common diarrhea, amoebic dysentery, typhoid, and cholera) which are directly contracted by drinking impure water. They also number, however, a whole range of human diseases for

which water serves as the breeding ground for the intermediate host in the disease transmission cycle, the more devastating of which are the malaria and yellow fever transmitting mosquito; the black fly (*simulium damnosum*), which has helped spread river blindness (onchocerciasis) over vast areas of Africa; and the varieties of snail which serve as the alternate host in the spread of schistosomiasis, or bilharzia.¹ Ironically, as man, in pursuit of development, starts impounding water for hydroelectric power, expanding production of rice and other water-fed crops, providing supplies for cattle, or even, ironically, attempting to secure a source of pure water he may unintentionally escalate the incidence of water-related diseases among the very people the development schemes are intended to help.

The original price tag of \$140 billion the UNDP put on the accomplishment of the decade-long goal was roughly four times that which governments and other agencies were spending on water development at the end of the 1970s. Inflation, particularly with respect to the cost of oil, has caused the cost estimate to skyrocket. In any event, it was clear that the UN—which, after all, depends for its revenues on contributions by member states—would require extraordinary outlays of funds from the governments of the more developed states as well as from private donor agencies if it were to accomplish its task.

Achieving the goal would also require additional commitments of human and financial resources from the states which would be the direct beneficiaries of such a program.

Such commitments can require severe sacrifices among competing development projects. The potential severity of such sacrifices especially in the poorest nations in Africa is revealed in the fact that two-thirds of the members of the "Fourth World" (those countries existing at or below the subsistence level of survival) are located there. These new states may have various priorities; yet, it is no longer a question of whether the developing countries should give higher priority to this single goal—it is a certainty. For the annual loss of life, particularly among the very young, and the loss of productivity of the working population through high absenteeism due to illness serve only to retard *all* progress and to put these least developed states even further behind in the struggle to raise the quality of life from the floor of subsistence.

The Malawian Effort

One of the more instructive cases in the pursuit of the goal of clean water is that of Malawi in Central Africa. It is instructive, first of all, because Malawi has lacked the ingredients necessary for industrialization and even the mineral wealth with which many of its central and southern African neighbors have been endowed. Its efforts to overcome poverty are based largely on attempting to improve productivity in agriculture. Indeed, those who knew Malawi—or Nyasaland as it was then called—during the colonial era tended to be extremely pessimistic about its prospects for overcoming poverty.

Malawi is instructive also because it has had a history of recurrent drought. Although the shores of

Lake Malawi and the other smaller lakes (which make up roughly a third of the area under Malawian jurisdiction) have for over a thousand years at least served as a refuge during times of severe drought in Central Africa, they did not help many of those living on the plateau or in the mountains.² Indeed, in ancient times the people of this area were constantly overrun by waves of immigrant invaders who came to the lake area for survival.

Today, most of Malawi's 5,547,460 citizens live at altitudes of roughly 3,000 feet or more above sea level. In the past, limited technology and resources to trap water allowed most of the rainfall (an annual average of 51.6) to escape down the escarpment where it was ultimately carried to the Indian Ocean through the rivers of Mozambique.³ Even under the best of circumstances, the search for water during the five months' dry season was a challenge that absorbed the energies and ingenuity of Malawians—particularly the women. When the rains failed to come—as happened in 1949—the human tragedy almost defied description. Many of the older generation vividly recall 1949 as the year when uncouneted thousands in the colonial protectorate either died or fled the territory in search of food and water.

Third, Malawi is an important case because of the firm commitment of its national leadership to attack the problems of rural poverty. Some measure of the success of this, Life President H. Kamuzu Banda's chosen course, is revealed in the fact that the 1980 drought, which blanketed eastern Africa from the Sudan to South Africa, had less severe effects in Malawi than in most countries of the region because of Malawian agricultural policy. Dr. Banda's efforts to achieve self-sufficiency in food production (a goal which eludes most African leaders today) are premised not only on increasing the quantity and quality of production, but also on providing enhanced marketing and storage facilities for food crops. Thus, although the 1980 drought severely depleted Malawian food reserves, the country was not forced to import massive quantities of food as were Tanzania, Mozambique, and Zambia.

Further, far fewer Malawians now must migrate in search of water than was the case in the colonial period, another direct outgrowth of Dr. Banda's long-standing commitment to eradicate rural poverty. Unlike other leaders in Africa with rhetorical commitments to such a goal, Banda has focused his development efforts on increased productivity in agriculture, fishing, forestry, and other rural economic activities. Even before the UN "Decade of Clean Water," Dr. Banda committed the Malawian government to improving the supply of clean water to the rural countryside in both good years and lean years to enhance the quality of rural life and thereby keep people in the areas of the country where they could be most productive. The task has been an enormous one, considering that most Malawians live in dispersed rural settlements far from the major lakes. The program has been imaginative. In addition to using gravity-fed systems (the principal subject of this *Report*), the government has invested in pumping water from Malawi's lakes and rivers, and has built dams (most significantly to provide water to the new capital city of Lilongwe). Further, between 1968 and 1978, the number of boreholes drilled and maintained by government for rural communities grew from 1,615 to 3,655.⁴

The Malawian focus on clean water, however, also ties in with two other priorities that President Banda set for his country even before Malawi's independence in 1964, his concerns for children and women within his strategy for development. Infant mortality in colonial Nyasaland was much worse than was officially recorded. And indeed, as recently as 1976, 25.1 percent of recorded deaths were of children under the age of one year, with an additional 55.3 percent in the one to four-year age bracket.⁵ Malawi's innovative "Under-5 Clinics" were created to combat the situation depicted by these appalling statistics. As the Principal Secretary in the Ministry of Health told me, these clinics were concerned with the connection between clean water and infant survival.

The significance of the quest for clean water in changing the role of



Woman carrying water from the village tap in a traditional clay pot.

women in development should be apparent to anyone who has visited rural Africa in the dry season. It has been even more obvious in Malawi, where the exodus during the colonial era of thousands of young males seeking employment in the mines of Southern Africa (a phenomenon which has been considerably curtailed since independence) left many women de facto heads of households. In addition to fulfilling parental and occupational roles women were forced to make a considerable investment in time and energy during the dry season to the relentless search for and fetching water. Quite apart from what the carrying of 25 pounds or more of water on one's head does to the spine, the time spent by women in digging into the sand of seemingly dry riverbeds could have more creatively been devoted to providing better care to the children, in supplementing the family income, or even pursuing independent careers in government or the private sector.

The Mulanje Water Scheme

While the Malawian gravity-fed water system now serves the needs of an estimated 418,300 people in 13 districts in the Northern, Central, and Southern regions (and will serve an additional 303,000 by 1985), this *Report* focuses on the development

in Mulanje District, where the first major efforts took place.⁶ Today, over 268,000 people in the district now have clean water no farther than one-quarter of a mile away from any homestead.

Upon visiting the Mulanje for the first time in mid-1980, I found myself quite unprepared for the beauty of the terrain and particularly the majesty of Mulanje, southern Africa's highest mountain, which rises more than 9,000 feet above sea level. The sight of the mountain stirred within me long dormant romantic memories based upon my 1952 reading of Laurens Van Der Post's *Venture to the Interior*. The South African journalist/novelist had visited Mlanje (as it was then spelled) on behalf of the British Overseas Food Corporation, though disappointingly, it is unknown whether he made a positive or a negative recommendation about the food-growing potential of the area around Mulanje or whether anyone in Britain or the Colonial office really cared. His vivid descriptions of the magnificent mountain and the treacherous *chipero* fog which bathed its upper reaches during a good part of the year, however, leave a lasting impression.

What Van Der Post did not include in his 1949 account of the mountain and Mulanje district, moreover, was the contrast between the sheer physical beauty of the terrain and the dreadful poverty of the inhabitants of that part of the British protectorate. Indeed, Nyasaland was often referred to as one of the "Cinderellas" of the British Empire in Africa, and the Mulanje District as among the poorest of the poor. Poverty and the absence of wage-earning potential in the district, combined with its location in the areas most accessible to South African mine labor recruiters, early on imposed a pattern of migration of young males who worked for extended periods in the mines of South Africa and what are now Zambia and Zimbabwe. Most of the districts' cultivated land was devoted to a single crop: maize. Failure to rotate crops (plus other factors) has made it one of the least productive districts of the country—roughly half the yield per acre of the most prosperous districts. Of the 24 districts identified in both the 1966 and 1977 censuses, it had the fourth

highest density of population (350 persons per square mile) and the second lowest rate of growth (1.8%, compared to 2.9% nationally). Its educational level in the 1977 census was among the lowest in the country and its incidence of disease was among the highest. In many respects it was a natural target for needed change.

Although there are literally hundreds of thousands of Malawians who deserve credit for the improved conditions in Mulanje's water situation—from President Banda to the women and children who helped dig the trenches for the piping—there seems to be consensus among Malawians and expatriates alike that one individual should be singled out for special mention, a modest British expatriate, L.H. Robertson. During my interview with him in May 1981, he kept stressing the community development aspect of the Mulanje scheme; nevertheless, his technical ability from his training as an army engineer (which preceded his coming to Malawi as a Presbyterian Church of Scotland missionary in the 1950s) was a factor in realizing the potential of the district in resolving its recurrent problem of water shortages during the dry season. As he said to me, "It often troubled me to see water cascading down the mountain side during the dry season literally within view of thousands of people who had no water at all—let alone water fit to drink. I felt it was my mission to bring the two aspects of the situation together." Deciding that he could serve God as effectively by working for the government as a water engineer as he could in his role as a missionary, he crossed over and is still involved in 1981 with the expansion of the gravity-fed scheme.

Robertson realized that the district, despite its seasonal water shortages, was relatively well endowed with rainfall (roughly 60 inches a year). This was more than sufficient to keep the streams originating high up Mulanje Mountain flowing the year round. This simple realization was to change dramatically the lives of the people in the district. As one of our Malawian friends born in the district said:

The absence of water during the dry months meant that my mother had to get up before dawn and start the

search for water before we took off for school. Often she had to travel many miles to a riverbed and dig through the sand with a metal cup until she came to the water level. It often took hours of digging and dipping until she had enough water for the cooking and drinking. There was never enough for bathing or washing our clothes even though we insist on bathing daily during the rain season.

And as Mr. S. Phiri, who is one of the current supervisors of the project, commented:

It was not until I went off to boarding school that I realized that I did not actually have to suffer from dysentery during the dry months. I thought it was a natural state of affairs associated with the change in the weather. We used to drink green brackish water like that over there [pointing to a stagnant pool].

Even where wells had in the past been dug, the denseness of the population often meant that they were seriously polluted by human waste where they had not gone dry.

The genius of the Mulanje and other gravity-fed water schemes is that they work with, rather than against, nature. The primary source of energy is gravity, and thus there is no need for pumping equipment which has a high initial cost, high costs of petroleum fuel to operate it, and high costs of labor and parts to maintain and repair it.

Maintaining the purity of the water is also relatively cost-free. Since the main pipes are placed in mountain streams at an altitude above most human habitation (at least 300 feet above the plain being served, 600 feet if the distance of transmission is 25 or more miles), there is little pollution at the source and hence no need for chlorine or other chemicals. All that is required is a sedimentation tank to remove natural debris and sediment before the water enters the main conduit. Since the pipes and intermediate storage tanks are completely covered, not only does the water remain uncontaminated but its potential as a breeding ground for mosquitoes, snails, and other disease-transmitting hosts is avoided. Constant surveillance of the water in the storage tanks and immediate repair of any break in a pipeline or a tap are

further guarantees against pollution. The tanks, which hold about 50,000 gallons of water, are routinely emptied and cleaned twice a year as a further precaution against the buildup of algae and other organisms.

The other major factor in the low cost of the Mulanje and other gravity-fed schemes in Malawi is the centrality of creative community self-help as an instrument both in the initial construction and in the continued maintenance of the system. One of the villagers related during our inspection of the system in 1980 a phrase which I have heard repeated on numerous occasions since then: "God provided the water, the Kamuzu [Life President Banda] provided the pipe, and the villagers provided the labor."

The labor of literally hundreds of thousands of villagers enormously reduced the cost, but self-help, to be successful, must be supported by external agencies. In this instance, it was not only the psychological and material support provided to the people by President Banda, the Malawi government, and the Malawi Congress Party leadership in the area, but also the skill of the political leadership in convincing external donor agencies of the worth and feasibility of the project. Indeed, the result was an impressive collaboration on the part of the Malawian and foreign government aid agencies, the United Nations, and both religious and secular private donor groups.

One of the foreign governments early to recognize the intrinsic merit of the scheme was the United States, which assisted the project through its AID unit in Malawi. Although USAID dropped out for a period, by 1981 it was once again the largest donor in the continuing development of the scheme. Other governmental groups included the Canadian CEDA program and the Danish government, which actually financed three major phases of the scheme. Among the private donor groups, the British OXFAM has been a consistent supporter as have Catholic and Protestant groups from the Netherlands and the broad-based Christian Service Committee. (The activities of the Committee demonstrate how donor agencies' responsibilities frequently dovetail

and complement each other. Working frequently with UNICEF, for example, which can provide pipe but not funds for local labor and other necessary expenses, the Christian Service Committee picked up the local operating costs.)

Many of the donor agencies look upon the Malawi gravity-fed water system as ideal from the standpoint of their overall development philosophies: the project is aimed primarily to help the rural poor; it focuses on improvement of health as the key to the developmental process; and it has elicited a continuing spirit of community cooperation which can be transferred to other development projects. Its results, moreover, become visible in a relatively short period of time—essential in convincing the support groups in the United States or Europe—and the costs per person show maximum use of the funds available. Robertson estimated that the entire gravity-fed system to date had cost roughly \$10 per person assisted *for life*, since it is estimated the system will last 100 years before major replacement is required. The scheme has already permitted close to half a million persons to receive an average of four imperial gallons (nearly five U.S. gallons) of water a day—a significant accomplishment.

Community Development in Action: Preparatory Phase

Creative community development recognizes not only the need for external financial support, but the fact that unskilled and semiskilled voluntary labor—no matter how well motivated and energetic—can accomplish little unless skills are introduced which can guarantee the success of the enterprise. Indeed, one of the most corrosive elements in the developmental process is the legacy of innovative failure. Africans during decades of colonial rule had been subjected to a series of enthusiastic innovations, only to have to live with the consequences of failure while the "inspired" colonial innovator moved on to more rewarding greener pastures in his advancing career.⁷

Many technical problems had to be resolved in order to close the gap between inspiration and its fruition. First, statistical data and oral tradition had to confirm that the mountain streams which were

targeted for the scheme could be guaranteed to be perennial in flow.⁸

Second, extensive aerial photography had to be done to insure that there was a feasible route for a pipeline from the source high on the mountain to the plains below. In making the appropriate site selections from the aerial survey maps, the engineers had to take into account the configuration of the terrain, the clusterings of population, the food producing capacity of the area to be served, and existing local political boundaries.

Next, decisions had to be made on the appropriate piping for the system and to place advance orders so that the arrival of the piping would be coordinated with the actual work. It was decided that asbestos piping would be the best for the segment from the mountain source to the storage tanks. (Asbestos would be the most resistant to corrosion and would be strong enough to withstand the weight of stone and sand piled into the trenches to protect the conduits from breakage.) More flexible plastic tubing, however, was adequate for those stretches of the system that carried the water from the tanks to the village taps.

Finally, before the volunteer community labor could be involved, it was necessary to train a limited number of technicians in rudimentary hydrology, geology, and other subjects so they could provide informed supervision of the volunteer laborers. Since the piping would be buried under three feet of stone and dirt, it was absolutely essential that the laying and joining of the pipes be done carefully and skillfully. The technicians would also have to be trained in the art of maintaining the commitment and enthusiasm of the volunteers until the scheme was actually in operation.

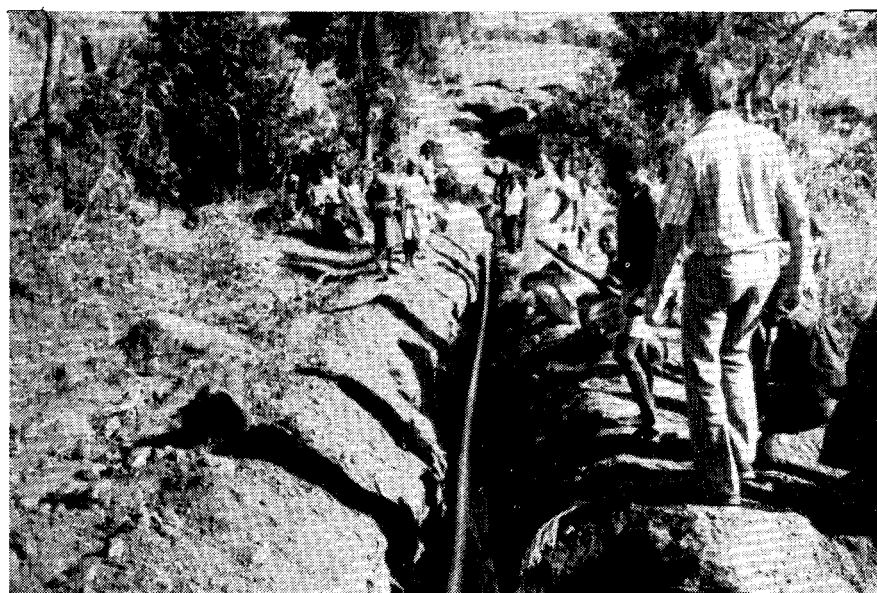
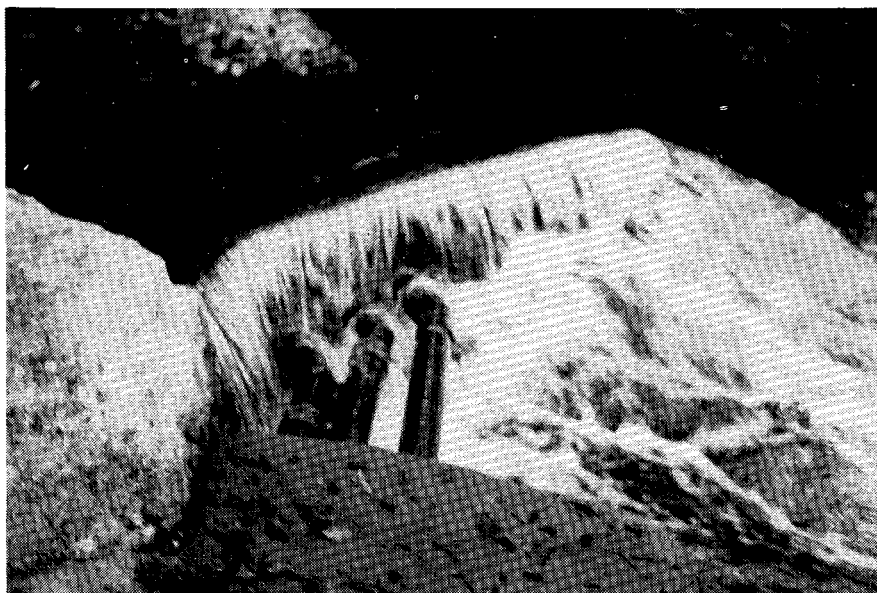
The involvement of community labor in the project took place in two stages. First, a far smaller pilot project was selected, partly on the basis of the terrain but, more important, on the strength of previously demonstrated commitment of the community to self-help projects. Here, L.H. Robertson's nine years of experience in southern Malawi proved invaluable, for he had the direct knowledge required to make

the critical choice. Significantly, the pilot area selected in 1968 involved Zomba Mountain rather than Mulanje. And the area to be served contained only 16 villages, which meant that the time lag between the commencement of the digging and turning on the taps in the villages was limited to only 6 months.

In the pilot scheme at Chingale on Zomba Mountain—as was true of the work on the subsequent major schemes—no community labor was actually involved until it had been demonstrated strong community commitment existed. This meant that there had to be numerous village meetings in which the local leaders of the Malawi Congress Party, Members of Parliament, traditional chiefs, and other opinion leaders attempted to explain the benefits that would accrue to the villagers in health, access to water during the dry season, and other advantages. It was also explained what would be required of them should they decide to participate in the self-help scheme. Throughout the discussions, as Robertson pointed out, ran the message: "This is not the government's water scheme, it is yours. It will only work if you are willing to work. And it is you, rather than government, that will make the decision on whether to proceed, on organizing yourselves into committees, and on deciding the order in which various villages would participate." The project would not work, Robertson was convinced, if the people felt that this was just another imposition by government. This attitude was also in keeping with Dr. Banda's philosophy of self-reliance, of "helping those who help themselves."

The Construction Phase

With the success of the pilot scheme at Chingale (which had also provided invaluable field experience for the paid staff), it became relatively easier to persuade the people of the Mulanje area that the system did work and that it had brought water to within a quarter of a mile of every homestead in the pilot area. The "demonstration effect" upon political and other leaders brought to the Chingale area was dramatic, and it was a significant factor in getting the local committees in the Mulanje area organized quickly and in maintaining a high level of enthusiasm until the water actually



Above, the water's source: pipes are laid into the mountain stream. Below, villagers lay pipe down the mountain in deep trenches.

(Photos courtesy USAID)

reached the villages. In the larger projects at Mulanje and other areas, the anticipated benefits could be up to two years in coming.

In addition to the demonstration effect, other techniques were employed to sustain the villagers' enthusiasm. The work, for example, proceeded from the mountain downward. This meant that at the end of each day's laying of pipe, the water was turned on. This had the dual effect of flushing out the pipes

as work progressed (which was technically sound) and of graphically demonstrating that the mountain water was now that much closer to the villages.

Second, it was necessary to maintain a certain rhythm in the work schedule so that the various phases could be coordinated, the quality of the work maintained, and the best use could be made of the paid technical and supervisory labor while maintaining some flexibility.



Above, construction of a central water storage tank and below, the end of the line: clean water at the village tap.
(Photos courtesy Malawi Information Department and USAID).

Without the latter, it would be hard to instill the notion that this was the *villagers'* project, not just government's. Account had to be taken, for example, of the demands which the various phases of the agricultural cycle placed upon the volunteer labor—to cite just one reason for flexibility. The wisdom of this policy was demonstrated in the early 1970s when opponents of the Malawi Congress Party in the Mulanje area asserted that the government had ulterior motives in launching the

scheme. The dissidents used violence in attempting to discourage the people from participating.⁹

For each day's work, the paid supervisor would lay out with two parallel pieces of string the digging that was to be accomplished. Each village, on rotation, was expected to give a week's work to excavating the trenches from the mountain source to the storage tanks, as well as doing the shallower digging on the branch lines that led to the village

taps. Much of the digging was done by the women, who in many cases worked with babies wrapped to their backs. Men did, however, participate in both digging and laying and joining of the pipes. During Youth Week—an annual March event in Malawi—many school age youngsters committed themselves to digging trenches as part of their service contribution. Even preschool children carried the lighter plastic pipes and performed other tasks.

The construction of the system was a remarkable blending of modern and traditional technologies. While there were the hydrological skills of the engineers, the aerial survey analysis, and other aspects of modern technology, the digging was done largely with the *jembe*, or short-handled hoe, supplemented by a pickax where the ground was very hard. When the trace reached an area where large granite boulders obstructed the path of the pipeline, some very ancient African technology came into play in splitting the boulder into manageable pieces for removal. This consisted of building a huge bonfire atop the rock and letting the wood burn for about six hours. Then, cold water would be thrown on the heated boulder causing it to crack along fault lines. It was then relatively easy for workers with hammers, crow-bars, and pickaxes to reduce the boulder to small pieces.

The construction phase was also used to further reinforce the message that this was the people's project and not that of the government alone. For example, each village committee was told that it would be responsible for reimbursing the scheme for any pipe that was broken during its work period. As a consequence, Robertson pointed out, the breakage was far less than that normally incurred in a commercial undertaking. In addition (within the requirements that each village tap serve approximately 300 homes with no home being more than a quarter of a mile from the tap) a measure of flexibility was left to each village committee in making the decision on placement of the tap to insure its enhancing the rhythm of village life. Turning on the tap, moreover, was made an occasion for celebration and ceremony, with the village headman being given the privilege of turning

the spigot. The presence of the village committee and all the participants again served to emphasize the need for continuity of enthusiasm in maintaining the water system.

Continuity of Self-help: the Maintenance Phase

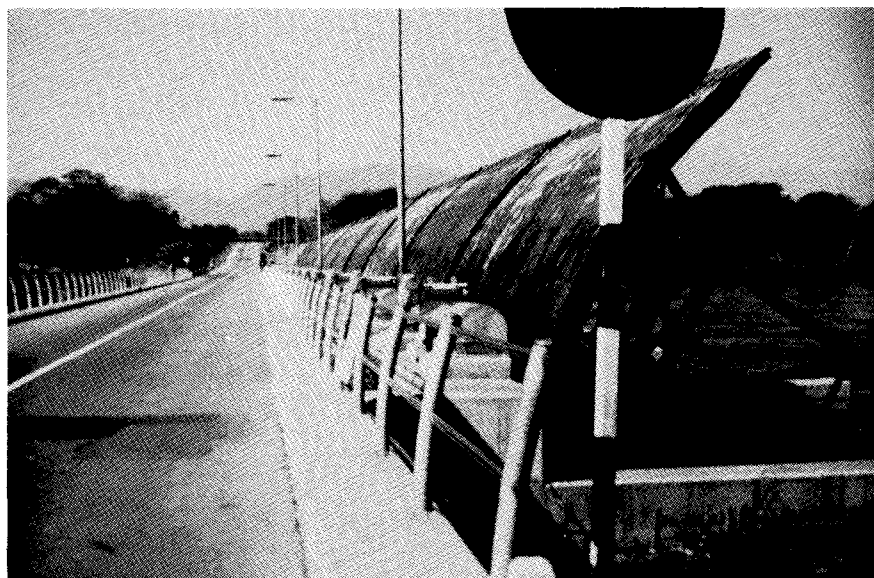
As in the construction phase, the success of maintenance required a blending of paid, technically-trained personnel with continuity of spirit of community self-help. Without it, the ultimate objective of providing clean water to the rural population of Malawi cannot be realized. Typical, perhaps, of the trained supervisory personnel for the Mulanje and other gravity-fed systems was Mr. Nkhoma, who assisted us during our tour on various Mulanje villages in 1980. Since he had been a participant in the project, he had firsthand knowledge of the general problems and knew the route of the pipeline so he could quickly find major breaks in the system should they occur. He was a resident of the area who had elected not to migrate in search of more lucrative employment. His modicum of primary school education served to reinforce the respect and confidence the people of the area had in him. This was important, for in addition to the routine tasks of supervising the cleaning of the storage tanks twice a year or checking on the condition of the taps, he had the responsibility of instructing the villagers in the importance of sanitation and clean water in maintaining good health.

The responsibility for continuing the spirit of self-help fell largely on the women. Since it was they who had the major burden in the past of finding, digging for, and carrying the water during the dry season, they appeared to embrace their responsibilities with enthusiasm. Several I interviewed in the villages said they now had more time for their families, that they could now put in gardens to supplement the family food supply, and that they could visit with friends and not feel guilty.

Each tap has its committee of women, who see that the tap is not left running, that people do not leave standing water that might serve as a breeding ground for mosquitoes or snails, and that the cement slab around the tap (a gift of the government) is kept clean. No

one is permitted to wash clothes, bathe, or do anything other than draw water at the tap area. (The ruckus that the women raised when my escort from External Affairs attempted to wash his hands at one tap was genuine indeed!) Each committee has responsibility for disciplining offenders, but it appears that the women's pride in their contribution to the water scheme, as well as social pressure, constitute the major deterrent. The pride of each tap committee was amply evidenced, moreover, by the friendly competition in landscaping the

water. Unlike their urban counterparts (who had no role to play in constructing the water systems of Blantyre or Lilongwe), beneficiaries of the gravity-fed system pay no fees for water. Since the villagers contributed their labor, this has been regarded as but a small reward for their work. The greatest guarantee against wastage is the fact that water must be carried away from the tap before it is used. As long as the flow from Mulanje continues and people want to take the effort, they are free to use the water for their gardens or watering their small



Barrage dam, Shire River, Malawi.

perimeters of the cement slabs with flowers. As with the local supervisor, the knowledge that the women acquired in digging the trenches insured that the pipe could be quickly located in the event of a break.

Maintenance costs, moreover, are minimal. The only thing a village may have to pay for is the replacement of a tap. It is reasoned that the breakage (as well as wastage of water) can normally be avoided by replacing used washers with the new ones provided free of charge by government.

In addition to the enthusiasm of the tap committees, the resolution of two critical issues before the first foot of pipe was ever laid has been a factor in the continuity of the spirit of community self-help. The first was the matter of payment for

animals; few, however, do. Since women must still come to the taps with their traditional earthenware pots as well as large galvanized buckets, it is unlikely the uses go beyond drinking, cooking, and bathing.

In any event, charging people for water could either drive them out of the rural area to the cities or lead to their using water from polluted streams and wells. Hence, the very purpose of the scheme would have been undermined.

Second was the issue of piping water directly into a homestead. On egalitarian grounds alone, it can be argued that no one—even if he or she has the resources to pay for it—should be permitted to enjoy as a privilege that which almost the entire community helped to build as a matter of necessity. Moreover,

since the country is still far away from realizing its 1989 objective of clean water for all Malawians, the diversion of materials, skilled talent, and foreign exchange for the benefit of a few rural residents ought to be discouraged. National priority should be given to those with no safe water at all.

The Significance of the Gravity-fed Water System

Given the newness of the gravity-fed water system in Malawi, it is difficult to gauge the precise impact it has made upon the lives of the residents of Mulanje and other districts. One obvious yardstick, however, is the fact that 418,300 persons now have water throughout the year, and they—particularly the women—no longer have to make the arduous and demeaning search for water during the dry season. Another crude index of the economic value to the people served by the scheme was offered by L.H. Robertson. He suggested that if these same rural residents had to pay for the water consumed (as their urban compatriots do in Lilongwe), the cost per year would amount to over Kwacha 1,000,000, or roughly \$900,000. The real economic value, however, can only be judged in the future as the fall in absenteeism leads to greater productivity in agriculture in the areas affected.

Similarly, the returns are not yet in regarding the increase in life expectancy and the drop-off in infant mortality of the rural populations involved in the gravity-fed schemes. Other evidence of improvement in

health is apparent to residents of the districts. Robertson quoted an OXFAM evaluator who found it difficult to get responses from an older resident to hypothetical questions about how many persons were still alive today because of the improved water source. Finally, the exasperated villager proclaimed almost triumphantly: "But diarrhea we don't have!" An even more dramatic testimony came during the cholera epidemic of 1974. In plotting the cases of cholera on a map there was a striking correlation between the incidence of cholera and areas where the people were not served by the system (represented by large clusters along the rivers and streams). In contrast there were only scattered isolated cases in the area served by the gravity-fed schemes. (In the latter area those affected had probably carried the disease from the riverine areas.) In any event the graphic evidence from Malawi was enthusiastically seized upon by consultants from the World Health Organization in Geneva, who now use it in their educational programs.

One further common-sense index of the success of the program is the fact that people are literally "voting with their feet" in support of the program. Impatient with the time lag required to extend the system to their home areas (if indeed that is possible), there is a considerable migration of Malawians into the areas already served. Although this may strain existing facilities, there is probably enough flexibility in the system to accommodate them. And they will not only be healthier for the

move, but they give promise of remaining in the rural area as a potential force for improving agricultural productivity.

The supporters of the gravity-fed scheme would be the first to acknowledge that the system cannot be replicated throughout the rest of Africa or even Malawi, although similar conditions of perennial mountain streams above fertile plains do exist in many parts of the continent. They recognize that in accomplishing the goal of clean water for every Malawian by the end of the decade, resort will have to be made to more costly pumping systems, deep well drilling, and catchment dams. Greater costs and greater vigilance will be required in these alternative systems, however, to insure that the benefits are not canceled out by pollution and creation of conditions which inadvertently spread bilharzia and other water-related diseases.

In the long run, however, the truly invaluable benefit derived from the way in which the Mulanje and other schemes were carried out is the spirit of self-help so apparent in the areas affected. People realize not only that their lives can be changed for the better but that they themselves can also be a significant factor in accomplishing change. That kind of pride can be transferred to other phases of the developmental process and help Malawians overcome the extreme conditions of poverty, their unwanted heritage from colonial rule.

(August 1981)

NOTES

1. See my "Bilharzia Control in Swaziland—The Dilemma of Development" [JGL-1-'81], *AUFS Reports*, No. 2 (1981).
2. For the historical significance of Lake Malawi, see J.B. Webster, "Drought and Migration: The Lake Malawi Littoral as a Region of Refuge," *Proceedings of the Symposium on Drought in Botswana*, Madalon T. Hinchey, ed. (Gaborone: Botswana Society, 1979). pp. 148-157.
3. National figures on rainfall are, of course, highly deceptive. Within Malawi the range is considerable. At Nkhata Bay, for example, the average is 95 inches per year; while it is only 27 inches at Kasungu. Further, 98 percent of the rain falls within a seven-month period.
4. Malawi *Statistical Yearbook*, 1979.
5. Ibid.
6. In addition to conversations with many citizens and officials on the spot in both 1980 and 1981, I am particularly indebted to Mr. S. Phiri and Mr. M. Nkhoma of the Department of Lands, Valuation and Water and to Mr. L.H. Robertson of the Water Supplies Board. Some of the background data was obtained from a film, "Piped Water for the Villages" (rights owned by the Malawi Government, Ministry of Information) and from a Master's thesis by Colin E.R. Glennie: "The Rural Piped Water Programme in Malawi: A Case Study in Community Participation," University of London, September 1979. Also useful was a cyclostyled manual by L.H. Robertson, "Rural Piped Water Projects Handbook" (Lilongwe: Ministry of Community Development and Social Welfare, December 1977).
7. See, for example, the section, "White Man's Madness," in J. Gus Liebenow, *Colonial Rule and Political Development in Tanzania: The Case of the Makonde* (Evanston: Northwestern University Press, 1971).
8. This was one of the miscalculations in the Shishelweni scheme in Swaziland. See my "Bilharzia Control in Swaziland...."
9. See Glennie, "The Rural Piped Water Programme..."p. 31.