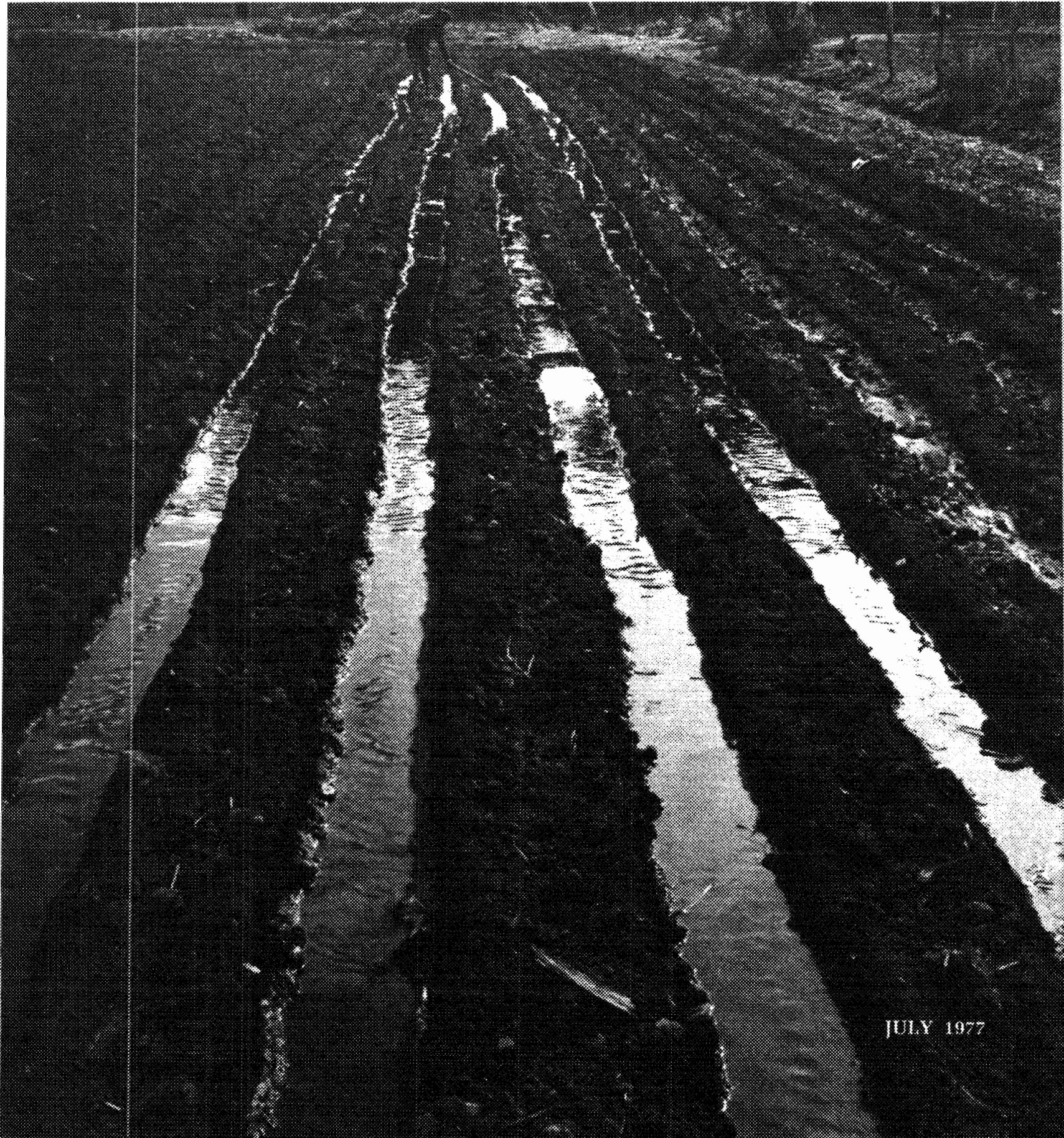


War on Hunger

A Report from The Agency for International Development



JULY 1977

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A Report from The Agency for International Development

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IN THIS ISSUE

July 1977

Volume XI, No. 7

Water: A World Problem

1

Water and Development

8

Magic Trees in the Desert

14

Lady With A Black Bag

16

In Print

19

In Brief

20

Quotes

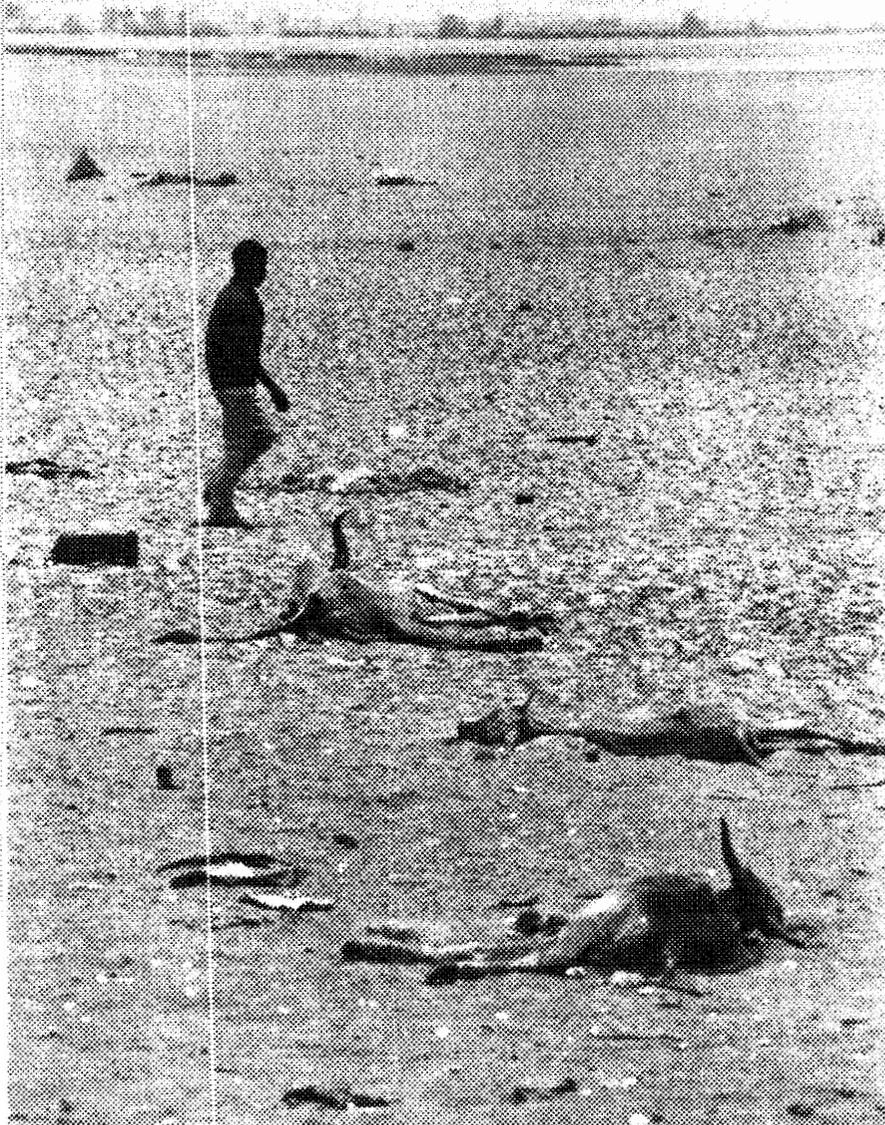
inside back cover

COVER: Water is vital to all life. In lands where water is not easily accessible or scarce, mere survival is threatened by a lack of water. With pumps, wells and irrigation systems, people of developing nations have a chance.

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A dry river bed becomes a graveyard for cattle in the drought-stricken Sahel.



WATER: a world problem



By Dean Peterson

The Earth is three-quarters water, but not much of it is fit to drink or use. The potable water supply of the world is diminishing rapidly, and some two-thirds of the people in the world have no access to an adequate or safe water supply. By the year 2000, the problem will be even worse and far more people will be affected.

As the world's water supply diminishes and the world's population increases—creating a larger demand for more water—the problem becomes more severe. To address the problem, the United Nations convened a world Water Conference last March in Mar del Plata, Argentina. Here, delegates from 19 countries focused on the technical, social, and financial problems posed by the decreasing water supply to meet human needs.

Mr. Peterson is Chief, Soil and Water Management Division, Office of Agriculture, Bureau for Technical Assistance, AID.

Representatives from the Food and Agriculture Organization (FAO); the United Nations Educational, Scientific and Cultural Organization (UNESCO); the World Health Organization (WHO); the World Meteorological Organization (WMO); the International Labor Organization (ILO); the International Atomic Energy Agency (IAEA); and the International Bank for Reconstruction and Development (IBRD) joined other representatives from 18 governmental and 47 non-governmental organizations at the conference.

The World's Water Supply

Although the Earth is known as the water planet, its fresh water resources are remarkably limited. Only about 2.5 percent is non-oceanic, but more than 70 percent of this fresh water is tied up in glaciers and ice caps. More than 20 percent of the remainder is in groundwater exclusive of moisture in the plant root zone. Most of this groundwater is too deep or too salty for human or agricultural use and has been in

storage, so to speak, for centuries or millennia.

Most of the groundwater that is renewable is found in alluvial sediments associated with rivers. Each year only 0.007 percent of the Earth's water falls onto the land as rain or snow. Two-thirds of this is evaporated or transpired by plants. The small remainder supplies the world's rivers and the associated alluvial groundwaters.

Except for rainfed agriculture (84 per cent of the cultivated area), it is this latter source which provides the world's supply for human use: domestic, industrial, and irrigation. The total world supply is fixed, but the real usable water supply, as stated by John Maxwell in 1965, is measured by total pure water versus waste. All of our streams are not immediately available for new uses; many are already too laden with wastes.

All countries are concerned about water supplies not only to increase food production and to provide domestic and industrial water supplies, but for hydroelectricity, navigation, recreation and fisheries.

Water can be an enemy too. Floods often destroy crops and cause loss of human lives. More than 500,000 people perished in the flooding caused by the disastrous typhoon that struck the Ganges-Brahmaputra delta in Bangladesh in 1970. At the opposite end of the scale, droughts cause great human misery and loss of life, as in the great six year drought in the African Sahel.

Water for Agriculture

Plants are not very efficient in their use of water. On an average, about 550 pounds are needed to produce one pound of dry biomass (that part of a given habitat consisting of living matter, as per unit volume of habitat). There is much that can be done to increase agricultural production on rainfed crops and even on grazing land, such as the use of improved varieties, better crop management and water conservation practices.

Much of the attention of the U.N. Water Conference was directed toward irrigation and drainage, however. Many of the developing countries, including the most populous ones, are located in arid or semi-arid; tropical or subtropical regions. Particularly interesting are the wet-dry monsoon areas where rain may total several hundred to even 3000 millimeters during a three to six month rainy season and be essentially zero during the rest of the year. Even during the rainy season, short-term droughts may exhaust the soil's moisture and cause crop damage or even crop failure. If water can be stored, either in surface reservoirs or as groundwater, it can be used to extend the growing season to produce three or more crops each year.

In the developing market economies of Africa, Latin America, the Near East and Asia, about 92 million hectares (227.2 million acres) were under irrigation in 1975 (up from 70.5 million in 1965), according



Through AID assistance for pumps and wells, fields are being irrigated to give small farmers more fertile land to tend.

to the report prepared on "Water for Agriculture" by an international team working with FAO. These countries contained 460 million deprived and hungry people in 1974 and this number is increasing at a rate of 12 million per year.

During the past decade, per capita food production has barely stayed even, so no gains have been made on improving the lot of the deprived poor. The report, however, did not explicitly state production targets in terms of food increases, but proposed that irrigation areas be increased by 22 million hectares and that cropping intensity (rates of cropped area to land area x 100) be increased from 129 per cent to 142 per cent. The World's total area under irrigation in 1975 was estimated at 223 million hectares, 27.6 million hectares of which were cropped areas. To achieve the increase in intensity desired, the team estimated that systems serving 45 million hectares of land now irrigated would need rehabilitation.

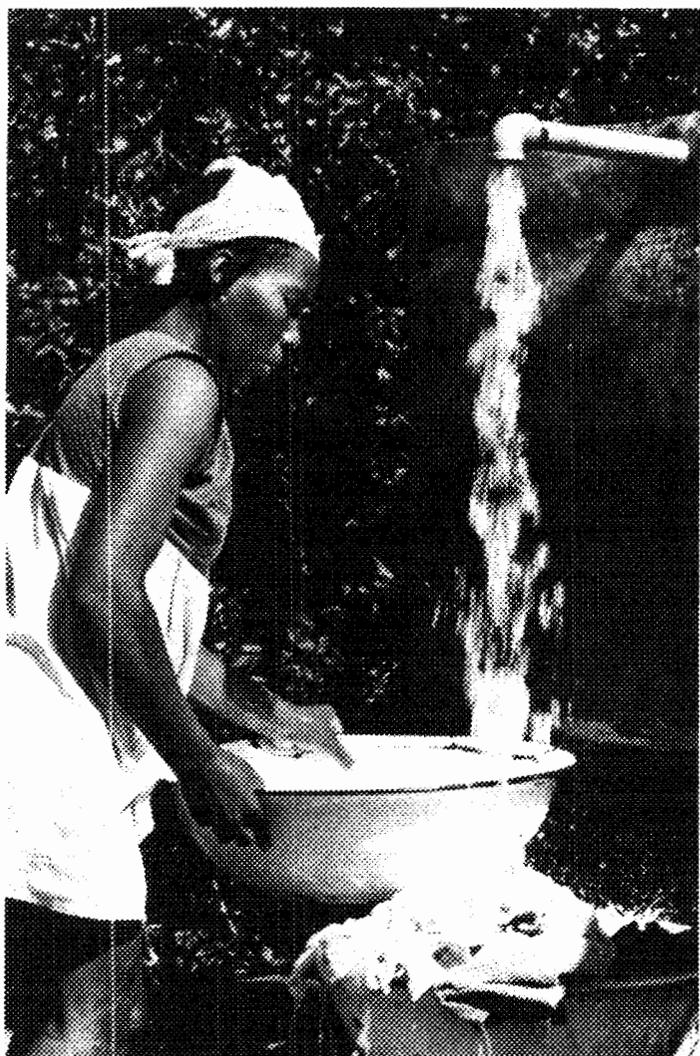
The United States position is that there are some tradeoffs in these numbers. Costs for new irrigation works were estimated at \$2800 per hectare (about \$1300 per acre) and rehabilitation costs at \$500 per

hectare. These estimates, however, may be too low. New irrigation projects have substantial environmental impacts, including the risk of increasing schistosomiasis and other water-related diseases. First, priority, thus, ought to be given to rehabilitation. An increase of 10 per cent in yields on existing lands through better overall management would produce as much as 9.1 million hectares (22.5 million acres) of new irrigated land which at \$2,800 per hectare would be equivalent to a capital investment of \$25.5 billion dollars.

Improving and increasing aquaculture (fish-farming) could substantially increase high-quality protein. Only 6 million tons of the annual world fishery yield of 70 million tons is now produced by aquaculture. A conference report suggested that a reasonable target for aquaculture for the year 2000, would be 16 million tons with an estimated cost for development being \$1.245 billion dollars.

Community Water Supplies

Water: Life or Death prepared by the International Institute for Environmental Development (I.I.E.D.)



This woman washes clothes with water from a local well. Such wells are vital in many communities.

in preparation for the Mar Del Plata conference says: "— 70 per cent of the world's population is without safe and dependable water supplies. More than two billion men, women and children are exposed to infectious diseases because of the lack of safe water. There are 250 million new cases of water-borne diseases a year and 25,000 people die daily from them."

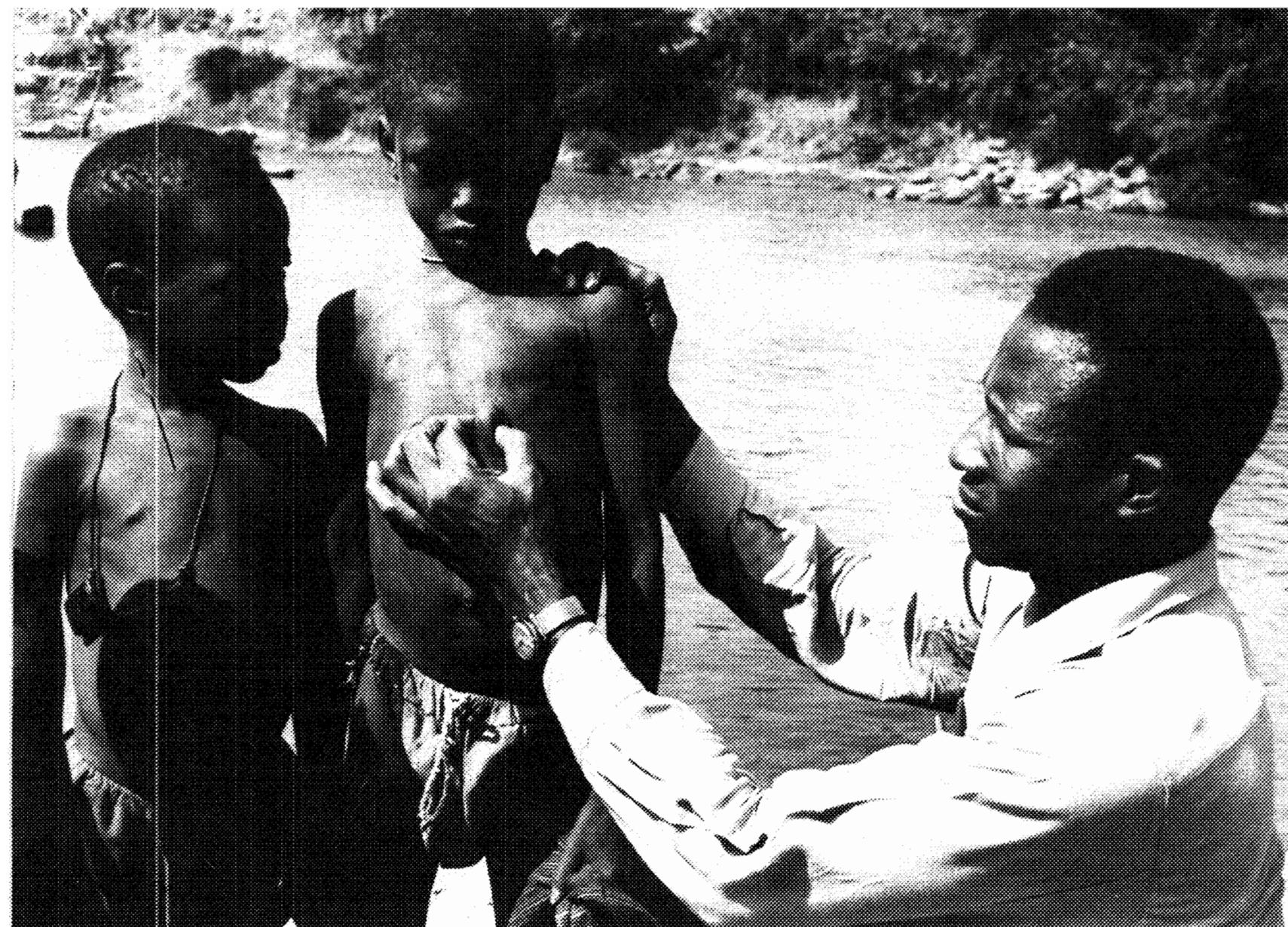
Providing a safe water supply is a difficult and complex task. Even though the benefits appear obvious, a "blue ribbon" panel of experts (according to I.I.E.D. sources) concluded "that it is difficult—if not impossible—to identify and measure the health effects of improved water supply". But few would deny that it should be provided because it is a "basic human need." Also agreed universally at the conference is that it is the safety of the supply, rather than the amount, which is most important. A lavish supply of polluted water spreads disease, does not control it, even if the water comes in pipes.

One of the plaguing problems is that, in spite of the best of intentions and the employment of technology judged by experts to be adequate and appropriate, many, probably most, water supply systems in rural developing areas and in many urban areas of developing countries as well, do not work very well. Many of them do not provide safe water at all. Either they are improperly maintained or operated incorrectly.

Perhaps providing safe drinking water is more a social phenomenon than a technical one. This means involving the users in appreciating owning and operating water supply and waste disposal systems. Emphasis also must be placed on the practice of associated hygiene. This social involvement is probably more important in rural and village supplies than it is in large cities. There is still a great deal to be learned about water hygiene, including institutionalized water supply and waste disposal. More than 2000 years ago, the Chinese believed that if one drank cold water he became sick. If a host did not have tea, boiling water was served, even on the hottest days.

Water-related diseases are numerous. Some, like typhoid and various forms of dysentery, enter water supplies from human wastes and are transmitted by drinking the contaminated water. Others, also enteric, may be transmitted through food or by skin contact. These are not all bacterial or even water-borne. Hookworm, for example, is directly related to the lack of sanitation dependent upon water. Other diseases, like malaria, schistosomiasis and river blindness, are not enteric but are injected into the blood stream by vector organisms breeding in water, such as mosquitoes or snails.

Effective technology for controlling bacterial enteric water-borne diseases can be traced directly to Louis Pasteur's discovery of bacteria. It emerged in western Europe and North America by the turn of the last century. For many of the vector-borne diseases, par-



This six-year-old child is being examined for symptoms of onchocerciasis-river blindness. Lumps in the body indicate the

presence of parasitic worms transmitted to humans by the bite of the black fly.

ticularly schistosomiasis, effective technology has yet to mature. When DDT 30 years ago appeared to be the answer for mosquito-borne diseases such as malaria, genetic resistance and environmental side effects placed limits on its use.

The many aspects of a water supply program, technological and social, were explored in a "Report on Community Water Supplies" prepared in draft by the WMO in collaboration with the World Bank. Recommendations of the report focused on public education, manpower and institutions, including financing. Specific targets other than those set by the UN Conference on Habitat, i.e. "to meet realistic standards for quality and quantity to provide water for rural and urban areas by 1990, and to adapt programs for the sanitary disposal of excreta and waste waters in urban and rural areas, were not set.

Work of the Conference

On Monday morning, March 14, at the Hotel Provincial, the Conference was opened by Gabriel van Leatham, Under-Secretary General for Economic and

Social Affairs. The delegates were welcomed by President Videla of Argentina.

Two Working Committees were formed to consider the 109-point report of the Conference and to formulate recommendations and resolutions to be referred to the final plenary session.

The tone of the U.S. delegation's approach was set by Mr. Charles Warren, Chairman of the Council on Environmental Quality. He called for better management of water supplies. Mr. Warren said that in the United States, "We are beginning to reduce our emphasis on *water development*, and to give more thought to *water management*. We are beginning to distinguish human *needs* for water from human *desires* for water. In short, we are employing an environmental perspective in evaluating water projects and water use and recognizing that the supply and quality of water are affected by a host of factors that have nothing to do with hydraulic engineering."

Mr. Warren cited population as foremost among those factors. Location of people is another. "Instead of settling in places where safe water is abundant,

people have been encouraged to settle where they must rely upon complex systems to bring water to them," he said. "Sometimes such systems violate natural laws which limit carrying capacity, destroy aquifers, and almost guarantee periodic shortages" Mr. Warren said.

Recognizing that many topics would be discussed, Mr. Warren commented on three: water supply and health, water for food and fiber; and disaster assistance. Stating that the United States intends to increase its commitment to programs which have as their purpose the fulfillment of basic human needs, he stressed importance of the quality of water and the need to consider explicitly the health aspects of each water project as part of environmental reviews.

On agriculture, Mr. Warren pointed out that: "Our analysis of crop yields, farming conditions and water utilization around the world indicates that the overriding focus should not be on the amount of new land and water that might be developed for agriculture, but rather on improving the effectiveness with which water and other production aids are applied and managed on land already under cultivation."

Committee Response

The effect of the discussion on the draft report by both committees was to strengthen emphasis on improved irrigation water management, especially in existing systems; controlling of water-related diseases; improving environment and health; preserving unique environments; increasing community water supplies (especially rural) and fisheries. In the latter case, a separate section on fisheries and fish-farming was added to the report.

Result of the Conference

According to the diplomatic members of the delegation, the political issues such as North/South, were low key.

The issues of the Panama Canal and the occupied territories were raised and the thorny problems of

shared river basins between competing upstream and downstream riparian states were debated, but mainly in regional sessions. The attention of the conference, however, concentrated on the principal business at hand: world water problems.

On April 23, the plenary session considered the recommendations of the committees. Following tradition, one could have expected that a recommendation for a special fund for water development and/or a new UN agency for water development would have been proposed. Although neither of these recommendations came out of the committees, this does not mean that the delegates were not concerned about financing and coordinating international water efforts. Other agencies contain the apparatus to address these concerns. For example, the FAO Division of Resources and Transportation, is concerned with water in agriculture; WMO, with meteorology and operational hydrology; UNESCO, with scientific hydrology; WHO, with water supply and health; and IAEA with isotope hydrology. The UN Development Program provides funding for a broad assortment of water studies and planning.

A large share of the World Bank's portfolio of loans is invested in water development for agriculture, community water supply, hydroelectricity and other water-related projects. Many delegates felt that a special fund, earmarked for water, at this time would not overcome the more basic problems of manpower development, effective institutions, planning, and general education about water hygiene and water management in aquaculture.

The report and recommendations of the committees recognized these difficulties and proposed their correction. Clearly, these initiatives are not easy to execute. Far too little is known about how to bring them about. The Conference did recommend that the period 1978-87 be designated the "Decade for International Water Supply and Sanitation."



As this child wades in the stream, she may be contracting a waterborne disease. More than 25,000 people die each day

from such diseases throughout the world. Each year there are 250 million new cases of waterborne diseases.



Without water, plants will not grow. This farmer sits in his field which has not received rain for more than six months.

Rain-fed agricultural areas must have sufficient rain, since this is the only water source in most cases.

Resolutions

Following the recommendations of the two committees, the Conference adopted resolutions on:

- community water supply;
- agricultural water use;
- research and development of industrial technologies;
- water resources assessment;
- planning, management and institutional aspects;
- technical cooperation among developing countries;
- river commissions;
- water policies in the occupied territories;
- role of water in combating desertification;
- institutional arrangements for international cooperation in the water sector; and
- financing arrangements for international cooperation in the water sector.

The resolution on community water supply focused on the achievement of Habitat goals by 1990. For both community water supply and agriculture, the resolutions called for preparation of comprehensive national plans and programs for 1980.

Also for community water supply, plans and programs are to be reviewed by an appropriate mechanism to be determined by the Economic and Social Council. The resolution called for giving priority to the less privileged. It emphasized a response to the manpower shortage, new approaches to international and bilateral funding, and community education.

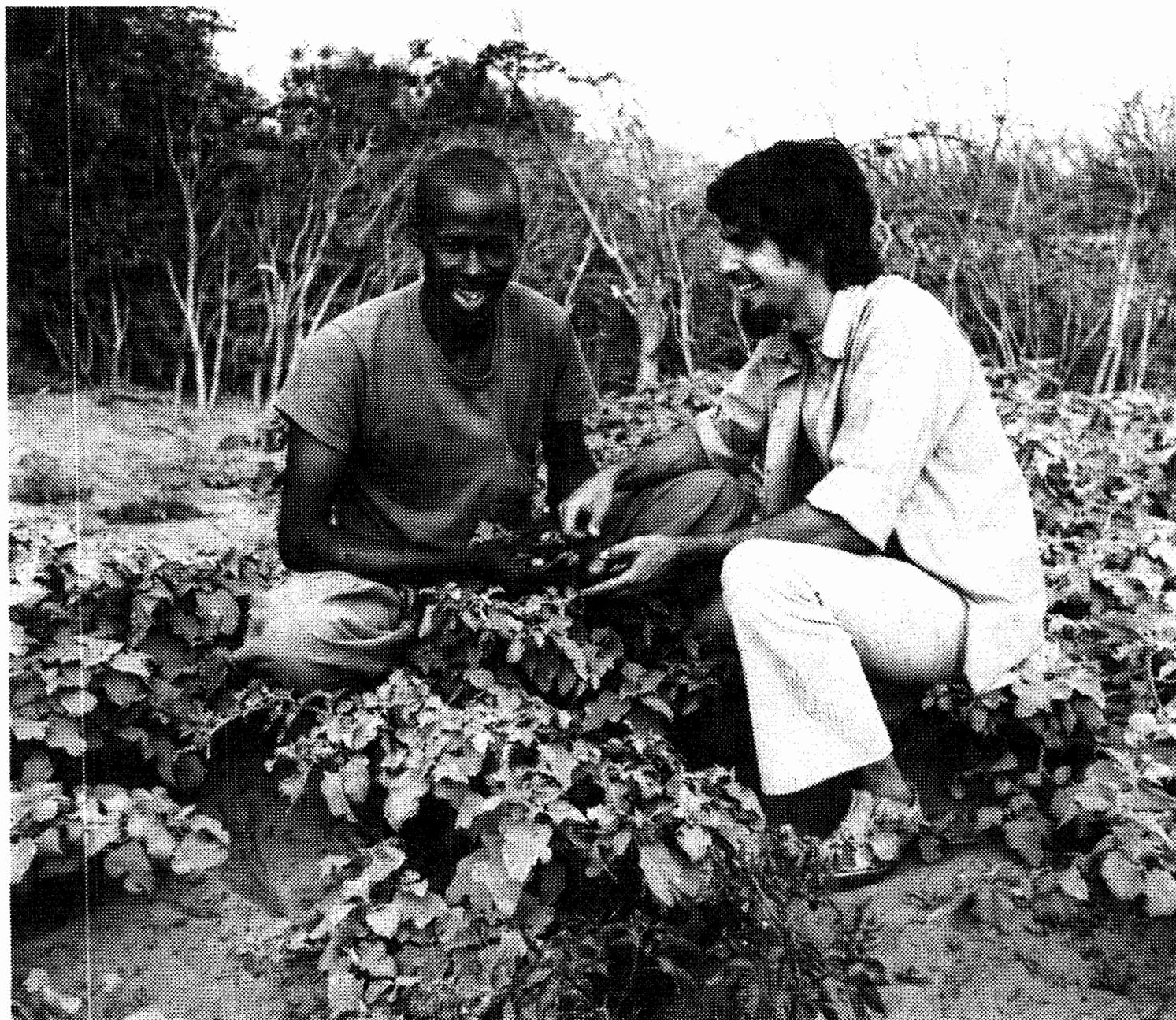
The resolution on agricultural water use called for an action plan which would improve existing irrigation, implement efficient new irrigation, improve rain-fed agricultural and livestock production, reduce flooding and waterlogging, and increase fish-rearing. It also called for increased training programs and ex-

tension of research. A phased program of financial needs is to be included in the national plans.

On financing, the Conference agreed that the UN Secretary General will be asked to undertake a study, based on consultation with governments and international agencies, to determine the most effective means to effect the flow of financial resources specifically for water development and management through existing organizations.

Many delegates were quite concerned about the means for coordination of international programs. The Conference recommended that more attention be given to this matter by the Regional Economic Commissions. At the international level the matter was referred to the ECOSOC Committee on Natural Resources.

It is too early to speculate on what new directions, if any, U.S. programs may take as a result of the Conference. This is definitely a matter for decision at the highest levels of our government. The Administration's goals have been expressed in terms of "human needs" concepts. Community, especially rural, water supply and food would seem to be priority targets. If the Conference recommendation on plans by 1980 is followed, these plans should be the best that can be devised using the best knowledge and information available. Considering especially the complex and poorly understood social and human dimensions involved in both community water supply and in agricultural water management, the means to accomplish this calls for thoughtful attention by AID and other concerned agencies.

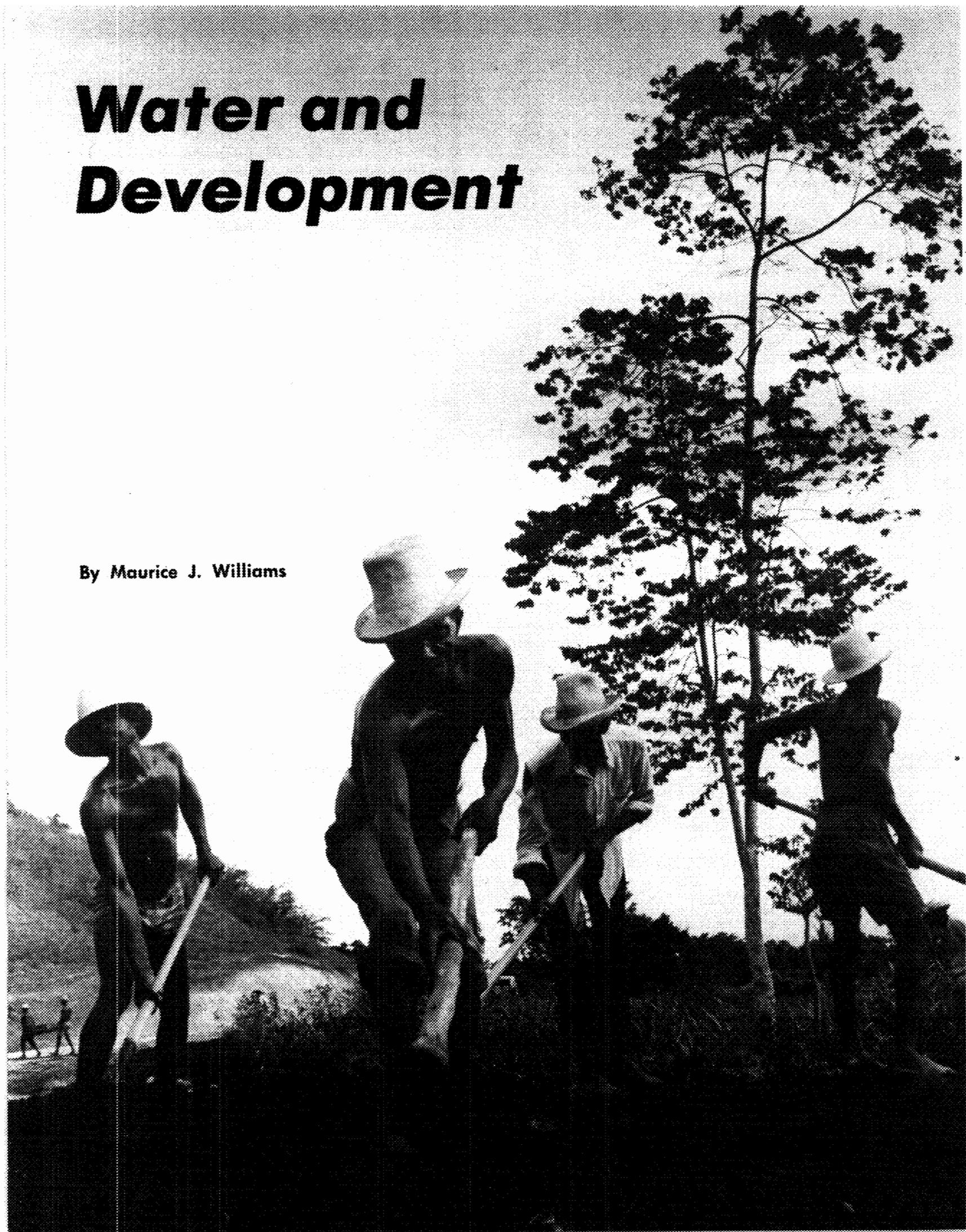


The difference that water makes is evident in this field irrigated by a well. Former Peace Corps volunteer Bob McGurn, who

helped install the well that was provided through AID funding, checks the crop of Senegal farmer, El Hadji Saw.

Water and Development

By Maurice J. Williams



Development is increasingly concerned with meeting the basic needs of the world's expanding population. This concern arises from widespread humanist values that "man is the measure of all things," that development is for the betterment of people. Also, there is better understanding that a pre-condition for stabilizing world population growth is the attainment of decent standards of life in developing countries, particularly for the most basic of human needs: food and health.

Policies for water are at the core of programs for rural development. In many areas, water is an important limiting factor in expanding food production. Provision of timely and adequate supplies of water, accompanied by improved farming practices, could result in dramatic increases in food yields. For example, a recent Japanese study suggests that more water in the right places and its better management could double rice production in Asia over the next fifteen years.

Safe drinking water and environmental sanitation programs are important for improvement of health. Over a third of the people in developing countries are forced to rely on contaminated water for drinking. Within these populations, waterborne diseases are chronic and pollution of water is a common cause of early death. Safe drinking water, improved sanitation, and adequate food would greatly improve health and reduce death rates, especially among young children—opening prospects for a better life for poor people throughout the world and conditioning their decisions on family size.

The need for policies of improved water management is not restricted to rural areas in developing countries. Industrial countries have vastly increased their water consumption, and most anticipate a doubling of water demand between now and the end of the century. Excessive reliance on the waste-assimilative characteristics of water—by cities, factories, mines, power plants—and in the use of bi-products of industrial life have brought adverse environmental and economic effects. There is urgent need to adopt means for reducing pollution pressures on natural streams and water bodies from industrial use and disposal of waste; and to devise policies for apportioning the cost and benefits.

These were among the complex of issues before the United Nations Water Conference in Mar Del Plata, Argentina. The task of the Conference was to promote preparedness, both national and international; to meet soaring demands for domestic and industrial uses of water; and for irrigation to step-up food production in the next few decades.

A recent study of the International Food Policy Research Institute in the United States estimates that in order to avoid a serious food deficit by 1985, develop-

ing countries would have to increase their food grain output by about 4.25 percent a year from 1976 onward. That is more than double the rate of 1.7 percent which they attained between 1967 and 1974, and considerably above the 2.5 percent annual average for the past 15 years.

Development of water resources is critical for the expansion of food production. Many developing countries have a large potential for substantially increasing crop yields through irrigation and improved water management.

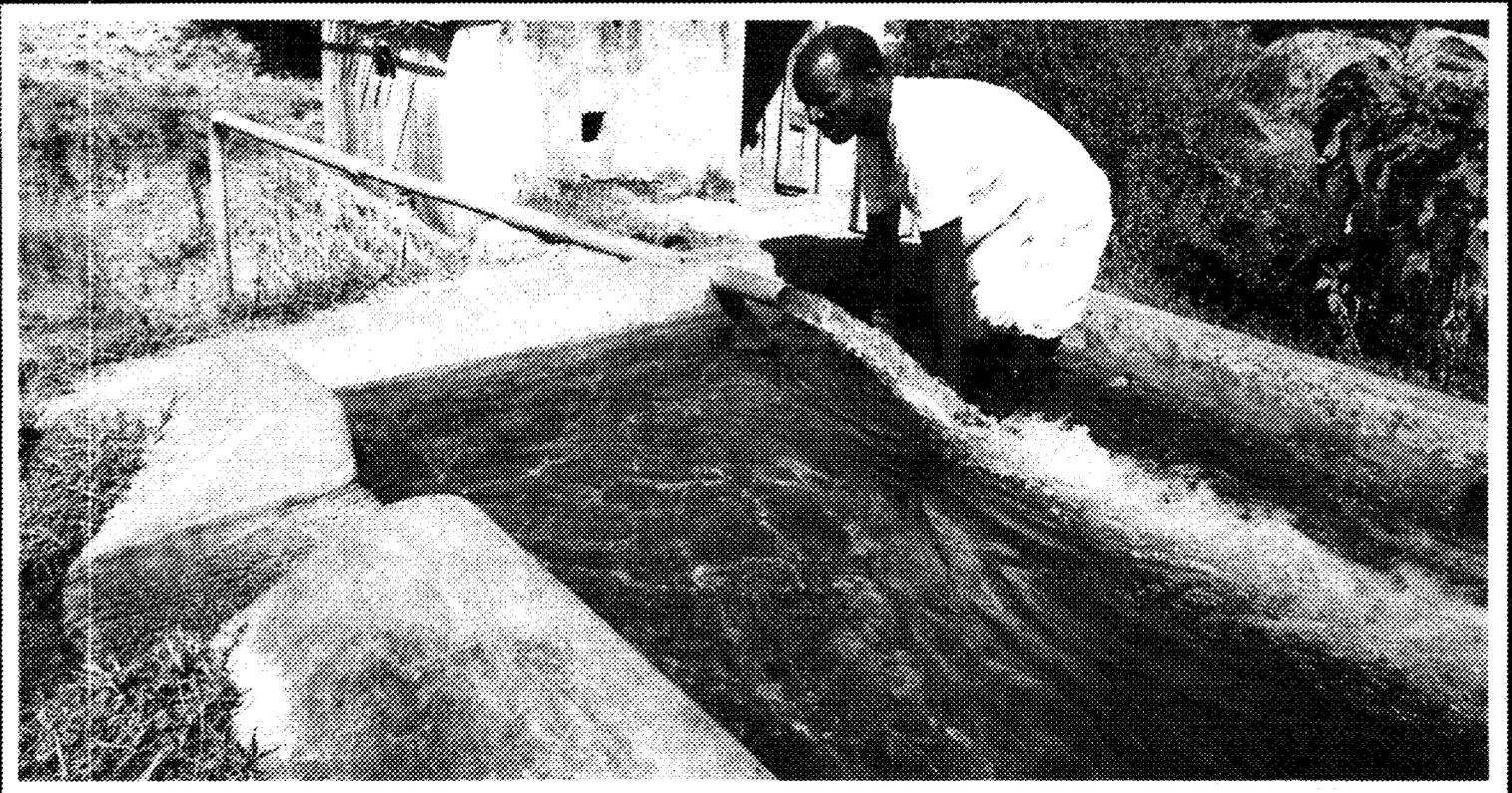
Yet, the very urgency of the food problem can lead to costly mistakes. While irrigated lands provide, on the average, several times the yields of dry farming, irrigation can be as much a problem as a solution to improved agriculture. Often the institutional components of irrigation schemes have been neglected. Inadequate delivery systems, improper management of water, and poor choice of crops have contributed to low returns. Two-thirds of irrigated lands in Egypt, Iraq and Pakistan are adversely affected by waterlogging and the build-up of salts. These countries are engaged in costly efforts to drain excess water and reclaim the productivity of irrigated land.

Half of the existing water facilities in developing countries need renovation and improvement. Relatively modest investment in improved water channels and desilting of small reservoirs could provide substantial returns. More ambitious proposals before the Rome World Food Conference placed emphasis on improvement of existing irrigation facilities, at an estimated cost of over \$21 billion for 46 million hectares, followed by new irrigation programs for some 23 million hectares at an estimated cost of \$38 billion. The Conference did not endorse these targets, but gave recognition to the importance of improved water management.

Medium and small scale irrigation projects have a definite advantage over larger ones. Smaller projects provide flexibility for adaption, local involvement and integrated management of the many factors necessary for successful agricultural development. There are many project opportunities to divert, pump, store and distribute water for irrigation. Whether or not irrigation is needed, farmlands should be properly leveled for more effective water management. The new International Fund for Agricultural Development should seek out relatively small water projects which provide an early return in increased food.

Priority should be given to better use and conservation of presently available water resources for crop and livestock production. It is often possible to save significant amounts of water by better farm management. Cultivation practices are significant factors in shaping the flux and storage of water within the soil in farmland areas. Spray and trickle techniques are capable of distributing water very sparingly. An important need is for better coordination in the appli-

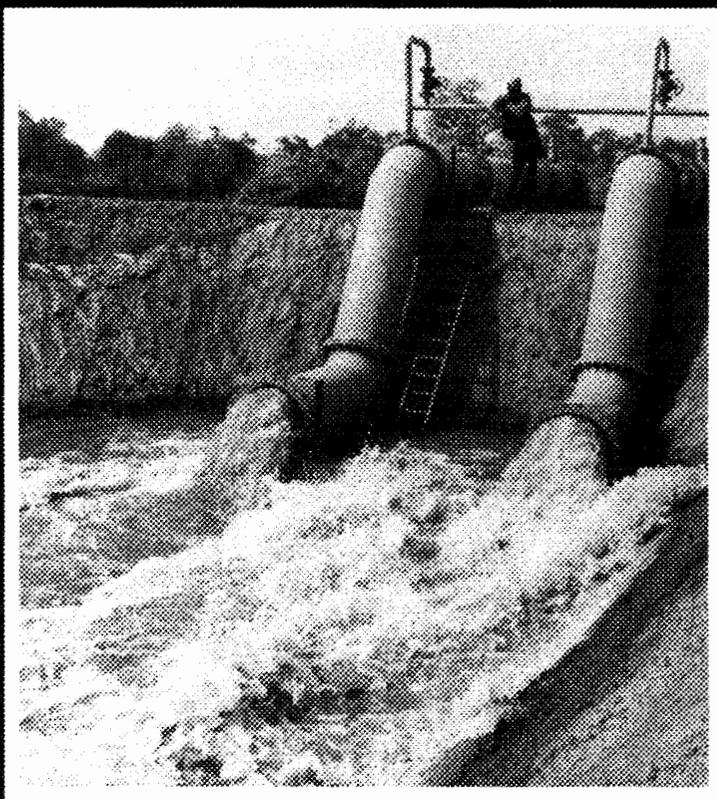
Mr. Williams is Chairman of the Development Assistance Committee of the Organization for Economic Cooperation and Development.





WATER

Water and rural development. Left, an Indian farmer uses a tubewell to irrigate his land. Increased profits from his crops enabled him to send his son to medical school. Upper left, farmers work in fertile land, thanks to irrigation. Far upper left, children stand in the silt-filled basin of a canal in Bangladesh. Above, this farmer and his family are close to a water supply, while, above right, a woman in Thailand must walk several miles to obtain the water she carries back to her family. Right, AID projects such as this irrigation system help countries where water is not easily accessible or scarce. Water is precious in all developing countries. It is a key element in survival and progress.



cation to farm problems of the several specialities related to the effective use of water.

Better water and farm management is essential, but in order to achieve a modernization of agriculture it must be accompanied by a structure of market incentives which yield appropriate returns on rural investment. Increased investment is required for better markets, village access roads and for large numbers of vermin and moisture proof storage structures. Many of the necessary facilities can be constructed by human labor, thereby helping to relieve unemployment. But investment is also needed for manufacture or import of chemical fertilizer, pesticides and farm machinery. Where there is sufficient command of water resources, double and triple cropping is possible with machinery to speed cultivation, harvesting and drying of crops.

Heading the list of investments for expanding agricultural production in developing countries is investment in people, in their basic skills and health. This brings us back to the importance of safe drinking water. The Government of Venezuela has estimated that investment in clean rural water returns its costs over five-fold in additional working days and productivity which better health makes possible.

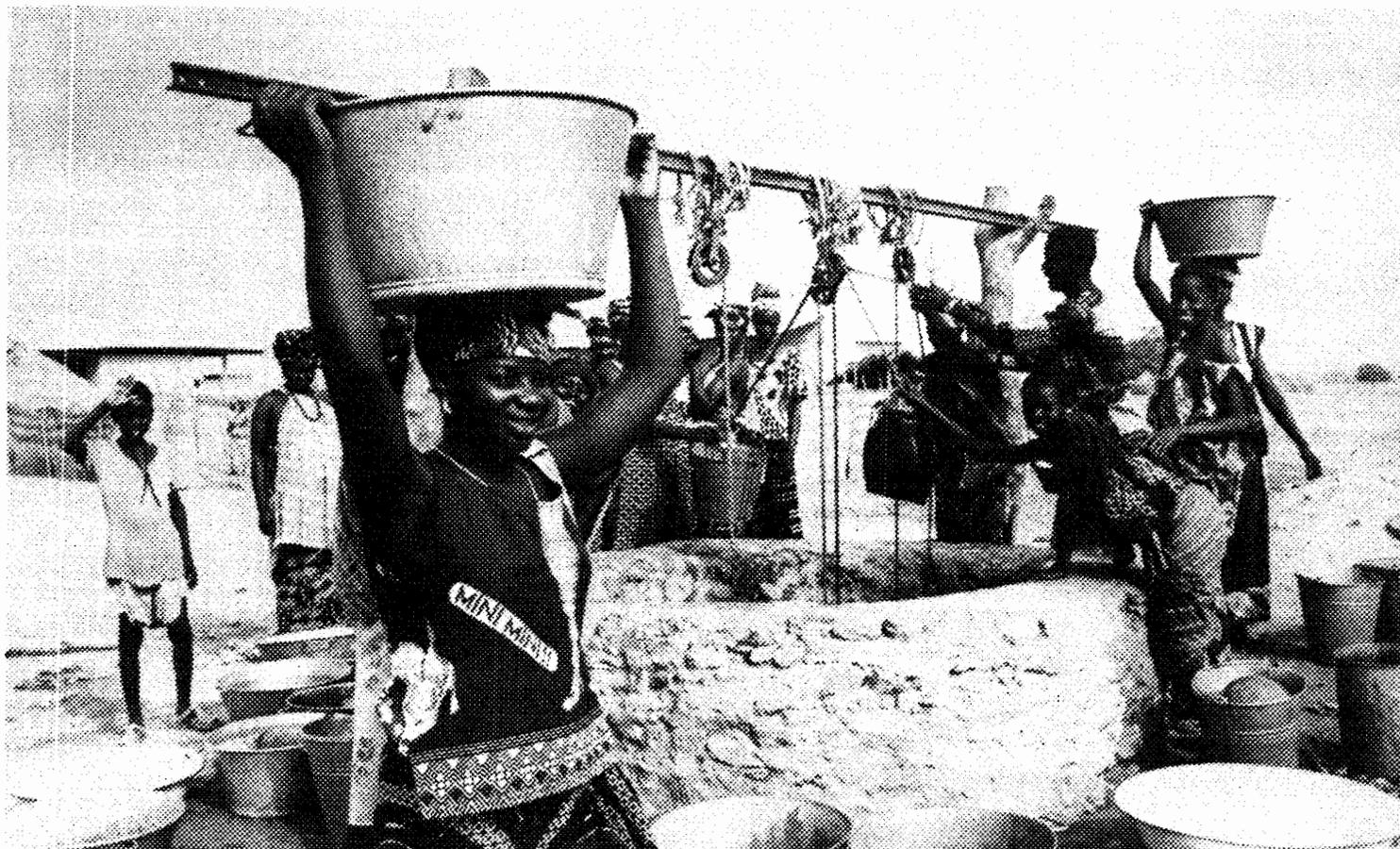
In the period 1971-75, estimated investments in developing countries for community water totalled some \$11 billion with about 12 percent from foreign assistance and about \$4 billion for sanitation facilities with

5 percent from external sources.

The United Nations Water Conference had before it the Habitat resolution on achieving safe water and related sanitation measures for all communities by 1990. Targets for community water supplies were adopted by the World Health Assembly in 1972 but progress to date has been far from satisfactory. A World Health Organization survey in 1975 indicated that about three-quarters of the urban population of developing countries is adequately served by community water and sanitation services. The proportion for rural people drops, with 22 percent having reliable drinking water and 15 percent being served with proper sanitation facilities. Without an increased effort, there will be little improvement in drinking water and sanitation facilities for large parts of the world in the years ahead.

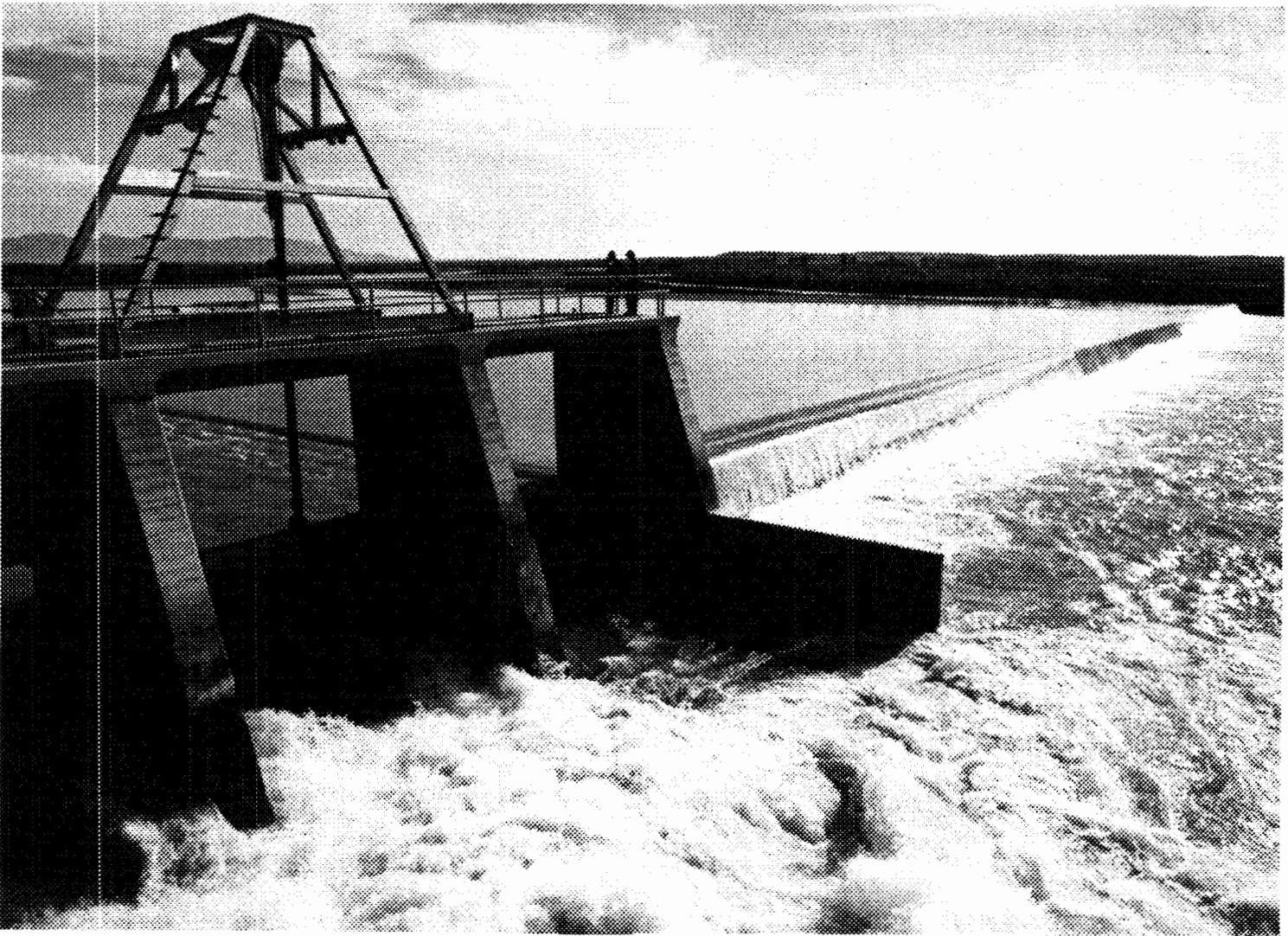
If the benefits of development are to reach the poorest people, increased investment in food production, safe drinking water and sanitation must be recognized as central elements of development policy. This will mean major changes in past development priorities of developing countries and higher levels of foreign assistance.

Programs for stepped-up water development for agriculture and livestock production should include community water as a priority component. Higher water quality for people initially could be provided by sim-



African women draw water from a community well. Anything that will hold water is used to carry the precious liquid. Such

wells and pumps help to improve the lives of rural people in the developing countries.



The water intake gates for the irrigation system in the Helmand Valley in Afghanistan make an impressive sight. This AID sup-

ported project irrigates thousands of acres of land in an arid section of the country.

ple sanitary protection and treatment procedures. This would benefit a large number of people with simple services which could be upgraded later as incomes increased. An interim target for community water and sanitation facilities would be to double the annual average rate of investment from the \$3 billion of recent years to *at least* \$6 billion a year—with external assistance increasing to an annual level of \$1 billion, in contrast to the estimated \$300 million annual level of past external financing.

One objective of the United Nations Water Conference was an annual investment of \$9 billion for community water supplies and related sanitary facilities, in an effort to meet minimum needs by 1990.

Food, water and health objectives can best be achieved through longer-term, broadly integrated programs for rural and water development. These programs place a heavy burden on developing countries for improved planning, management and mobilization of resources—and they require close cooperation between developing country governments and donors to augment technical and capital resources. One such pro-

gram, the Club du Sahel, is a major effort for integrated, longer-term planning by the Sahelian countries of Africa to achieve food self-sufficiency by working cooperatively with donors and internal organizations.

The Secretary General of the United Nations Water Conference, Yahia Abdal Mageed, has called attention to the importance of “greater cooperation between bilateral assistance programs and those of the United Nations and other international systems, with a view to achieving coordination among all programs in the water resources sector. This would primarily benefit recipient countries where the assistance available is too often fragmented and uncoordinated to be fully effective, but it would also provide an incentive for bigger and better programs on the part of the donors.”

At the International Water Conference, and resulting follow-up actions, governments have an opportunity to affirm their support for programs of adequate food, safe water and improved sanitation—through appropriate management of water and other resources—as basic to the needs of all people.

'Magic' Trees in the Desert

By Emmett George

Michael McGahuey and Robert Kirmse are modern-day Johnny Appleseeds who believe in magic—the magic of the *Acacia Albida* tree.

The two believe in the magic of the tree because they have seen it work through their involvement in the joint Agency for International Development and CARE program of planting the tree in the Sahelian areas affected by the great drought (1968–1974).

"This is really a great tree," says Kirmse a 30-year-old former Peace Corps Volunteer from Corpus Christi, Texas. "It's amazing how this tree survives and grows in areas of drought. It is a nitrogen-fixing tree. Animals gather under this tree and fertilize the soil. During the rainy season, the leaves fall off and more fertilizer is produced."

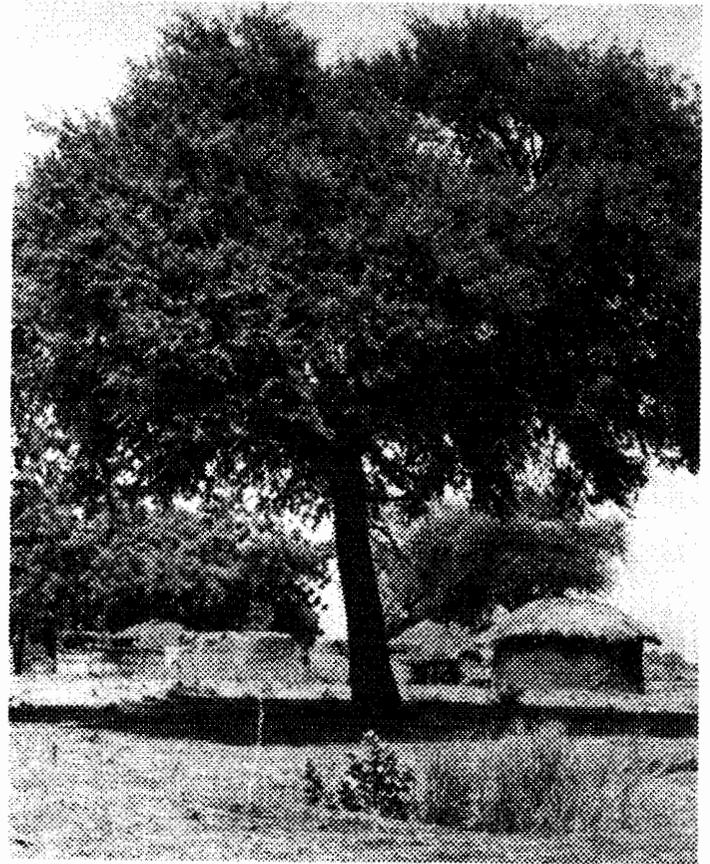
As one who knows the ins and outs of reforestation, Kirmse realizes the value of the *Acacia Albida* to the drought-prone Sahel. "This tree is helping to rejuvenate the soil. Without rain, most vegetation dies, but the *Acacia Albida* seems to thrive in this climate."

Michael McGahuey, also 30, co-manages the project with Kirmse in Chad, one of the Sahelian countries afflicted again with drought. The Portland, Oregon native has spent six years in the Sahel (two years in Chad). For the past two years, he has been working on revitalizing the near sterile soil near Mandelia and Mailao in south central Chad.

"In this area, you can plant for four or five years but after that you must leave the land vacant for 15 years or more because there are no nutrients left in the soil," he explained.

"A sign that the land is becoming sterile is the appearance of calotropis or milkweed which thrives on sterile soil. When a farmer sees the milkweed, he simply gives up and moves on to less sterile land. But with the *Acacia Albida* tree, the soil is rejuvenated."

Mr. George is an AID Press Officer.



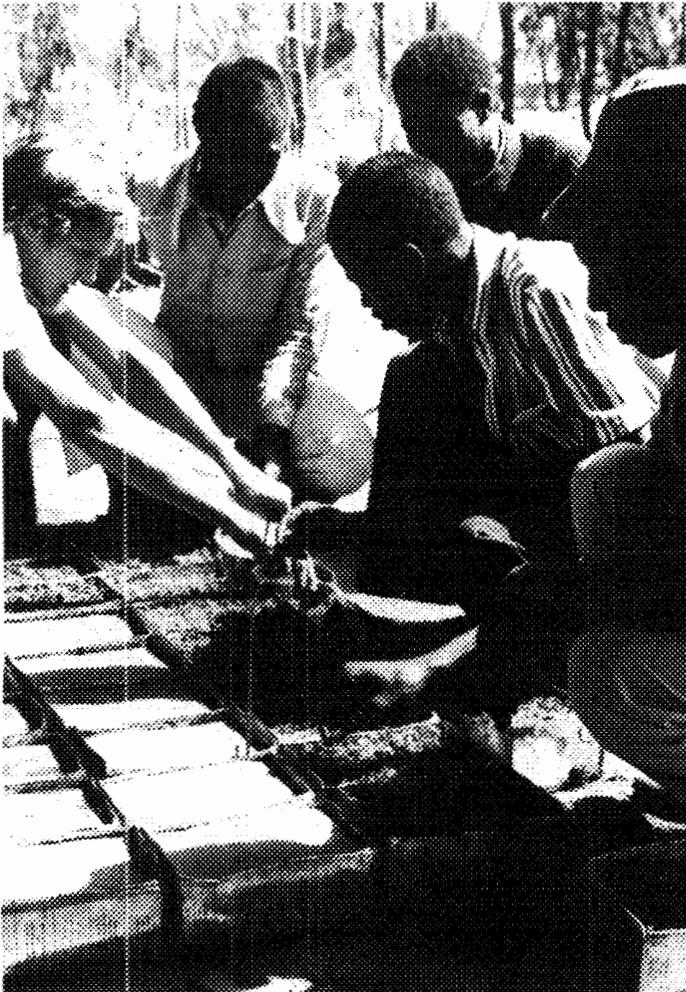
*Michael McGahuey watches as Chadians drill holes in the soil to plant *Acacia Albida* trees.*

nated. They also serve as windbreaks," McGahuey said.

In the first two years of the three-year tree planting project, McGahuey and Kirmse have planted over 50,000 trees for 550 hectares (1,485 acres) of reforestation. The project was assisted by an AID Operational Program Grant, a program that provides assistance to voluntary agencies. They attribute their success to the use of Food for Peace stocks as payments to farmers for planting and maintaining their "magic trees".

"It's hard to ask a man to work on an empty

"... this tree survives and grows in areas of drought . . . it rejuvenates the soil . . ."



Robert Kirmse shows Chadians how to plant Acacia Albida seedlings in old vegetable oil cans.

stomach," said McGahuey. "Food for Work was the best way. It was very logical to use food and introduce tools. This time of year the farmer wouldn't be working. He would be saving his energy because of the lack of food for the harvest season. This way we supplement his diet and get the trees planted at the same time.

"We are hoping for a 30 to 50 percent increase in millet crop production," McGahuey said. "Studies over the past 20 years have shown a 30 percent increase in crops planted under trees like these."

The Acacia Albida, whose roots extend deep into the soil, carries vital nutrients to restore the soil. The trees were planted under CARE supervision on sites at Bongor, Guelendeng, Mailao, Mandelia, Massakory, Massguet, Moussoro and Mogroum. More than 300 farmers participated in planting 57,510 seedlings on 575 hectares of land. The project was carried out in cooperation with the Chadian Forestry Service. This year CARE plans to plant an additional 2,000 Acacia Albida trees.

Each seedling is encased in wooden pickets 1.5 meters long and planted in neatly spaced rows across barren flatland areas. The wooden pickets protect the young trees from goats and other livestock. In addition, the seedlings are treated with crankcase oil to protect against termites.

As payment for this work, local farmers are given bulgur wheat, cartons of biscuits, carbohydrate supplements, peanut butter and dried peas. CARE also supplies them with hoes and hatchets.

Chadian farmers were able to record an 85 percent survival rate among the trees planted. The need for Acacia Albida, Neems and other drought resistant trees is great in Chad, a land of dwindling soil fertility. So serious is the problem that the government has imposed a national ban on cutting down trees except in cases where it is necessary to clear land for agriculture.

Culminating its second full season of planting, the reforestation project is barely noticeable from the highway. It was done in such a professional manner that it does not disrupt livestock migration patterns or tie up farmland.

The project is supported by a three nursery center in N'Djemena and an open air shed with a thin roof for drying and storing seedlings. The nursery is home for the first five months of a seedling's life; then they are taken out and transplanted in the field. Farmers watch over the trees until they reach two years of age. At that point, a tree is said to be on its own and survival chances are excellent.

"During the rainy season people will come in here and buy the trees and transplant them," said Kirmse, pointing to rows of seedlings planted in abandoned AID vegetable oil containers. "This is an interesting use of these cans," he smiled. "Nothing is wasted in Africa."



Lady With a Black Bag

By Kay Chernush

With her big black bag full of pills, tiny vials, syringes and charts, Leonida Mendez looks just like a country doctor. Children tag after her, clamoring for attention, or peer shyly from doorways as she makes her daily rounds. A familiar figure with a somewhat weary but ready smile, she inquires about their scraped knees and belly aches and remarks on how big they are growing. With the children's mothers she talks about diet and listens sympathetically to tales of family ailments. Her practiced eye takes in this one's rash, that one's dysentery, another's fever or weight loss; she dispenses pills, or a shot, or recommends a trip to the nearest clinic.

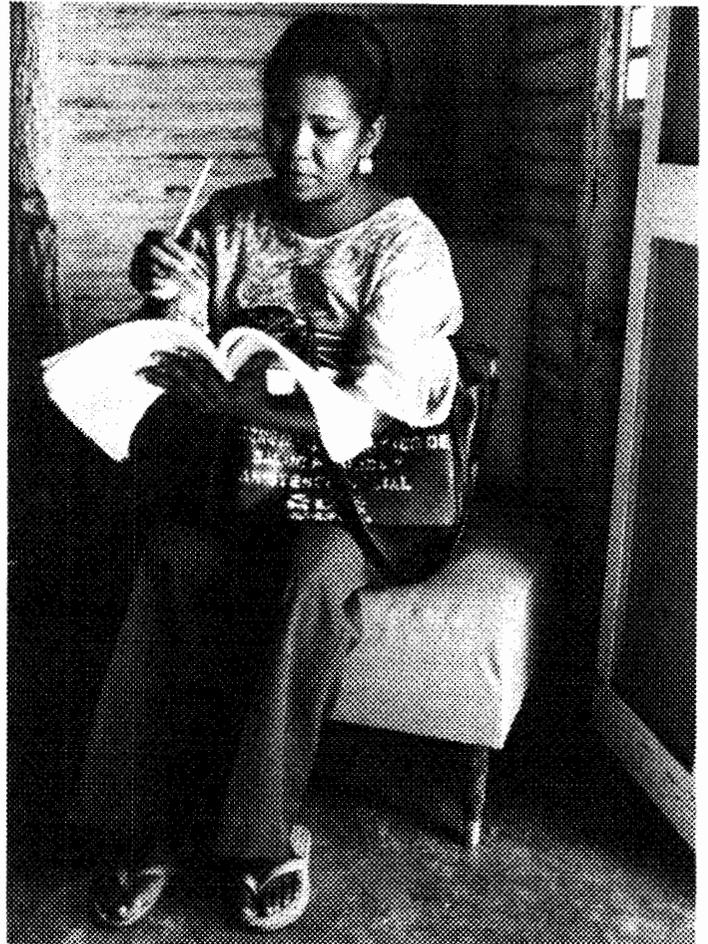
Senora Mendez is part of an innovative rural health program in the Dominican Republic, a Caribbean island nation of nearly five million people. Contrary to appearances, however, she is not a doctor. Her formal education never took her past the eighth grade. Everything she knows about medicine and health care she learned during a month-long training course.

If this worries her "patients" in Quita Coraza, the impoverished village of some 2,000 people where she lives with her husband and four children, it is not at all apparent. Most, in fact, express enormous satisfaction and appreciation for the services she has been able to provide in the village, services which have made a noticeable difference in people's health.

"The people like me a lot. They listen to what I have to say. They think the program has really helped them and they're very grateful," says the 32-year-old health worker, who is also friend and neighbor to the 103 families assigned to her care.

Scarcely a year ago, Senora Mendez was a simple wife and mother who had never held a job. Today she and hundreds of women like her form the backbone of the new Government effort to bring health services to the almost three million Dominicans who live in small villages and have had little if any access to even the most rudimentary health care. Called *promotoras*, the women are the Dominican version of China's

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Promotora Leonida Mendez works in her village to provide family planning assistance and basic medical help.

Another promotora explains to a villager how to take the pills she is dispensing. The medicines are simple and basic.



barefoot doctors—para-professionals who are recruited locally to provide the “basics” to people like themselves. When the program is fully underway, the *promotoras* will number 4,500 and will be directly supervised by 440 auxiliary nurses scattered throughout each of the country's five health regions.

Although the Dominican Republic averages about one doctor for every 1,900 people, a fairly respectable ratio in the developing world, only a handful work in rural areas where the bulk of the population lives. Until recently, moreover, the emphasis has been almost entirely on curative medicine. Because of the costs involved—hospitals with all their elaborate equipment, doctors and other medical personnel—this had the effect of virtually shutting out the poor from any sort of adequate health services.

To help remedy the situation, the Dominican Government turned to the U.S. Agency for International Development (AID) and together they designed a health delivery system to reach people who could not afford to pay for a doctor even if one were accessible. The program shifts overall priority in the field of health from curative to preventive measures and strongly emphasizes both family planning and nutrition education. Jointly funded by AID and the Dominican Secretariat of Health, the program represents an \$11.6 million investment over a three-year period. Of this amount, AID has provided \$4.8 million in the form of a low-interest loan.

What makes the program work, of course, are the local women who serve as *promotoras*. They are highly motivated and seem to have a real sense of the importance of their mission, even though the only requirement is that they be able to read and write. Selected by community committees, they are each assigned 400-500 people in their own villages, where

they are known and respected. The fact that they are women allows them to deal effectively with the issue of family planning, which is urgently needed to slow the nation's soaring three percent population growth rate.



A village mother learns about family planning and fertility from *promotora* Senora Mendez.

The program has roughly four parts: family planning; immunizations; distribution of various medicines such as cold tablets, aspirin and pills against diarrhea; and nutrition and basic health education. Within this general framework, each *promotora* works out a schedule that suits conditions in her village. Senora Mendez, for example, spends the bulk of her time making home visits, seeing each family once every 15 days. (Her caseload of 103 families, some of which have up to 14 family members, is unusually heavy and will be reduced as soon as more *promotoras* are trained.)

At each house, she carefully records on the family's chart any births, deaths, illnesses, medicine or immunizations given and general observations. She has learned how to spot signs of malnutrition and knows when a case is beyond her simple skills, when a person should be seen by her supervisor, an auxiliary nurse, or sent for immediate treatment to the district



Promotora Carmen Rodriguez gives a villager an injection under the supervision of a nurse. Although the villagers don't like the

clinic. In this sense she functions as an early warning system of sorts, alerting health officials to any serious problems that need professional attention or catching them before they become serious. At the same time, the immunizations and basic instruction she gives the villagers have gone a long way toward improving overall health conditions in Quita Coraza.

"The children seem to get sick much less often than they did before," Senora Mendez observes, proudly tapping her black bag. She can point to the fact that diarrhea, a critical factor in infant and child mortality and once a "really serious problem in Quita Coraza," has been all but eliminated in the community. And very few children have died of other causes since the program began, she adds.

An important factor in the reduced incidence of illness and childhood deaths is the concerted Government drive to immunize everyone against measles, diphtheria, polio and tetanus. The *promotoras* administer the shots, but only under the watchful eyes of their nurse-supervisors. They may not be the most painless practitioners of the art, but in Quita Coraza and places like it, nobody seems to mind. It is the end result that counts.

During her daily rounds and at village meetings, Senora Mendez gives basic instruction in nutrition, sanitation and hygiene, passing along the things she learned in her training. She encourages all her families to plant gardens so they'll have more food to eat and a more balanced diet than the typical starchy staples that yucca, rice and beans provide. Mothers are urged to breast-feed their babies for a full year and to start them on solid food at six months—both novel ideas for Dominican peasant women. Even introducing so seemingly simple an idea as covered latrines has markedly improved health conditions in Quita Coraza.

Perhaps most important of all that the *promotoras* are doing is their work in the area of family planning. Senora Mendez holds meetings for small groups of about 15-20 women to give instruction on birth con-

needle, they appreciate the medicine and help the *promotoras* have brought to their families.

trol, and she follows up the meetings with further discussion during home visits. She has credibility with the women, being "one of them," and can sympathize with their problems, fears and hesitations. In her first six months on the job, she convinced 38 women that either they or their husbands should use some method of contraception—she supplies them with both the "pill" and condoms—and "more and more people" are beginning to join the program.

"More and more they realize they're having a lot of children and simply can't afford it," Senora Mendez says.

Another aspect of the health system which has unquestionably added to its effectiveness is the support the *promotoras* can count on receiving in their work. The director for the Southern Region, where Quita Coraza is located, visits each village in the region three or four times a month, and there is always an auxiliary nurse on hand for the immunizations. In addition, the community committees which select the *promotoras* are there to advise them on how to solve problems they may confront in their efforts to introduce new ways of doing things. Sometimes, for example, a parent refuses to let his children be vaccinated, or won't follow a prescribed treatment. Instead of having to cope completely alone, the *promotora* can look to the assistance and moral support of the village leaders who make up the committee.

For their hard work, time and effort, the *promotoras* receive a salary of \$30 a month. But according to AID health officer Ramon Rodriguez, "Most of the women have enough motivation so they don't care how much money we're paying."

Senora Mendez would seem to bear this out. She simply likes serving her community, she explains with a puzzled smile when asked what satisfaction she receives from the work. "Before, people got sick and would need medicine but couldn't get any," she says. "Now, I can give it to them for free and they don't have to suffer because they don't have money." 

IN PRINT

Seabed Mining and Economics

A Review by James W. Howe

Seabed Mineral Resources and the Economic Interests of Developing Countries by Danny M. Leipziger and James L. Mudge. Ballinger Publishing Co., Cambridge, Mass., 1976. 241 pp.

This is not one book; rather it is two. One is about offshore oil and gas found mostly within 200 miles of shore; the other is about manganese nodules containing manganese, copper, cobalt and nickel among other metals and found mostly in the deep sea bed. It is also a book about two time frames, one current while the book was being written — up to the time of the Third Law of the Sea Conference (beginning in March 1976), and the second being a last minute updating of the important effects of the agreements reached at that Third Conference. Although the authors assert that these recent agreements did little to disturb their work, in this reviewer's opinion, a portion of the first book on oil and gas was undone by the work of the Third Conference. The second book, on manganese nodules, remains fully relevant and is quite valuable.

Oil and Gas

The first book begins with a discussion of the distribution of oil and gas. It notes the growing consensus that coastal states will claim 200 miles of seas as zones within which they have exclusive rights to develop all economic potential including oil and gas. About 88 percent of the total offshore oil and gas production potential is included within that zone. If the 200 mile zone is agreed to (as was made virtually certain by the Third Conference) it will convey vast resources to the fortunate bordering countries. The book provides a

country-by-country listing of the receivers of the potential bounty. It industriously relates the distribution of the bounty to population and to per capita income. Unhappily it finds that the distribution of oil and gas will not improve but will worsen the disparity in global income distribution among nations. This is an important finding for which the authors deserve high marks. Some 55 countries including 45 low countries will be excluded entirely or substantially from any benefits.

The first book goes on to examine the exploitation of oil and gas from the technological, financial and commercial points of view. Clearly the technology is available for widespread exploitation. The financial requirements for investment in undersea oil and gas recovery are very high. However, the chances of covering these costs and leaving a large margin for profits are good for a number of offshore sites. Although a few developing countries can and in fact are exploiting their offshore areas directly, many of them will find that they need the private drilling companies to help them. There is a range of possible relationships between host country and private company from complete independence at one extreme (as in the case of China) to a relationship where oil companies dominate the entire oil scene as might be characterized by the arrangements in some Sub-Saharan countries. After a labored discussion of whether a country is better off with or without oil, the not surprising conclusion is reached that those with oil are more likely to benefit than those without. There then ensues a long and inconclusive discussion on whether the winning countries should share some of their revenues with the losers, how to tax the revenues of the oil countries, and

how to share them with the rest of the world. The amount to be shared may vary in 1980 from \$14 million to \$1.2 billion. This discussion is rendered largely irrelevant by the decision of the Third Conference not to share any revenues on production out to 200 miles.

International offshore oil and gas politics has not matched rich countries against poor, but rather coastal states against non-coastal. The former have recognized the potential wealth of developing this resource and have claimed it for themselves. The latter group of countries has been slow to see the potential of offshore oil and gas and has only too late begun to take an interest in it. They are in a minority (some 55 countries out of 144 analyzed) and as often occurs in affairs among states, they have been left without a share of the spoils.

Manganese Nodules

The second part of this book deals with the manganese nodules lying for the most part at the bottom of the deep seas. It is interesting, concisely written, timely and quite relevant to current discussions. Manganese nodules, often potato shaped and sized, are composed of varying metals including iron, manganese, nickel, cobalt, copper and lead plus other trace minerals. It is the nickel and copper that attract most attention. Some systems for gathering the nodules already exist and other more sophisticated methods are being developed.

The battle lines over the exploitation of these metals are generally drawn between the industrialized and the developing countries. The former, having the technology to exploit these resources and the markets to use them are eager to get negotiations completed so exploitation can get under way.

Mr. Howe is a senior fellow at the Overseas Development Council.

They would generally prefer a system that permits producers a free hand—a system that features production efficiency over distributional equity.

The developing countries would like to ensure that any revenues gained are distributed among developing countries, as well as industrialized countries, and that production does not proceed at a pace that will harm onshore producers of these same or competing metals.

The book examines the potential impact on existing metals producers, reviewing each of the metals in turn. It finds that there is little likelihood of damage to producers of copper or nickel, and only Gabon has a significant degree of dependency on manganese exports. Only in the case of cobalt is significant damage likely to occur, chiefly to Zaire. The authors proposed a contingency fund be set up to help any adversely affected developing countries (currently only Zaire is a prospect) diversify their exports.

A first rate discussion of how the international community should organize to exploit the deep sea resources follows. There are a variety of alternatives ranging from virtually unfettered freedom for the technologically qualified nations

and firms to an International Seabed Resource Authority (ISRA) that would itself exploit (or hire private companies to exploit) such resources.

The authors offer a compromise which would commit all parties to the dual goals of production efficiency and equity in distributing revenues. The Authority (ISRA) would lease tracts to miners who would be sponsored by states. ISRA would also receive a share in the benefits of mineral production. It would encourage developing countries to acquire underwater mining technology including joint ventures with private miners.

In the final chapter, the authors review the major developments in the Third Conference. With respect to oil and gas it is increasingly certain that the coastal states will gain virtually all of the benefits and will share almost none of them with the rest of the world. In the case of the manganese nodules, the authors fear that concessions made by the United States at the Third Conference in an effort to respond to demands by the developing countries for greater equity may unfortunately impair the efficiency of production without improving, perhaps even worsening, equity. —

IN BRIEF

Helping Haiti Farmers

The Agency for International Development is providing \$12.1 million to help Haiti's small farmers increase food production and income.

The funds consist of a loan of \$8 million and a grant of \$4.1 million which will help finance a \$22.6 million five-year comprehensive agricultural development project. In addition to an investment of \$8.8 million by the Government of Haiti, local community groups will contribute \$1.7 million in the form of local labor. The loan contract was signed April 27 in Port-au-Prince.

The Haitian program is designed to develop institutional structures and to train technicians who can integrate the flow of foreign resources from 15 countries and international lending agencies being offered for Haiti's agricultural revival.

One aspect of the plan is to improve the agricultural technology available to small farmers so they can make significant improvements in crop yields. The expected increase in productivity would in turn increase total production and incomes in the small farm sector. Better use of the land could be expected to provide additional employment in areas where there are now many jobless.

Buses for Egypt

A shipment of 50 heavy-duty transit buses recently were unloaded at Alexandria, Egypt, as the first of a major transit purchase of 1,600 buses by the Egyptian government from an American firm.

The buses were specially designed for Egypt by Ward Industries of Conway, Arkansas, under a \$68 million contract financed by the Agency for International Development through its Commodity Import Program. The buses cost \$52 million and spare parts total \$16 million.



A Haitian farmer receives help from an AID program designed to increase food production. Haiti recently has suffered a drought.

Papua New Guinea

AID is providing a \$548,240 grant to the Foundation for the Peoples of the South Pacific to help 35,000 women, children, farmers and youths in Papua New Guinea.

The Foundation will assist six local institutions in different parts of the country with rural and human development programs for the needy. Two programs are primarily for women, three deal with building and strengthening farm cooperatives, and one concentrates on youth development.

Environmental Impact

The Agency for International Development has filed with the Council on Environmental Quality an Environmental Impact Statement on its pest control program.

The Statement declares AID is adopting a policy which will place greater emphasis on technical assistance and research to promote the concept of integrated pest management. AID will decrease its assistance for the procurement and use of pesticides.

Agricultural pests such as locusts, grasshoppers, wire worms, aphids, grubs, scales, caterpillars and rodents destroy millions of tons of food crops in developing countries every year.

Except in emergency situations, AID no longer will provide assistance for pesticides cancelled or suspended by the Environmental Protection Agency (EPA) for health or environmental reasons — unless a thorough analysis shows that the benefits outweigh the risks and there is no other practical alternative.

AID's most significant policy shift is from one of providing pesticides to developing countries to one of helping those countries select and manage pesticides safely and effectively. (In the past, AID has provided only 1.6 percent of the pesticides used in developing countries.)

AID will promote the practice of integrated pest management in developing countries, focusing on the best and safest methods to improve human health and safeguard agricultural production.



QUOTES

"The earth has four billion people, it is estimated one-fourth of whom are desperately poor. For the fifth time the 26 nations of the International Development Association (associated with the World Bank) are just getting ready to raise money for long-term development assistance to poor countries. It's no small amount. The so-called IDA fifth replenishment is to raise \$7.6 billion, of which the U.S. will supply \$2.4 billion, subject to congressional approval.

"The IDA program has been successful; it promotes development programs in nations with the greatest poverty. The oil-rich countries are now joining in: Kuwait is down for \$180 million; the United Arab Emirates, \$50 million; Saudi Arabia (contributing for the first time) a hefty quarter billion (in U.S. dollars).

"Political strings are not tied to programs. Their goal is to raise standards of living by channeling financing resources to valuable projects. A side effect is that birthrates normally decline if living standards rise. But that takes time."

Christian Science Monitor
April 8, 1977

"Where mankind has erred in industrial development, population growth, or urbanization, it usually has gone wrong in the area of water development as well—and vice versa.

"Previous mistakes in water development, especially in developing nations, appear most often to have been associated with too singular an emphasis on industrialization and urbanization. For example, dams built to provide hydroelectric power to industry have aggravated water-borne diseases that afflict the peasantry. Or irrigation and other agricultural technology have been available only to well-to-do farmers and thus have aggravated the problems of 'surplus' poor leaving the country-

side for city slums.

"Judicious planning of water developments can serve as the pivot point around which earlier mistaken growth patterns are reversed. If, for instance, water use is geared to the needs of co-operative, labor-intensive irrigation projects, the poor might stay in rural areas. If at the same time, 'squatter camps' of displaced rural poor around cities are not furnished with water supplies for expansion, then these camps might cease growing. Likewise, if rural parents become assured of a supply of clean drinking water so that their existing children will not die of water-borne intestinal diseases, then they may be more willing to practice birth control."

Baltimore Sun
March 15, 1977

"In the developing world, Latin America remains the most promising region for agricultural expansion because of huge tracts of potentially arable land and the means at hand to increase productivity on already existing farms. At the same time, the rapid urbanization and substantial industrialization during the last three decades have led to neglect of the agrarian sector and frustrated its immense potential."

Jonathan Kandell
New York Times
March 23, 1977

"As long as the international economy remains based on market considerations, in an exclusively commercial arena dominated by trading powers, competition would seem to be the most immediately effective choice of weapon. Strengthening trade within the Third World is a step in the same direction: in the long term it would upset the arrogant self-assurance of the trading nations. Then would be the time to resume the North-South dialogue."

Sennen Andriamirado
Development Forum
March 1977



