BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

U.S. Strategy Needed For Water Supply Assistance To Developing Countries

The United States has no water policies and strategies despite the fact that much of the billions of dollars provided for developing countries' water projects emanates either directly or indirectly from the United States.

Inadequate maintenance and the need to rehabilitate community water supply systems are major obstacles to achieving the U.N. Water Decade goal of providing clean water and adequate sanitation for all by 1990.

This report concludes that the United States should exert more active leadership in influencing the allocation of available funds for, and in removing constraints to, water resources development.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This report discusses water resources development activities and problems in developing countries, especially those problems associated with providing community water supplies. The United States has not developed water policies and strategies despite the fact that much of the billions of dollars in financial support for developing country water projects emanates either directly or indirectly from the United States.

We are sending copies of this report to the Director, Office of Management and Budget; the Secretaries of State and the Treasury; the Acting Director, International Development Cooperation Agency; and to the Administrator, Agency for International Development.

Milton J. Socolar

Acting Comptroller General
of the United States

D I G E S T

GAO made this review because it has done no analysis previously to address water resources development, an essential and growing component of United States development assistance. Because of the magnitude of this worldwide problem and the significant resources invested in water and water related projects, GAO reviewed the direction of U.S. assistance programs. The report will be useful to officials involved with the recently announced U.N. Water Decade goal to provide clean water and adequate sanitation for all by 1990.

FUNDING WATER RESOURCES DEVELOPMENT AND THE U.S. STRATEGY

Most of the funds provided for water resources development by aid donors are channeled into projects for community water supply, irrigation and flood control, and hydroelectric power. Some funds are provided for other water-related activities, such as watershed management and development of institutional capability. Despite the fact that much of the billions of dollars in financial support for developing countries' water projects emanates either directly or indirectly from the United States, the United States has not developed water policies and strategies and does not possess an information base which would enable the formulation of comprehensive policies and strategies.

THE U.N. WATER DECADE

According to the United Nations, about 2 billion people, most of whom live in developing countries, are without reasonable access to safe water supplies and a greater number lack proper sanitation. To help cope with this vast problem, the United Nations has undertaken a new major effort to fulfill these needs and has designated the 1981-90 period as the International Drinking Water Supply and Sanitation Decade. (See p. 8.)

CONSTRAINTS TO PROVIDING SAFE WATER AND ADEQUATE SANITATION

Numerous problems and constraints will limit the progress that developing countries can make toward the U.N. goal to provide clean water and adequate sanitation for all by the year 1990. These major constraints involve funding; institutional and manpower needs; concentration of assistance in urban areas--even though the rural poor are in greatest need; and problems in maintaining facilities.

FUNDING

The estimated external assistance needed by developing countries to attain the goal of clean water and sanitation for all ranges from $5 to $12 billion, annually. Estimated assistance to water and sanitation programs from external sources was about $2.4 billion in 1979. Therefore, the average annual external assistance now provided would have to more than double during the Water Decade years just to meet the minimum capital costs--a difficult task for the United Nations, which is seeking funds for the Water Decade. In addition, developing countries would have to double their own funding just to meet the minimum needed to reach the goal. It seems unlikely that the developing countries will have the capability to generate and devote such vast added resources.

INSTITUTIONAL AND MANPOWER NEEDS

Even if sufficient funds are provided, there remains the problem of developing countries using funds efficiently and in time. A conservative estimate by the World Bank is that 100,000 people from developing countries will have to be trained annually in water and sanitation systems to meet the decade goal. How this will be done or funded is not clear and raises questions about whether the goal is realistic.

RURAL AREAS HAVE GREATEST NEED

The greatest need for safe water supplies and improved sanitation is in rural areas of developing countries, where about 70 percent of the population lives. However, external financial

assistance provided to date has been concentrated in urban areas, which are also considered the priority of developing countries themselves. Donors active at the grass roots level of developing countries provide very limited resources when compared with rural area needs. Most of the World Bank's assistance, for example, is for urban projects. The Bank finds it more difficult to develop drinking water and sanitation projects in rural areas and such projects almost never are self-supporting. Although developing countries decide for themselves whether some reasonable balance of assistance should be provided to both urban and rural areas, donors should exert their influence on such decisions, especially, if their emphasis or policies are to meet the needs of the rural poor majority.

MAINTENANCE PROBLEMS

Numerous comments have been made concerning inadequate maintenance of water supply projects in developing countries, particularly rural projects. For example:

--The World Health Organization estimated that from 40 to 80 percent of the handpumps installed in developing countries are inoperable within 3 years of installation.

--According to an official of the Agency for International Development, the developing world is full of broken pumps. Of 150 million pumps, two-thirds may be out of order at any given time.

--The United Nations stated that although $6 or $7 billion in total is being spent annually on new water and sanitation systems in developing countries, investments in maintenance are so negligible that they are not even recorded separately.

Information is not systematically generated to apprise host governments and aid donors of water supply maintenance problems and projects which need rehabilitation. Such information could be helpful in deciding how to make the best use of available funds for increased access to water supplies by poor people of developing countries. (See ch. 4.)

CONCLUSIONS AND RECOMMENDATIONS

A principal mission of the International Development Cooperation Agency is to formulate development policy and provide guidance on policy and aid budget matters to U.S. bilateral and multilateral programs. Given the magnitude of the needs in water resources, the billions of dollars of donor funds expended or programed, and the emphasis on significant increases in new funds called for by the U.N. Water Decade, it seems incumbent on the United States to develop policies and strategies for use in its bilateral program and to direct U.S. participation in multilateral programs.

GAO believes that the Agency should take a more active leadership role by influencing the allocation of bilateral and multilateral funds coming from the United States and by working with multilateral organizations and other bilateral donors on common views and concerns about water resources development. These concerns should focus on major constraints to water resources development, such as providing a reasonable share of external funds for the basic water needs of the rural poor, and on seeking opportunities to minimize waste and inefficiency associated with project maintenance.

GAO also believes that maintenance problems present a substantial obstacle to the success of water supply and sanitation projects. Insofar as projects constructed during the U.N. Water Decade are concerned, failure to maintain them while providing massive capital funds for short-term benefits would be unrealistic. Ways must be found by external donors and governments of developing countries to assure that viable projects are undertaken which will provide lasting benefits to the world's poor.

GAO recommends that the Director, International Development Cooperation Agency, develop comprehensive policies and strategies affecting U.S. bilateral and multilateral financial support for community water supply and sanitation activities in developing countries, and that they encompass, but not be limited to

--establishing reasonable and attainable interim goals during the U.N. Water Decade;

--emphasizing the use of bilateral and multilateral funds for water development activities and projects that will have a significant impact on the rural poor;

--collecting and maintaining information which would systematically assess the condition of existing water supply and sanitation projects and suggest a program to help those in need of rehabilitation;

--incorporating into loan agreements a requirement that developing countries provide funds for project maintenance;

--encouraging external donors to provide incentives to developing countries which have demonstrated that they will maintain water supply and sanitation projects; and

--emphasizing the need to fund programs for institutional development and training of maintenance personnel in those countries having the most critical needs.

GAO further recommends that the Director, International Development Cooperation Agency, also acquire information on irrigation and hydroelectric power activities which would enable the Agency to determine whether it should develop comprehensive policies and strategies for these major segments of water resources assistance. The information could include data on the levels of U.S. and other donor participation and financing of such activities, constraints to developing the resources, problems dealing with operation and maintenance of projects, and the extent to which the rural poor are to participate in the benefits derived from irrigation and hydropower projects.

AGENCY COMMENTS

GAO requested comments on a draft of this report from the International Development Cooperation Agency, the Agency for International Development, the Department of the Treasury, and the Department of State. The Department of State chose not to comment on the draft; comments were received from the other agencies. In a combined response, the International Development Cooperation Agency and the Agency for International Development agreed with most of the conclusions and recommendations.

Tear Sheet.

IDCA asked that GAO clarify its recommendation concerning establishment of interim goals during the U.N. Water Decade. GAO has done so. The Agency also suggested that GAO restrict the scope of its recommendations to community water supplies because of the absence of adequate information on irrigation and hydroelectric power activities. In view of the substantial financial assistance for irrigation and hydropower development, as discussed in the report, GAO believes the broader recommendations are still valid. (See app. III and p. 29.)

The Department of the Treasury said that it found GAO's coverage of the operations of multilateral development banks entirely satisfactory. (See app. IV and p. 32.)

Contents

		Page
DIGEST		i
CHAPTER		
1	INTRODUCTION AND OVERVIEW	1
	Assistance to developing countries totals billions of dollars	1
	Objectives, scope, and methodology	5
2	COMMUNITY WATER SUPPLY STRATEGY NEEDED	7
	Water policies and strategies	7
	The U.N. Water Decade: A new major effort to provide communities with clean water	8
	U.S. position on the Water Decade	13
	Observations and conclusions	14
3	WATER SUPPLY FOR THE RURAL POOR	16
	Urban projects receive most of the funds	16
	Congressional interest	19
	Donor activity in rural areas	21
	Observations and conclusions	21
4	PROJECT MAINTENANCE--A SUBSTANTIAL OBSTACLE TO SUCCESS	23
	Comments on inadequate maintenance of prior projects	23
	Condition of existing projects not known	26
	Observations and conclusions	27
5	SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS	28
	Conclusions	28
	Recommendations	28
	Agency comments	29
APPENDIX		
I	Water Problems in Developing Countries	32
II	Water Supply Status in Countries Visited	37
III	Agency for International Development and International Development Cooperation Agency comments	53
IV	Department of the Treasury comments	65

ABBREVIATIONS

AID	Agency for International Development
CARE	Cooperative for American Relief Everywhere, Inc.
FAO	United Nations Food and Agriculture Organization
GAO	U.S. General Accounting Office
IDCA	International Development Cooperation Agency
U.N.	United Nations
OECD	Organization for Economic Cooperation and Development
PVOs	Private and voluntary organizations
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
WHO	World Health Organization

(WHO photo by P.A. Pittet)

This Moroccan child benefits from a safe village fountain.

CHAPTER 1

INTRODUCTION AND OVERVIEW

Spacecraft pictures of the Earth dramatically show that the planet has an abundance of water; however, very little of it is directly usable in satisfying human needs. Fully 97.3 percent of the world's water is salty and, thus, unfit for drinking or for use in farming. Of the 2.7 percent of the water that is fresh, more than three-quarters is locked either in glaciers or polar ice. Another large portion is trapped in underground aquifers, some of them thousands of meters below the earth's surface.

The world's water resources should be sufficient to accommodate the needs of the projected doubling and trebling of population, but a fear is that growing mismanagement and abuse is reducing the availability of usable water. Local or regional sources of water can be exhausted by short-sighted use or can be rendered unusable through contamination.

The demand on community water supplies in developing countries has been increasing at an ominous rate as more and more people use water not only for drinking and cooking but to bathe, dispose of sewage, and to water gardens and livestock. In developing countries there is a great need for improvements in community water supplies, involving its quality, quantity, accessibility, and reliability. In addition to domestic consumption and waste disposal, water is principally used for irrigation, hydropower, industrial activities, navigation, recreation, and wildlife habitats.

Numerous problems have been cited in literature and reports on water resources development. (See app. I.) Many of these problems were emphasized and repeated during our discussions with donors and officials of developing countries which we visited during our review. (See app. II.)

ASSISTANCE TO DEVELOPING COUNTRIES TOTALS BILLIONS OF DOLLARS

Most funds which are provided to developing countries for water resources development by assistance donors are channeled into projects for community water supplies, irrigation and flood control, and hydroelectric power. Some funds are provided for other water-related activities, such as watershed management, development of institutional capabilities, industrial needs, desalination of water, and fisheries.

Precise financial information on external assistance provided or programed is not available, partially because funding for water resources activities frequently is integrated into more comprehensive programs. Nevertheless, the information we obtained from various sources shows that external financial assistance to developing countries for water resource development amounts to billions of dollars annually. Among the donor countries, the

United States, through its bilateral program and assistance to multilateral development banks and United Nations (U.N.) agencies, is the major contributor supporting the development of water resources. Currently, U.S. contributions to the international organizations generally range from 20 to 30 percent of their budgets. With respect to the World Bank group, cumulative U.S. contributions, as of September 30, 1980, to the International Bank for Reconstruction and Development were 22.7 percent of paid-in and callable capital and were 32.9 percent of subscriptions to the International Development Association.

Water supply and sanitation projects

External development assistance for community water supply usually includes funds for sanitation facilities. The World Health Organization (WHO) estimated that in 1979, total assistance to water supply and sanitation programs from external sources was about $2.4 billion. The World Bank has a separate water supply and sewage sector under which $1 billion was provided for projects in developing countries during 1979 1/--a substantial increase over the $375 million loaned in 1978. The amount loaned in 1979 represented 10 percent of the Bank's total lending for that year.

The Inter-American Development Bank loaned between 7 and 18 percent of its resources for water supply and sanitation activities in 1978 and 1979, averaging about $250 million per year. Asian Development Bank lending for water supply and sanitation during the 3-year period from 1977 to 1979 was about $96 million and substantial increases have been projected for the ensuing 3-year period. The lending for such activities during 1982 is expected to reach $228 million.

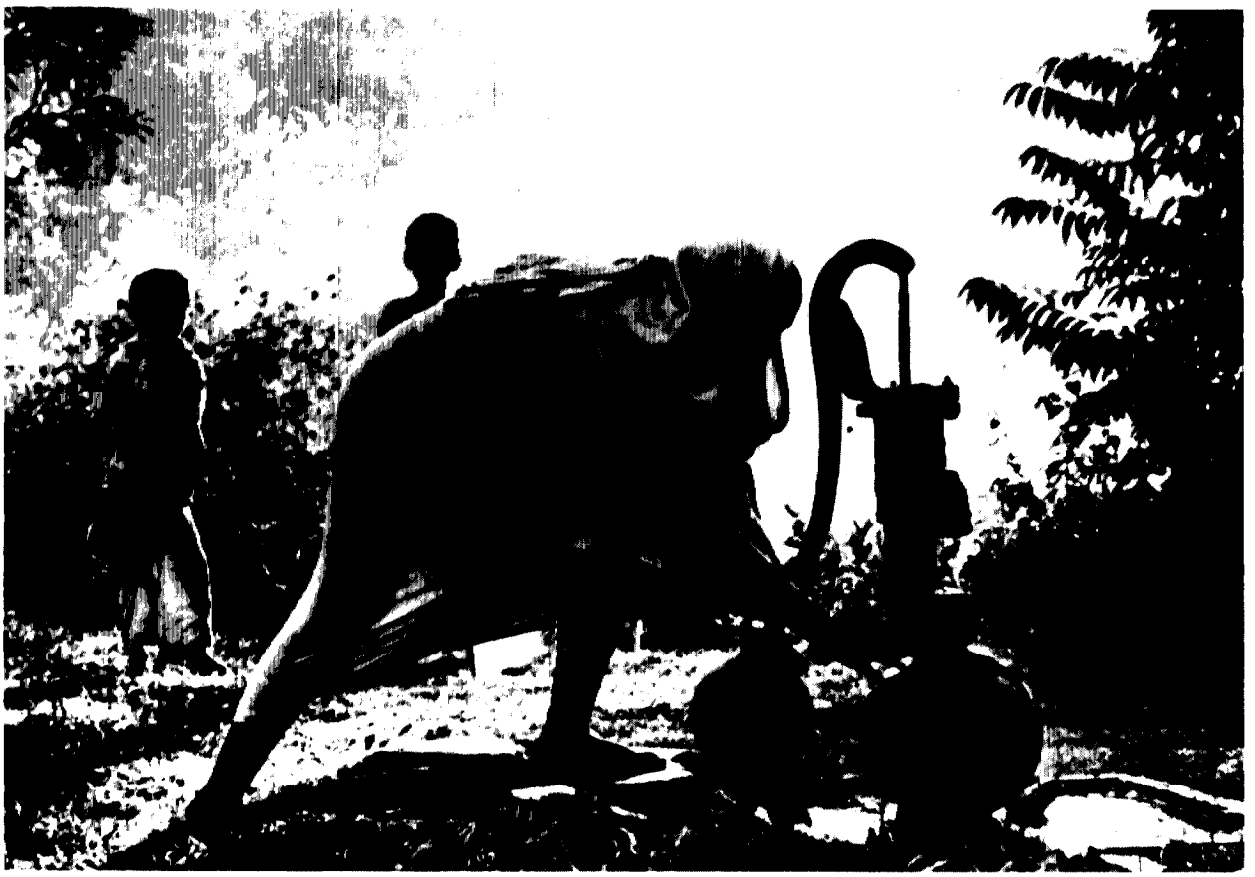
The Agency for International Development (AID) does not have a separate sector for water supply as does the World Bank. AID funds water supply and sanitation activities under its health sector and economic support funding. Economic support funds are often prompted by political or security objectives, but, as required by the Congress, funds are directed toward basic human needs and development goals. The amount of bilateral funds which AID provided for water supply and sanitation projects in developing countries was estimated by AID to be roughly $185 million in fiscal year 1979. In addition, the Peace Corps also provides U.S. bilateral assistance. A Peace Corps official estimated that of the Corps' 6,000 volunteers, 400 were working on water and sanitation projects. The estimated amount obligated for such work was $7 million in fiscal year 1980.

1/Funding for the years mentioned in this report frequently refers to fiscal years which end on June 30. For example, in the case of the World Bank, the year 1979 covers the period from July 1, 1978 to June 30, 1979.

Other bilateral donors contributing substantially to water supply development include some Scandinavian countries and Canada. The United Nations estimated that a recent annual average of about $87 million was contributed to developing countries by Sweden, Finland, and Canada.

The United Nations Children's Fund (UNICEF) estimated that its expenditures for water supply and sanitation projects totaled $53 million during 1979. It plans to double its support to about $100 million annually by 1984. The United Nations Development Program (UNDP) expended about $700 million in 1979 but the manner in which it records project data does not provide a ready break-out of expenditures for water supply and sanitation activities. This is due partly to the nature of the projects funded wherein water-supply activities are often integrated into larger programs, so financial records do not list such activities under a separate category.

Other international agencies are involved in water resources activities in developing countries, including private and voluntary organizations (PVOs). For example, the Cooperative for American Relief Everywhere, Inc. (CARE), used about $10 million in 1977 for water supply and sanitation, according to a CARE official. Other active PVOs include the Catholic Relief Services, Church



A MOTHER IN BANGLADESH PUMPS WATER FROM A NEWLY INSTALLED TUBEWELL.

(WHO Photo by I. Guest)

World Service, Episcopal Church in the U.S.A., and Lutheran World Relief, Inc. These organizations did not have an overall estimate of the level of assistance applied to water development activities but some stressed that much of their work related to such activities.

A new major effort has been undertaken by the United Nations to improve community water supply and sanitation. In a special session of the General Assembly in November 1980, the United Nations designated the 1981-90 period as the International Drinking Water Supply and Sanitation Decade (Water Decade). The goal of the Water Decade is to provide clean water and adequate sanitation for all by 1990.

Irrigation projects

The agricultural sector is the largest user of water and accounts for about 80 percent of global water consumption. Compared to community water supplies, we found very little information readily available on the global needs and goals of irrigation programs. Funding information is also sketchy. Perhaps one reason is because of the emphasis currently being given by the United Nations on providing clean water for all by 1990.

Irrigation projects funded by the World Bank also provide flood-control benefits. Lending by the Bank for irrigation activities during 1979 and 1980 totaled about $2.3 billion. India, received highly concessional loans totaling $643 million for irrigation and flood-control projects during that period.

AID funding of irrigation projects for fiscal years 1976 through 1979 totaled about $167 million. An AID official informed us that most Agency funding of irrigation projects has been in the Asia region where AID invested about one-third of $1 billion. He said that if current estimates are followed, India should receive about $350 million, Bangladesh $170 million, for irrigation projects from AID during the next 5 years.

The U.N. Food and Agriculture Organization (FAO) will spend an estimated $2.5 million for assistance in water development and management during 1980 and 1981. To achieve significant progress in the use of available water resources, FAO estimated that an investment of about $34 billion (at 1975 prices) would be required by 1990.

Hydroelectric power projects

In contrast to North America, Europe, and the U.S.S.R., there is vastly more potential for hydroelectric power development in Africa, Asia, and Latin America. Current hydropower production in these regions has been estimated to range from 3 to 18 percent of potential output. We estimated that the World Bank loaned about $200 million in 1979 and $860 million in 1980 for hydropower

development. Financial resources provided by the Inter-American Development Bank for hydropower development in fiscal year 1978 totaled $603 million, about four-fifths of the resources allocated to its energy sector. In fiscal year 1979, about $320 million was provided for hydropower development.

AID does not generally get involved in large hydroelectric power development because it has deemphasized funding of such infrastructure projects. AID, however, is assessing small hydropower development potential in 12 developing countries. AID believes that small hydropower installations, using local labor and materials, can provide needed electrical power and useful supplies of water for rural areas.

OBJECTIVES, SCOPE, AND METHODOLOGY

Although we have completed substantial work in many areas of development in the past, we have done no in-depth analysis to specifically address this essential and growing component of development assistance.

Our objectives are to (1) give an overall picture of the world's water resource development activities (especially in relation to the Water Decade), (2) identify problems associated with water resource development and constraints in meeting the U.N. Decade goal, (3) determine the U.S. strategy for providing assistance to develop water resources, and (4) offer our observations, conclusions, and recommendations on how the United States and others can more effectively provide their aid. There are other objectives which we did not pursue because they are sufficiently broad to be considered separately. They include determining the elasticity of water supply in terms of population growth; reviewing plans and techniques useful for conservation and drought prevention; and determining the impact of water supplies and sanitation practices on health and economic well-being.

Because the United States is just one of many donor countries and organizations attempting to develop the world's water resources, we relied on the cooperation of many other donors and recipient countries for much information. We held discussions with officials of the International Development Cooperation Agency (IDCA), AID, the Department of State, the Peace Corps, selected U.N. agencies, multilateral development banks, and PVOs. We also visited selected developing countries--Morocco, Tunisia, Indonesia, Sri Lanka (formerly Ceylon), and Panama--to ascertain whether water problems exist in those countries and to inquire into the magnitude of such problems. Our country selections were based on a number of factors including levels of U.S. and other donor development assistance, regional coverage, and the desire to include a broad cross-section of water resources activities.

The information we obtained came from computer systems reports, studies, and various publications on water resources development in developing countries. We discussed many of the problems

with external donor officials and representatives of the developing countries which we visited. We sought information and data on external organization participation and funding, and we focused on the extent to which policies and strategies existed, on the attainability of the U.N. Water Decade goal and on the level to which the rural poor were receiving external assistance compared to that being provided to urban populations. We also sought information on any systems which may have been in place which described the condition of existing projects--to facilitate the rehabilitation of those which need such work.

Because of the extensive area of inquiry and time constraints, we relied heavily on interviews and written information willingly provided by various donor organizations and host governments. We also used interview material from many officials and publicly available information, such as articles, reports, and studies on the subject. In addition, we made an analysis of the estimated costs of reaching the U.N. Water Decade goal.

CHAPTER 2

COMMUNITY WATER SUPPLY

STRATEGY NEEDED

The United States, through its bilateral assistance program and in partnership with the United Nations and the multilateral development banks, provides hundreds of millions of dollars for programs to improve and develop the world's water resources. Yet, neither the United States nor the international development institutions have a clearly stated and comprehensive strategy to guide their respective assistance efforts.

The United States has not developed strategies to guide its assistance for community water supply and sanitation activities although it is participating in the U.N. Water Decade effort. A U.S. comprehensive policy and strategy seems to be particularly needed for such activities because this segment of donor assistance is currently receiving increased funding and attention. IDCA, the U.S. agency responsible for the formulation and coordination of U.S. international development policies, has not included water resources development as a separate area for priority attention, despite the volume of funds involved. IDCA does not possess an information base which would enable it to formulate comprehensive policies and strategies affecting the major segments of external aid for water resources development--community water supply, irrigation, and hydropower.

Similarly, the World Bank has no overall water strategy nor does the United Nations. A U.N. official said it hopes to ultimately develop an overall strategy in connection with the U.N. Water Decade. To guide its participation in the U.N. Water Decade activities, AID drafted a policy paper and transmitted it to its overseas missions for comment. Details on these matters follow.

WATER POLICIES AND STRATEGIES

A World Bank official told us that the Bank has no overall water strategy but relies on its developing countries' economic reports for establishing Bank priorities and country strategies. The reports outline the countries' needs, which the Bank sets by priority. The Bank official said that if a developing country, for example, makes a request of the Bank for financial assistance on a specific water project which does not coincide with the Bank's planned strategy for that country, the Bank will suggest that the country seek assistance from another donor and will help it find one. The World Bank official also said that the Bank and its affiliate, the International Development Association, formulate 5-year "rolling" program plans on a country-by-country basis. The plans take into account a developing country's credit history, absorptive capacity, and Bank priorities and money supply. The Association considers these factors as well as per capita income and population size.

The UNDP attaches a high priority to the U.N. Water Decade effort. A coordinator has been appointed at the Assistant Secretary General level to promote these activities to the fullest possible degree. The coordinator informed us that the United Nations is attempting to develop a strategy for this effort through its steering committee, whose membership includes representatives from WHO, UNICEF, FAO, the International Labor Organization, and the World Bank. He said that each U.N. organization is preparing its own strategy, encompassing its particular interest and concerns, and that ultimately these strategies will be used to develop an overall strategy. The steering committee held at least six meetings before the U.N. General Assembly launched the Water Decade on November 10, 1980. UNDP is also encouraging the development of national water strategies at the country level. Further, we understand that the Organization for Economic Cooperation and Development (OECD) had been considering holding a special meeting on the Water Decade for its Development Assistance Committee--the focal point for coordination of activities of bilateral aid donors from industrialized countries.

In August 1980, AID transmitted a draft policy paper on community water supply and sanitation to its missions for comment. The purpose of the paper is to guide AID participation in Water Decade activities. (See p. 13.) The draft paper contained a considerable amount of background material but it did not state what the AID strategy will be, concerning future funding or how it will cope with many specific water supply and sanitation project problems.

IDCA is responsible for developing policy guidelines for the use of bilateral and multilateral funds which the United States provides. It should, therefore, be in a position to influence multilateral development bank lending and U.N. activities through U.S. participation. It is responsible for identifying development policy issues and specific lending problems and for developing and coordinating the proposed U.S. position for the guidance of the banks.

As its priority, IDCA is focusing on bilateral efforts in the food, energy, population, and health sectors. The former IDCA Director said that this priority was established after reviewing needs and opportunities with developing countries and the activities of other donors. Insofar as the U.N. International Drinking Water Supply and Sanitation Decade is concerned, the Director said that the principal U.S. financial contribution to the Decade would be channeled through the World Bank, and that the Bank and UNDP are taking a welcome lead in that effort.

THE U.N. WATER DECADE: A NEW MAJOR EFFORT TO PROVIDE COMMUNITIES WITH CLEAN WATER

Since 1976, the United Nations has been preparing for the International Drinking Water Supply and Sanitation Decade. The Decade was launched during a special session of the General Assembly in November 1980, at which the need for improved water and

sanitation for better health was stressed. The Water Decade goal is to provide clean water and adequate sanitation for all by 1990. However, numerous constraints exist which affect the progress that developing countries can make toward this goal and raise questions about whether the goal is realistic. Some of the constraints are funding levels; institutional and manpower needs of developing countries; concentration of assistance in urban areas, even though rural poor are in greatest need; and problems in maintaining facilities. These problems are discussed later in this section.

Genesis of the Water Decade

The U.N. Conference on Human Settlements held in Canada in June 1976 recommended that quantitative targets be set by nations to ensure that their people have access to safe water supplies and hygienic waste disposal by 1990. The U.N. Water Conference held in Argentina in March 1977 pursued this theme further by recommending that member nations reaffirm their commitment to adopt programs having realistic standards for quality and quantity of drinking water for urban and rural areas by 1990 and that they should prepare plans for 1980 to provide such coverage and to expand and maintain existing systems. The Conference asked member nations to

A heavy daily burden for these women of India--and the water is not safe. (WHO photo by A.S. Kochar)

determine the resources needed and added that appropriate external assistance should be available to assist in building, operating, and maintaining water supply and waste disposal systems.

The United Nations, in launching the Water Decade, stressed the need for improved water and sanitation for better health and cited WHO estimates that 80 percent of all diseases in the world are water-related and that hundreds of millions of people suffer these illnesses. Some of the illnesses cited were:

--Diarrhea - kills 6 million children every year and contributes to the death of up to 18 million people.

--Trachoma - affects about 500 million people at any given time and often causes blindness.

--Parasitic worms - infect nearly half of the entire population of developing countries.

It was also stated that about 2 billion people are without reasonable access to safe water supplies and that a greater number lack proper sanitation.

Problems in achieving the U.N. Water Decade goal

Major problems in achieving the U.N. Water Decade goal involve funding, institutional and manpower needs of developing countries, and problems in reaching the rural poor and in maintaining facilities. Unless these interrelated problems are effectively dealt with, the overall effort could fall far short of the goal of clean water and adequate sanitation for all by 1990.

Funding

Several estimates have been made on the cost of attaining the U.N. goal.

--WHO and the World Bank estimate that a minimum of $140 billion will be needed--a four-fold increase in resources presently allocated to water supply and sanitation in developing countries. Of this amount, $5 billion a year would be needed from external sources.

--The costliest option, affected by choices of technology, scope, and level of services would exceed $600 billion--$60 billion, annually.

--Another option, based on use of less sophisticated, lower-cost technologies, would cost $300 billion--$30 billion, annually.

The latter two more costly estimates (in 1978 U.S. dollars), made by the World Bank, are considered more realistic but exclude costs of operation and maintenance.

UNDP stated that at least one-fifth, or perhaps as much as one-third, of the funds needed during the Water Decade might have to come from external sources. Using the above information, it appears that the external assistance needed by developing countries to fulfill the Water Decade goal ranges from about $5 to $20 billion, annually. WHO estimated that the 1979 assistance to water supply and sanitation programs from external sources was $2.4 billion. It should be noted, however, that lending by the World Bank, the major lender in this sector, decreased from $1 billion in 1979 to $630 million in 1980. Therefore, the average annual external assistance now provided would have to more than double during the Water Decade years just to meet the estimated minimum amount, a difficult task for UNDP in seeking Water Decade funds. In addition, most of the funds, if obtained, would result in expenditures beyond the period of the Water Decade. For example, World Bank and AID projects take about 7 or 8 years from conception to completion.

As of December 1980, support for the Water Decade has been in terms of verbal statements rather than a willingness to substantially increase funds. Exceptions are the World Bank, UNICEF, and the Asian Development Bank. Though World Bank lending for water supply and sanitation projects totaled $375 million in 1978 and $630 million in 1980, we understand that Bank staff believes the $1 billion in funding provided for 1979 will be maintained on the average throughout the Water Decade. UNICEF, probably the most active agency in the rural water supply subsector, plans to double its support by 1984 to about $100 million, annually. Asian Development Bank lending for water supply and sanitation projects for the 3 years beginning in 1980 is estimated to be $108 million, $146 million, and $228 million, respectively. The UNDP Administrator was disappointed at the limited financial commitments made when the Water Decade was inaugurated in November 1980, stating that to meet the U.N. Water Decade goal, new facilities were required to serve half a million more people every day of the 10-year period.

In addition to obtaining funds from external sources, the question remains of whether developing countries have the ability to provide their share of the resources. WHO estimated that the countries' 1979 investments in water and sanitation were about $4.6 billion. Using this amount and estimates prepared by WHO and the World Bank, the average cost to developing countries to fulfill the goal of the U.N. Water Decade would range from $9 to $40 billion, annually. It seems unlikely that the developing countries will have the capability to generate and devote such vast added resources needed to meet the goal.

The developing countries establish development priorities, and the emphasis they place on developing water supply and sanitation is determined by them. Therefore, the amount of funds to

be applied to water resources activities largely will depend on the political will of each developing country.

Institutional and manpower needs

Even if sufficient funds are provided, the problem remains of developing countries using funds efficiently and in a timely way to meet the Water Decade goal. This problem has been frequently mentioned in literature on water supply and by various donor and developing-country officials with whom we spoke. Some of their comments follow.

--In rural water programs, by far the most crucial problems are the institutional and financial ones. (World Bank paper on village water supply.)

--"More than anything else the need is for adequate training of manpower. In most developing countries there is an extraordinary lack of trained personnel at all levels ranging from village level maintenance workers to skilled national policy makers." (UNDP.)

--The Asian Development Bank's staff which deals with water supply activities stated that the lack of trained manpower and institutional competence generally are more serious handicaps to achievement of the U.N. Water Decade goal than providing funds.

--"A major hurdle for step-by-step planning of programmes and projects in technical cooperation is the high rate of turnover among country staff. The waste of time, energy and enthusiasm resulting from such lack of continuity is enormous." (WHO official.)

--Two-thirds of the engineers in one country's Ministry of Water Development are expatriates from varying backgrounds with short-term tenure, and one-third of the senior staff posts are either vacant or occupied by unqualified persons. (AID evaluation report.)

UNDP stated that the need for training professional and technical staff, such as policymakers, surveyors, economists, sociologists, engineers, and mechanics, is enormous. A conservative World Bank estimate is that 100,000 people a year from the developing countries will have to be trained in water and sanitation systems to meet the Water Decade goal. UNICEF made a similar estimate.

Reaching the rural poor and maintenance problems

The manner in which developing countries deal with constraints in reaching the rural populations and in solving pervasive water supply maintenance problems will have a significant bearing on the success or failure of the Water Decade. We believe that these are very critical issues; they are presented in detail in Chapters 3 and 4 of this report.

U.S. POSITION ON THE WATER DECADE

In 1978, the United States was preparing to play a significant role in fulfilling the Water Decade goal. The plan approved by the then AID Administrator, called for an increase in the funding level of development assistance for water and sanitation from about $50 million, annually, to an increased annual average of $250 million, and totaling $2.5 billion for the duration of the Water Decade. These amounts excluded economic support funds. AID cabled the missions of the U.S. intent, citing the need to improve the health of the people of developing countries, and stating that it planned to provide "substantial support" for rural water and sanitation projects if certain conditions were met. AID also asked the missions to identify activities to be supported, beginning in fiscal year 1981. Mission responses to the cable asked for assurances of support before planning and implementing projects.

An April 1980 memorandum stated that an interagency agreement to aim for bilateral support of $2.5 billion for the Water Decade was not announced because of budget problems and the time did not seem appropriate for Office of Management and Budget approval of a long-term commitment. The question then arose concerning the emphasis the United States should give to the Water Decade and how that emphasis should be expressed.

In August 1980, AID sent a draft policy paper on domestic water supply and sanitation to its missions for comment. The transmittal letter stated that the paper, when approved, would guide AID participation in the Water Decade. A primary question asked by missions in their responses was: --Will there be an increase in available funds for domestic water supply and sanitation programs during the next decade?

The IDCA Director partially answered the missions' question on increased funding at the special session of the U.N. General Assembly on November 10, 1980, inaugurating the Water Decade. He said that the United States supports the Water Decade and that its principal financial contribution would be channeled through the World Bank and that the United States would continue to use its bilateral assistance program to complement UNDP-World Bank efforts, particularly through innovative steps aimed at developing more effective and less costly ways of providing and maintaining basic water and sanitation systems in rural areas. No comment was

made suggesting a substantial increase in U.S. bilateral development assistance funding for water supply and sanitation programs.

Many missions also asked for more guidance, and their responses reflected the need for AID to transmit material on engineering, health, bibliographies, and state-of-the-art literature. Another question raised by some missions--how does improved water supply and sanitation compare to other health interventions in terms of cost effectiveness? Other missions stated that just getting water--any water--to developing countries is crucial. Comments on the missions' request for guidance and information on the health question were contained in a Bureau for Program and Policy Coordination memorandum summarizing mission responses to the AID cable. It referred the requests for guidance and information to other AID bureaus for action.

OBSERVATIONS AND CONCLUSIONS

Despite the volume of funds committed and anticipated for water resources development, donors generally have not developed comprehensive policies and strategies dealing with such activities and there seems to be a lack of good financial data and other information for decisionmaking. This is especially pertinent to the United States which, for example, has recently provided about 22 percent of capital increases and replenishments of multilateral development banks, yet has no strategy for influencing the manner in which funds used for water resources development are applied.

We believe that the United States could increase its attention to these activities by

--obtaining basic information, including better financial information on funds committed and applied for water resources projects, to enable it to prepare its own policies and strategies affecting irrigation and hydropower development, for example;

--working with multilateral institutions and bilateral donors, through the OECD Development Assistance Committee, on common views and concerns about water resources development, making these known to developing countries; and

--developing comprehensive policies and strategies in the community water supply and sanitation sector.

Based on the current responses by aid donors and developing countries to the Water Decade and projected funding needs, the long timeframe for preparation and implementation of viable projects, and other constraints, reaching the U.N. goal of providing clean water and adequate sanitation for all by 1990 appears overly optimistic.

Substantial increases in financial support would have to be forthcoming to close the gap between the level of funding committed to date for water supply and sanitation activities and that said to be needed over the 10-year period. Donor organizations and developing countries should collaborate in developing reasonable and attainable interim goals. We believe interim goals should be established on a country-by-country basis and should be consistent with each country's surveys of water resources, needs, and goals for the Water Decade.

Such interim goals, for example, could focus on problems related to institutional development, training, accessibility to drinking water, sanitation facilities, increasing the quantity and improving the reliability of water supplies, operation and maintenance services, rehabilitation of existing projects, and useful water resources surveys. These efforts could include identification of the amount and timing of funds to be applied, and the name or names of the funding sources. Further, a distinction should be made between the recipient populations--whether urban or rural.

UNICEF photo by Buss

Indian villagers draw clean drinking water from newly-installed hand pump.

CHAPTER 3

WATER SUPPLY FOR THE RURAL POOR

The greatest need for safe water supplies and improved sanitation is in rural areas of developing countries, where about 70 percent of the population lives. According to WHO, only 20 percent of the rural population in developing countries has reasonable access to safe water compared to 75 percent in the cities. In developing Water Decade costs, the World Bank estimated that by 1990 about 1.6 billion people in rural areas will need clean water and adequate sanitation compared to about 645 million in urban areas. However, financial assistance provided so far has been concentrated in the urban areas, which is also considered the priority of the developing countries themselves. Donors active at the grass roots level of developing countries provide very limited resources compared to the needs of rural areas.

What are the rural financial needs during the Water Decade? Using certain levels of service and costs which the United Nations suggested, we projected that rural financial needs during the Water Decade would range from $123 to $428 billion. UNDP stated that at least one-fifth, or perhaps up to one-third of the funds needed during the Water Decade might have to come from external sources. Therefore, it appears that external assistance needed by developing countries to reach the Water Decade goal in the rural area could range from about $2.5 to $14.3 billion, annually. 1/ In contrast, UNICEF estimated the overall investment to rural water supply and sanitation in developing countries from external sources in 1979 was about $400 to $500 million--a small sum, compared with estimated needs.

URBAN PROJECTS RECEIVE MOST OF THE FUNDS

Of all the external assistance provided to developing countries for water supply and sanitation activities the World Bank has provided more financial support than any other organization. For example, of the estimated $2.4 billion in funding in 1979, the World Bank provided $1 billion. However, most Bank support is for urban projects. Bank officials commented on the thrust of Bank funding to urban areas as follows.

--Urban areas receive priority over rural areas by the developing countries themselves because the cities are the center of economic development involving industry, government, and tourism.

1/These estimates exclude a factor for inflation during the Water Decade. The estimates also exclude operation and maintenance costs.

--Large concentrations of people pose the greatest threat to epidemics which makes it imperative to have safe water supplies.

--The World Bank finds it more difficult to develop rural water supply projects because these projects almost never are self-supporting and because there is a lack of indigenous institutional development in rural areas which precludes any significant rural development. Projects are more readily self-supporting for urban water systems but it is more difficult to have financially viable projects in rural areas.

A World Bank official said that the Bank's policy is to provide help to rural areas of developing countries, but difficulties in developing financially viable rural water supply projects makes implementation of the policy more difficult. World Bank lending for water supply as part of rural development projects, which averaged about $100 million annually during 5 previous fiscal years, dropped to $30 million in fiscal year 1979. This decrease was attributed to the realization that much greater efforts are necessary to solve problems of institution building, manpower development, operation and maintenance and to provide at least a minimum level of health services to make projects fully effective.

Similarly, the Asian Development Bank provides most of its assistance for water supply to urban areas--estimated at 95 percent of total water supply funding. One view was that aid to large urban areas makes sense because there is more impact on a country's economic development and that payment for water supplies by the urban users reduces the financial drain on governments.

In its 1981 annual report, IDCA stated that multilateral development banks are particularly qualified to fund large high-cost projects because they are able to generate large amounts of capital from their many donors. IDCA also stated that, at the urging of the United States, multilateral banks in recent years have allocated an increased portion of their funds for projects in the rural areas of the poorest countries. But it is apparent that there has been no substantial increase to date by these banks for rural water supply projects. In this connection, an AID memorandum stated that urban areas are receiving a disproportionate share of World Bank and AID assistance.

The funds which AID is currently providing for water supply and sanitation projects were estimated to be roughly $200 million annually. Despite its basic needs orientation, however, more funds are being applied to urban projects than to rural projects. One reason is that most of the assistance is from economic support funds provided for urban water supply projects.

The United Nations estimated that bilateral funds for water supply and sanitation contributed by other countries or through

(UNICEF photo by Diabate)

Providing water for cattle in Mali.

funds set up by Organization of Petroleum Exporting Countries averaged about $572 million anually in recent years. No estimate was given for the portion applied to rural projects, however, the United Nations did say that UNICEF is now probably the most active agency in rural water supply activities and that among the bilateral donors, the Scandinavian countries, the Netherlands and Canada have also concentrated their support on this subsector. UNICEF estimated that its expenditures for water supply and environmental sanitation totaled $53 million in 1979, and that the overall investment to rural water supply and sanitation in the developing countries from external sources in 1979 was estimated at about $400 to $500 million. Using the U.N. estimates, this would leave about $2 billion--the bulk of the external funds as provided for urban projects during 1979, even though the United Nations considers the financial and human needs of the rural areas to be much greater than those of urban areas.

Developing-country governments choose the financial balance between urban and rural water supply and sanitation development; international financial institutions, U.N. agencies, and bilateral donors act in response to government and to expressed priorities. A U.N. official stated that development of rural water supply sanitation is a priority of the U.N. Water Decade, however, most developing-country governments are under pressure to provide services to the urban areas where the benefits can be readily seen.

CONGRESSIONAL INTEREST

A June 1979 report by the House Committee on Appropriations said that the U.N. Water Decade reflects a new awareness of the need for coordinated action of a global scale and the President said the U.S. support for international efforts to provide clean drinking water for the world's people is a major priority. The committee urged that AID formulate a program without delay to assure safe drinking water for the rural populations of recipient countries. The Committee had hoped that AID would include such a plan in its fiscal year 1981 budget presentation, but AID did not present the requested program in its presentation. As noted earlier, AID did circulate a draft policy paper to its missions on water supply and sanitation, and an AID official said the policy paper should help satisfy the committee request. However, the paper did not include any comments on increased financial assistance for such activities nor did the paper request a shift of more funds to rural projects.

IDCA has not undertaken a concerted effort to emphasize a U.S. concern that its bilateral and multilateral financial support for water resources development be used to a greater extent to meet the basic needs of the rural poor in developing countries. We believe that opportunities exist for IDCA to lead in promoting such an effort, consistent with a congressional mandate to meet the needs of the rural poor. This can be done especially through the multilateral agencies which apply substantial financing for water resources for development.

WHO/UNICEF photo by Matheson

WHO photo by J. Abcede

Mobilizing community resources and training, showing the men of a Kenya village (top) laying a water pipe and young men in Sarawak (bottom) learning to connect pipes.

DONOR ACTIVITY IN RURAL AREAS

Numerous international and bilateral donors are involved in providing water supply and sanitation assistance in rural areas of developing countries. Though many of these donors operate at the grass roots level, they, as a group, provide very limited resources, compared with the needs for funds from external sources.

The estimates of financial assistance which we obtained were rough ones. An estimate was unavailable for some donors because funding for water supply and sanitation was combined under sectors or accounts principally involving other activities. Nevertheless, it is clear that only minimal funds are being applied compared with the estimated need for funds in the rural areas during the U.N. Water Decade, which is vast.

As stated previously, UNICEF is considered to be one of the most active agencies working in rural areas, expending about $53 million in 1979. Other U.N. agencies active in the rural area are UNDP, WHO, and FAO. Information on the amounts which they contributed, however, was not readily available.

PVOs active in the rural area include the Catholic Relief Services, Church World Service, the Episcopal Church in the U.S.A., and Lutheran World Relief, Inc. These organizations were unable to give us an overall estimate of the level of assistance applied to water development activities, but some stressed that much of their work is related to water resources activities. CARE is also actively involved in rural areas of developing countries, and a CARE official estimated that 30 percent of a recent $35 million budget was for water supply and sanitation projects. He said that it is more important to emphasize adequate quantities of reliable water supplies than concentrating on potable water. He also said that village projects should focus on upgrading existing facilities so that costs are within the economic means of the villagers.

In addition to AID, which has provided less than $100 million in bilateral assistance, annually, for rural water projects, the United States also assists developing countries through the Peace Corps. A Peace Corps official estimated that of the Corps' 6,000 volunteers, about 400 were working on environmental sanitation which included well drilling and improvements, building latrines, and training and education. He, too, was an advocate of upgrading existing rural water facilities, stating that periodic improvements should be made when villagers are better educated in sanitation practices and are capable of maintaining the water facilities.

OBSERVATIONS AND CONCLUSIONS

For the U.N. Water Decade goal to be successfully achieved in the rural areas, much more will have to be done by international financial institutions, U.N. agencies, bilateral assistance donors and the local governments.

Although developing countries decide whether some reasonable balance of assistance should be provided to both urban and rural areas, donors should exert their influence on such a decision, especially if their emphasis or policies are to meet the needs of the rural poor in developing countries. Consistent with this congressional mandate, we believe that IDCA should lead in promoting such an effort, especially through multilateral agencies which apply substantial financing for water resources development.

We believe that the proportion of external assistance provided to developing countries should be influenced in part by each country's efforts to provide a reasonable funding allocation to rural areas. Perhaps the international financial institutions, for example, could arrange to continue funding projects in urban areas of certain developing countries if the countries would agree to use more of their own resources for rural water supply and sanitation projects.

CHAPTER 4

PROJECT MAINTENANCE--

A SUBSTANTIAL OBSTACLE TO SUCCESS

Numerous comments have been made concerning inadequate maintenance of water supply projects in developing countries, particularly rural projects. The United Nations stated that although billions of dollars are spent annually on new water and sanitation systems in developing countries, investments in maintenance are so negligible that they are not even recorded separately. AID evaluation reports have highlighted maintenance problems.

There is no systematically generated information to apprise host-country governments and donors of water supply maintenance problems and projects needing substantial rehabilitation. Furthermore, donor organizations seem reluctant to rehabilitate projects previously constructed by another organization even though a U.N. committee believes that financing rehabilitation works could yield higher returns than new construction. (See app. II.)

COMMENTS ON INADEQUATE MAINTENANCE OF PRIOR PROJECTS

Some of the comments which have been made concerning inadequate maintenance of water supply projects in developing countries follow.

--WHO estimated that from 40 to 80 percent of the hand pumps installed in developing countries are inoperable within 3 years of installation.

--According to a World Bank publication, it is not difficult to find villages where the water supply system is either not working as planned or not functioning at all.

--According to an AID official, the world is full of broken pumps. Of 150 million pumps, two-thirds may be out of order at any given time.

--A World Bank official said that water supply systems which normally last at least 30 years in developed countries last only 5 to 7 years in lesser developed countries because of lack of maintenance.

--UNICEF spot studies in one country revealed that 70 percent of the pumps were not functioning.

--An AID report stated that it has been recently claimed that 35 to 50 percent of the water taps in rural areas are out of order 3 to 5 years after construction. The report also stated that the

accuracy of this and similar estimates could not be assured but that the estimate is symptomatic of a widespread and genuine concern based upon experience in many countries.

Most of the comments which we found pertained to inadequate maintenance of rural water supply projects, however, a World Bank official assured us that such technological problems exist in varying degrees in water projects in urban areas. The United Nations stated that although $6 or $7 billion is spent annually on new water and sanitation systems in developing countries, investments in maintenance are so negligible that they are not even recorded separately.

Evaluation reports highlight maintenance problems

AID has issued several evaluation reports on rural water supply projects. The reports described projects in Thailand, Kenya, Tanzania, and Tunisia and contained numerous comments on maintenance problems.

In Thailand, a potable water project's greatest impact pertained to economic benefits, a result not anticipated by project personnel. Most systems installed provided community access to water through public taps. However, collection of fees lagged in most communities with the result that operating costs were not met. It became impossible for the Thai Government to keep the pumps at the 5,000 wells functioning. In an effort to establish financial viability, the managers of most systems eliminated public taps in favor of metered private connections. The change resulted in increased water usage as well as time saving. The time saved permitted increased gardening, livestock raising, and crafts production. An ironic outcome of the project is that many villagers did not drink the water because of its taste, preferring instead the traditional sources of supply, such as rainwater collected from roofs or water from open, shallow wells. As a result of the economic success which evolved, the Thai Government has adopted a goal of installing piped water systems in rural villages throughout the country.

The project's piped systems are considered an improvement, whereas, few users regard the hand pumps as an improvement over commonly used ropes and buckets. The project's complex water treatment and distribution systems are working and a few handpumps, installed under a previous project, are still functioning.

Different results were found during an evaluation of a rural water program in Kenya. The large, complex systems were not working well because of problems in design, construction, and maintenance which made the system unreliable. The problem of maintenance was attributed to insufficient funding from the government. As new systems are being built, recently completed ones are going out of service, even though the program has not failed because of lack

of investment. The provincial offices in Kenya responsible for operating and maintaining the systems were hampered by poor communication, lack of vehicles, poorly trained staff, shortages of funds, and a restriction that prevents purchases of local supplies and equipment.

An evaluation report on Tanzania stated that several systems are not functioning because of inadequate funds to buy fuel or to replace worn parts. Present budgets failed to provide the level of funding necessary to maintain and operate the systems. With the exception of shallow well projects in two areas, most systems were not working well. A government official, for example, stated that 60 percent of the systems in one region needed rehabilitation. The lack of a national program resulted in wide variations of projects. Complex technologies predominated in one region while simple systems were emphasized in another. External donors chose technologies based on their interest and traditional approach rather than on the most appropriate solution for the physical and social setting. The report concluded that shallow wells with handpumps are the most appropriate for supplying water in rural Tanzania because they were more reliable, had a lower capital cost, and were the least expensive system to operate. Problems with the diesel engines used to pump water included poor installation, poorly trained operators and maintenance staff, lack of spare parts, and an uncertain fuel supply.

In Tunisia, an AID evaluation team visited 31 rural project sites, selected randomly. The team found that about three-fourths of the project sites were not producing water that was considered potable by Tunisian health standards and that about four-fifths of the sites visited needed repair. Local participation in the projects was minimal and the projects did not address the major needs as apparently perceived by the users, which were for greater access and more water.

An AID mission official in Tunisia told us that they have included a new provision in loan agreements to avoid previous maintenance problems and to assure adequate government funding. This condition states that before disbursing funds for public water taps, the Government of Tunisia agency serving population centers having more than 500 inhabitants must (1) provide AID with a maintenance plan and (2) certify that funds have been budgeted to insure satisfactory operation and maintenance of each completed potable water system.

Developing countries' problems frequently are caused by fragmentation of responsibility for water resources development among several agencies in different ministries, and limited cooperation between the governments and aid donors. To minimize the adverse effects following construction, donors need to (1) better coordinate their project activities and (2) work with the developing countries. The following comments, from an AID evaluation report, illustrate this situation.

"In some developing countries there are five or six, sometimes more, different friendly national governments helping with the water supply program. It is commonplace to be told that U.S. AID is helping in one region by providing a project planning and identification team. Elsewhere a German drilling rig is at work. Here a private British group is developing wind pumps and there a Swedish SIDA team is providing pipes and diesel pumps. Elsewhere the Canadians are supporting a regional scheme using equipment of Canadian manufacture, and so on. The action is not confined to a group of national governments. Each foreign assistance project may be served by different consulting firms and different suppliers of equipment."

The AID report further stated:

"The same is true for activities supported by UNICEF or UNEP (in cooperation with WHO) and a whole string of church related private and voluntary nongovernmental organizations. The result is often a bewildering and confusing array of helpers doing things their own way and leaving behind them such a variety of equipment, operating methods and maintenance requirements, that the problem of keeping a check on requirements for parts is itself of a magnitude and character such that no water supply agency in a developed country would find either acceptable or manageable. It is not efficient or cost-effective. Coordination among the external helpers is almost totally lacking and competition is the normal order of the day. This adds immeasurably to the subsequent maintenance problem."

Donor representatives consider coordination to be a problem. They say that the coordination that does exist is done informally. We believe that coordination problems could be minimized if donor headquarters offices collaborated to support their in-country representatives. Such action would be in concert with our conclusion on p. 14 that the United States, working with multilateral institutions and bilateral donors, should express common views and concerns about water resources development problems and make these known to developing countries.

CONDITION OF EXISTING PROJECTS NOT KNOWN

Our discussion with numerous donor officials, a review of written material, and visits to five developing countries revealed that information is not systematically generated to apprise host-country governments and donor organizations of maintenance problems and projects needing substantial rehabilitation. Such information could be useful to make decisions on opportunities to best use available funds so that increased access to water supplies can be provided for the poor people in developing countries.

An AID official stated that assistance donors avoid rehabilitating projects because the projects must have failed for some good reason; perhaps the communities did not like the projects; rehabilitation work was too expensive; or the equipment required to rehabilitate the projects was old and difficult to replace. A World Bank official told us that the Bank is reluctant to rehabilitate projects previously funded by other donors and that the problem of rehabilitating water supply projects in developing countries has not really been addressed. He said that developing countries usually have people capable of planning, designing, and constructing new projects but they do not have sufficient personnel capable of rehabilitating existing projects. During a meeting of the U.N. steering committee for the Water Decade, it was stated that financing rehabilitation works could yield much higher returns than new construction.

OBSERVATIONS AND CONCLUSIONS

We believe that maintenance problems present a substantial obstacle to success of water supply and sanitation projects. We also believe that insofar as projects constructed during the International Drinking Water Supply and Sanitation Decade are concerned, failure to maintain them while providing massive capital funds for short-term benefits would be unrealistic. Further, we believe that donors and governments of developing countries must find ways to assure that viable water supply and sanitation projects are undertaken which will provide lasting benefits for the world's poor.

While emphasizing the need to support rural projects, the United States should make clear to international financial institutions, and the U.N. agencies which it supports, that funds should be focused on those countries which are willing and able to assure that the projects will be maintained. Donors could consider including in their loan agreements, as has the AID mission in Tunisia, a condition that before disbursing loan funds, the developing country must provide the donor with a maintenance plan which certifies that funds will be available for satisfactory project operation and maintenance.

We also believe that there is a need for a system to obtain and periodically use information on the condition of existing projects. Such information could be useful in making decisions on opportunities to best use available funds through rehabilitation of existing projects rather than through new construction.

CHAPTER 5

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Most funds provided from external sources to developing countries for water resources development have been channeled into projects for domestic water supply and sanitation, irrigation and flood control, and hydroelectric power. Information on the actual amount funded annually is not available, but it is clear from information on estimated amounts provided that the external assistance totals billions of dollars. In addition, substantial increases in external funds are expected during the current International Drinking Water Supply and Sanitation Decade. The United States is the major contributor to U.N. agencies and multilateral development banks--the U.S. contributions generally range from 20 to 30 percent of their budgets--and also provides bilateral assistance for water resources development through AID and the Peace Corps.

However, IDCA, the U.S. agency responsible for the formulation and coordination of U.S. international development policies has not included water resources development as a separate area of attention and it does not possess information on water resources development which could be used to set U.S. policies and strategies. Given the magnitude of the needs in the water resources area, the billions of dollars of donor funds expended or programed, and the emphasis on significant increases of new funds called for by the U.N. Water Decade, it seems incumbent on the United States to have information which would enable it to develop policies and strategies for its bilateral program and to direct U.S. participation in multilateral programs.

We also believe that IDCA should (1) be a more active leader in influencing the allocation of bilateral and multilateral funds coming from the United States and (2) work with multilateral organizations and other bilateral donors on common views and concerns about water resources development. These concerns should focus on (1) major constraints to water resources development, such as providing a reasonable share of external funds for the basic water needs of the rural poor and (2) seeking opportunities to minimize waste and inefficiency associated with project maintenance.

RECOMMENDATIONS

Accordingly, we recommend that the Director, IDCA, develop comprehensive policies and strategies affecting U.S. bilateral and multilateral financial support for community water supply and sanitation activities in developing countries. These policies and strategies should encompass, but not be limited to

--establishing reasonable and attainable interim goals during the U.N. Water Decade--the interim

goals should be established on a country-by-country basis, consistent with country surveys of water resources and needs;

--emphasizing use of bilateral and multilateral funds for water development activities and projects which will have a significant impact on the rural poor;

--collecting and maintaining information which would systematically assess the condition of existing water supply and sanitation projects and suggest a program to help those in need of rehabilitation;

--incorporating into loan agreements a requirement that developing countries provide funds for project maintenance;

--encouraging external donors to provide incentives to developing countries which have demonstrated that they will maintain water supply and sanitation projects; and

--emphasizing the need to fund programs for the institutional development and training of maintenance personnel in those countries having the most critical needs.

We further recommend that the Director of the Agency also acquire information on irrigation and hydroelectric power activities which would enable the Agency to develop comprehensive policies and strategies for these major segments of water resources assistance. The information could include data on the involvement of U.S. and other donor participation and financing of such activities, constraints to developing the resources, problems dealing with operation and maintenance of projects, and the extent to which the rural poor majority are to participate in the benefits derived from irrigation and hydropower projects.

AGENCY COMMENTS

IDCA and AID combined their responses to our draft report (see app. III). AID said it agreed with many of the conclusions in the report, particularly those emphasizing the importance of maintenance and training of personnel in water supply and sanitation programs. AID stated that a policy paper being prepared on domestic water supply and sanitation will provide ample guidance for its activities in that sector. IDCA said that our draft report was a concise and objective review of the water supply sector and that it agreed with most of our conclusions and recommendations. IDCA asked that we clarify our recommendation concerning establishment of interim goals during the U.N. Water Decade and it suggested we delete our recommendation that the Agency also acquire information on irrigation and hydroelectric power activities which would enable it to develop comprehensive

policies and strategies for these segments of water resources assistance. IDCA stated that the policy paper on domestic water supply and sanitation, being prepared by AID, will also guide IDCA in its consultations with multilateral organizations providing assistance in that sector.

With respect to clarification concerning establishment of interim goals during the U.N. Water Decade, the interim goals we believe IDCA should seek to influence among donor organizations and developing countries during the Water Decade are presented on p. 15 of this report, as included in the draft report. We suggest that interim goals be established on a country-by-country basis and should be consistent with each country's surveys of water resources and needs and overall goals for the Water Decade. Such interim goals, for example, could focus on problems related to institutional development, training, accessibility to drinking water, sanitation facilities, increasing the quantity and improving the rehabilitation of existing projects. These efforts could include identification of the amounts and timing of funds to be applied and potential funding sources. In addition, a distinction should be made between the recipient populations--whether urban or rural.

Generally, IDCA's comments focused on what was being done with respect to the U.S. bilateral program. We believe efforts by IDCA and AID to develop a comprehensive strategy should encompass the entire spectrum of U.S. water supply and sanitation assistance, especially covering the multilateral agencies, through which the bulk of U.S. financial support for water resources assistance is funnelled. In doing so, the agencies should require, evaluate, and scrutinize financial and other information in a form which would be useful in guiding and making decisions on U.S. strategy and funding.

IDCA suggested that we restrict the scope of our recommendations to community water supply because of the absence of adequate information on the other two aspects of water resources (irrigation and hydroelectric power). IDCA went on to state that AID has already issued a policy paper that describes a wide range of energy activities, including hydropower, eligible for AID support and that AID will leave to multilateral development banks the financing of the large capital costs of conventional schemes.

As stated in our report (see p. 4.), compared to community water supply, we found very little information readily available on global needs and goals of irrigation and hydropower programs and funding information on these activities is also sketchy. We do know, for example, that the World Bank group loaned $2.3 billion for irrigation and flood control projects in 1979 and 1980 alone. Of this amount, India received highly concessional loans from the International Development Association, a member of the World Bank group, totaling $643 million. Applying the U.S. subscription rate of 32.9 percent, the U.S. share of contributions for irrigation and flood control activities in India would be

about $212 million during this 2-year period. Concerning hydropower development, one source stated that multilateral development bank projects continue to account for almost 10 percent of total multilateral development bank lending.

In view of the substantial amount of financial assistance to multilateral organizations by the United States for irrigation and hydropower development, we believe it is incumbent on IDCA, the U.S. agency responsible for formulation and coordination of U.S. development policies, to obtain information which would help it decide whether comprehensive policies and strategies are needed covering irrigation and hydropower, in addition to community water supply activities. For example, specific information could be developed on the condition of previously funded projects. Are such projects likely to last at least 30 years, as we understand water supply systems do in developed countries, or only 5-7 years in developing countries (see p. 23). If such a problem exists, obvious questions are--where is this happening, why, and what can the United States do in formulating policy and strategy to influence change to correct such a problem?

We are not in a position to say whether IDCA should address irrigation as an area separate from agriculture or hydropower as a separate sector. Our aim is to have the agencies (IDCA and AID) recognize the relationship and importance of these water resources areas--as they apparently have for community water supplies--and address them by obtaining adequate information (such as that described above), and then decide whether a comprehensive policy and strategy is also necessary for irrigation and hydropower activities.

The energy assistance policy paper referred to by IDCA contains only brief policy comments on U.S. hydropower assistance. In our view more is needed to effectively direct our limited bilateral input and judiciously guide and influence our greater multilateral effort in these water resources areas. It may be that the United States needs a comprehensive strategy covering all three water assistance segments--community water supply, irrigation and hydropower.

The Department of the Treasury (see app. IV) said that because our recommendations were directed to IDCA it focused on those parts of our report which covered operations of the multilateral development banks and found our report entirely satisfactory. The Department also stated that although the World Bank has no global strategy for eradicating the problem of providing safe and dependable water supplies, the Bank and the Department agree that developing and using economic reports and establishing country strategies (see p. 7) is the most satisfactory approach in fulfilling the need for safe water supplies.

WATER PROBLEMS IN DEVELOPING COUNTRIES

The United Nations Water Conference of 1977, held in Mar del Plata, Argentina, identified several problems relating to the development of water resources. It concluded that

--in many areas of the world, water is wasted or used in excess of actual needs;

--large-scale water development projects have important environmental repercussions of a physical, chemical, biological, social and economic nature, which should be evaluated and considered when formulating and implementing water projects;

--increased attention should be paid to the integrated planning of water management;

--flood and drought problems need to be addressed;

--public information, education, training, and research programs are needed concerning the proper utilization, protection, and conservation of water; and

--regional and international cooperation should be improved.

The World Bank characterized water supply development problems as institutional, financial, and technological. Referring to rural water supply, the World Bank cites the institutional and financial problems as being the most critical, stating that if these could be resolved, the technological problems could disappear. The problems cited were:

Institutional

--lack of a rural water supply policy forming part of a national water supply policy;
--existence of several government agencies whose lines of responsibilities overlap or are not well defined;
--lack of institutions capable of project development;
--lack of water user organizations at the local level;
--lack of trained manpower at every level; and
--lack of criteria for project evaluation and priority selection.

Financial

--per capita costs which, for a given level of service, increase as village size decreases;
--relatively low income of villagers and limited financial resources;

--lack of a policy to obtain maximum financial support from areas to be served;
--lack of local government framework and inability to collect and/or retain taxes for local use, and difficulty in collecting fees from water users;
--lack of village motivation and of public health education, so that villagers are unaware of the potential benefits of improved water systems and are not willing to pay for them; and
--seasonal availability of water from ponds, streams, shallow wells, and other sources of questionable quality to which the rural population may return if high charges for piped water are imposed.

Technological

--a record of short operating life for equipment, poor maintenance, and many project failures;
--lack of local capacity to fabricate simple, reliable equipment for which spare parts and service would be available locally;
--use of a wide variety of types and makes of equipment by the various donor agencies, compounding the problem of operation and maintenance;
--severe communication problems between remote, rural systems and their support organizations in areas of poor or nonexistent telephone service, so that system breakdowns are not reported promptly;
--difficulties in obtaining spares due to lack of money, scarcity of foreign exchange, cumbersome procurement procedures, problems of logistics, and absence of a support agency to maintain an inventory of needed parts; and
--difficulty in providing sufficient repair staff and transport to attend promptly to breakdowns in widely dispersed rural systems with very poor roads.

Additional problems, identified by AID and attributed to specific countries, although they may apply equally to numerous developing countries, include the following.

--The centuries-old water supply system in Syria is inadequate and poorly maintained. (There are numerous leaky mains and unrepaired water meters; transmission capacity is small.)
--Forty-five percent of the rural area in Syria does not have access to safe drinking water. (Targets have not been met due to budget shortfalls, rampant inflation, and shortage of skilled manpower.)

--In Jordan, despite a slight excess of water supply over demand, operating problems affecting the country's water supply, as well as long distances between sources and areas of highest demand, have resulted in severe shortages.
--In Indonesia, Surakarta's water supply system is too outdated to provide reliable potable water to an increasing population.
--Inadequate sanitation systems and potable water supplies exist in many rural areas of Bolivia.
--Lack of safe and convenient water supply is an important factor contributing to poor health status of rural Panamanians.

Regarding irrigation projects, it has been said that because of the visibility and propaganda value, officials in many countries put more emphasis on constructing new dams and projects than on improving the efficiency of present irrigation systems even though it usually is cheaper to rehabilitate existing schemes than to construct new ones.

Often, water is not used efficiently for agricultural purposes because of losses in transit, unsuitable irrigation systems, or lack of institutional coordination. Because irrigation is the principal water user in a great many countries, and because water and land capable of being cultivated are becoming increasingly scarce, a special need to achieve greater efficiency in using both resources exists.

Following, are some problems relating to irrigation.

--Basic data does not exist for adequate appraisal of groundwater resources in Egypt.
--The amount of water used in Sri Lanka to irrigate rice fields far exceeds what is required. Excess irrigation of some areas limits the water available for other areas.
--The lack of an assured and dependable water supply is a major reason for the low average crop yields and large fluctuations in agricultural production each year in India.
--On-farm water management practices in Pakistan are inefficient when evaluated by social and cost benefits.
--There is a lack of funding, organization, and technical expertise to mount effective, small-farm irrigation projects in El Salvador.

Because agriculture is by far the largest user of water, even small improvements in irrigation efficiency could result in large savings of water. Systematic attempts were reported to increase efficiency in water use by moving from surface irrigation to sprinkling and, later, to more sophisticated methods, such as direct dripping at the roots of plants.

Hydropower is one obvious alternative to oil-fueled energy systems available to many countries. However, hydropower surveys have not been undertaken in many countries and the delay in gaining the benefits of hydropower sources includes not only the 4- to 10-year project construction time but also the 2 or more years required for surveys and feasibility studies. Because feasibility studies represent only about 1 percent of final project investment, substantial long-term savings may be possible by obtaining adequate information on all potential hydropower project sites.

Brazil has benefited from such an inventory because, before 1973, hydropower surveys had been completed for those regions within transmission distance of the power markets. After the oil price increases, the country was able to implement nearly all of its hydropower program.

Many problems concerning water resources development in developing countries that are cited in the literature and publications which we obtained also were mentioned during our meetings with donor officials. In addition to a shortage of funds, major problems frequently cited by donor representatives pertained to a lack of viable projects and a lack of absorptive capacity in developing countries because of inadequate institutional capabilities. These interrelated problems will affect the achievement of the U.N. Water Decade goal and are covered in detail in the report chapters. The problems presented below add to, or elaborate on, those presented in literature and publications and are considered to be major problems by the officials of the organizations mentioned.

A problem cited by Church World Service officials is that land rights of the poorer farmers are greatly affected by the newly provided irrigation waters. For example, peasant farmers who have been farming for years on land owned by absentee owners are now finding that because of newly provided irrigation, the returning owners are interfering with their crop production.

Catholic Relief Services officials said that there are environmental and funding problems pertaining to projects in Africa. For example, wells are frequently dug without a knowledge of the environmental impact and in one area the Catholic Relief Services did not have access to an environmental expert. In addition, seasonal changes affect many water projects. When AID funding slows down, projects may not be completed before the rainy season approaches, causing numerous additional problems.

CARE officials also complained about AID policies. One official said that some AID officials believe that all wells should be capped so that safe water could be provided, whereas he believed that the first step should be to supply adequate amounts of any water rather than being overly concerned about its potability.

Peace Corps officials claim that donors often come into a country, put in a handpump and leave; 6 months later the pump

needs repairs and there is nobody there to repair it. Additionally, because the local community is not sufficiently involved, it does not have a sense of responsibility for the handpumps. As a result, the communities generally do not understand how the pumps work.

Peace Corps officials said that there is a need for standardized equipment within a country. In Tanzania, for example, there are eleven different donors installing eleven different handpumps, each requiring unique parts for repairs. Another problem is that many countries have several ministries with responsibility for wells and pumps. In Sierra Leone, there are five ministries installing wells, creating duplication of efforts, coordination problems, and potential drainage of water tables.

WATER SUPPLY STATUS IN COUNTRIES VISITED

In the five developing countries we visited, water resources problems exist. For example, in Sri Lanka piped water in cities has been judged unsafe, often coming from unprotected surface water sources, and rural populations rely on untreated rivers and streams. The Government of Sri Lanka is responding to U.N. efforts to improve water supplies by drafting a Water Resources Act and by developing a plan for the U.N. Water Decade. The draft plan calls for improvement of the quality of drinking water, making supplies accessible to the entire population by the year 2000. A major constraint to water resources development is that many young professionals and technicians are taking relatively high-paying jobs in the Middle East rather than accepting positions with their Government. Consequently, the Government is using external donor consultants and expatriates to fill project development roles.

In Indonesia, only about 4 percent of the population benefits from piped water systems, tubewells with handpumps, or protected springs even though about 80 percent of the population lives in rural villages. In urban areas, problems involve low water pressure and intermittent availability, and water entering the systems frequently becomes contaminated. Drinking water supply targets are to provide 75 percent coverage for the urban population and 41 percent for the rural population by 1990. The major constraints to water resources development in Indonesia are considered to include shortages of technically qualified staff, water pricing issues and limited coordination between the Government and donor agencies.

In Tunisia, 85 percent of those population centers having less than 500 inhabitants do not have access to potable water but the Government is working on a strategy to serve these rural areas. Government officials are confident that they will attain the U.N. goal to provide clean water and adequate sanitation for all by 1990 but donors believe the goal will not be attained. Major constraints in Tunisia involve inadequate funding, especially funds needed for providing water supplies to rural populations, and the availability of water, a scarce commodity in Tunisia.

In Morocco, the urban population has at least limited access to piped water but 75 percent of the rural population depends on traditional sources of supply, such as hand-dug wells and rainwater storage tanks which often are contaminated. One donor official said that even if funding is substantially increased Morocco will not attain the U.N. Decade goal but it may be achieved by the year 2000. In addition to the lack of funds, other constraints involve a lack of an organization to manage and maintain rural water systems and a lack of health facilities to insure that water remains potable.

In Panama, water supply is not a major problem. A factor behind the high percentage of population--100 percent in urban areas and 64 percent in rural areas--having adequate water supplies

has been the strong U.S. presence because of Panama Canal operations. Of the five countries we visited, it seems that Panama is the only one that can reasonably achieve the U.N. Water Decade goal for virtually all of its population.

Maintenance problems in countries we visited generally centered on the lack of information on the operating status and condition of water supply projects; broken, damaged, or leaking water pumps and gauges; and wells falling in disrepair. Failure to maintain projects was attributed to lack of maintenance expertise and spare parts, and the need for transportation equipment to visit water points. Water user charges, particularly in rural areas, were not imposed or were insufficient to cover operating and maintenance needs. Details on general problems and those involving maintenance for each of the countries which we visited follow.

SRI LANKA

Sri Lanka (formerly Ceylon) is an island country with a 14-million population (estimated in 1977); 3 million live in urban areas and 11 million in rural areas. The rural population included about 1.5 million people living and working on the country's estate plantations which produce export crops. The Government has adopted economic development policies which give high priority to water resources development for irrigation and hydroelectric power. Drinking water supply and sanitation programs are also being accelerated toward a target of providing safe water to at least 70 percent of the country's population by 1990; 100-percent urban coverage and 60-percent rural coverage are projected for the year 2000. A similar target for coverage is planned for sanitation.

About 30 percent of the urban, 25 percent of the estate, and 95 percent of the rural populations have no access to piped water. Piped water even in cities has been judged unsafe, often coming from unprotected surface water sources. The rural population relies mainly on untreated rivers, streams or tanks (reservoirs), or on wells frequently contaminated as a result of poor location, design, maintenance, and cover. Forty-five percent of the rural population relies on pit latrines for sanitary facilities and over forty percent have none.

The Government has initiated several actions in response to the 1977 U.N. Water Conference, including a draft Water Resources Act, a draft of a new irrigation law, and other water management policies. The Government is currently developing an International Drinking Water Supply and Sanitation Decade plan. The draft plan calls for improving the quality of drinking water and for making supplies accessible to the entire population by the year 2000. The plan also provides for reaching certain levels of service for the urban and rural populations. For example, the plan provides that pipe connections be provided to 15 percent of the rural population by 1990 and 20 percent by the year 2000.

Sri Lanka receives development assistance from a variety of sources, including the U.N. system, the Asian Development Bank,

the World Bank, and numerous bilateral country donors. An assistance group to Sri Lanka comprised of 13 countries and the World Bank has been formed to coordinate development strategies through annual group meetings and regular contact in country. In 1979, the group pledged $480 million for development projects in the country; $445 million was projected to be pledged for 1980. The World Bank's International Development Association 1979-80 share was expected to be about $100 million. The Asian Development Bank loaned $25 million to Sri Lanka in 1979, and the U.N. system, under the leadership of UNDP, provided $23 million for the same period. The U.S. AID mission assistance, excluding Public Law 480, in fiscal years 1980 and 1981 was scheduled to total $29.8 million and $40.5 million, respectively.

The World Bank is the designated coordinator for the group meetings and UNDP serves as the focal point for Water Decade activities. World Bank representatives said that the donors, as a group, have not addressed water resources development as a separate development sector. The UNDP representative said that the water supply and sanitation program will not gain full momentum until the Government of Sri Lanka approves the Water Decade plan.

The World Bank is the major external donor supporting urban water supply and sanitation projects whereas UNICEF supports rural water projects which include technical assistance, training, and the supply of imported materials and equipment, such as pipes, fittings, pumps, motors, chlorinators, water meters, water testing equipment, and vehicles. A proposed AID mission project would focus on providing improved water and drainage facilities to two market town areas having about 90,000 people. According to the AID project data sheet, the project would focus on small market towns because the World Bank and other donors are financing large city projects and UNICEF is supporting village projects.

The Government of Sri Lanka has ambitious goals for irrigation and hydroelectric water resources development and for activities which support the Decade. However, there are several major obstacles to achieving these goals which could significantly affect actual development accomplishments, including

--several macro-economic factors, the most important being the impact of increasing oil prices and international inflation;

--shortages in qualified personnel to implement programs, institutional deficiencies related to the lack of qualified personnel, and the bureaucratic autonomy of existing government organizations; and

--poor operation and maintenance practices and water-pricing policies which are inadequate to sustain water development schemes.

Concerning qualified personnel, for example, it is quite common for young professionals and technicians to seek employment in

relatively high-paying jobs in the Middle East rather than accept positions with their Government. In addition, the proposed Government legislation to develop a national water policy as drafted is sophisticated in intent and may be beyond the institutional capability of the Government to effectively implement. The lack of Sri Lankans trained to fill project development roles has been overcome in the short term by donor consultants and other expatriates. A Government official confirmed that there are serious long-term manpower shortages in Sri Lanka for all development projects.

Maintenance problems

According to the Government draft Water Decade plan, little statistical information is available on the actual operating status of water supply and sanitation facilities in Sri Lanka because the Government does not keep central statistics on operational problems, equipment breakdowns, or spare part requirements. Based on the limited information available, the Water Decade plan cited the following examples of substandard urban and rural water supply systems.

In urban areas, the Water Decade plan noted that substandard operations in water supply facilities are the rule. Almost every urban area of the country has water systems in which pumps and gauges are broken, water quality testing for process control is either erratic or non-existent, and public standpipes are damaged, leaking or permanently closed. In many systems, flow rate and pressure monitoring equipment is inoperable. Further, many water treatment plants have had unrepaired chlorinators out of service for 3 years or more. A 1976 survey of water samples from 24 piped water schemes illustrated the significance of this. The survey found over one-third of all samples contained fecal pollution, one-third were chemically unsatisfactory, and fully one-half showed no detectable residual chlorine.

In rural areas, operating conditions are also poor, according to the Water Decade plan. Many large diameter, hand-dug wells in Sri Lanka have been allowed to fall into disrepair and eventual abandonment. Although most are open wells with good surface works and drainage aprons, others are closed wells with diesel or electric-powered pumps connected to nearby storage tanks and small distribution systems. Many of both types have been found unusable due to such problems as saline intrusion, lowering of the water table, deterioration of subsurface walls, and pump breakdowns.

According to the Water Decade plan, the generally poor operational status of both urban and rural water supply facilities in Sri Lanka can be traced in part to inadequate maintenance and insufficient spare parts. The maintenance of almost all water supply schemes has been extremely limited for a considerable period of time. This is essentially a result of a lack of maintenance expertise both at the responsible Government agency, the National Water Supply and Drainage Board, and at the local government level, as well.

The Board has recently attempted to address piped water supply maintenance deficiencies by establishing

--a new division to maintain the water supply system,
--a separate section to store maintenance supplies, and
--eight regional mobile maintenance teams for field maintenance.

The Decade plan noted, however, that the local authorities for continuing operation and maintenance of non-piped rural water supplies, such as hand pumps and community wells, are still not providing effective maintenance.

Regarding the availability of spare parts the Decade plan suggests there are a variety of problems relating to the functioning of the Board, including

--storage of parts based on financial requirements rather than anticipated needs,
--deficiencies in recordkeeping and inventory management,
--inadequate staff supervision and training, and
--problems in procuring needed materials.

Regarding available spare parts, further problems were noted to exist in the wide variety of equipment and materials which external donors provided. Requirements that procurement of equipment be from specific donor countries was believed to cause difficulties with spare parts, equipment compatibility, storage capacity, inventory control, operator competence, and training needs. Too often, the plan noted, donors furnish equipment without a local representative being provided for servicing and repairs. In the event of malfunctions, such equipment frequently cannot be repaired and must be left idle.

A pricing policy that will charge water users in a manner that encourages conservation--while still covering at least the marginal costs of operation and maintenance--is proving difficult to address and formulate in Sri Lanka. The Director of National Planning, Ministry of Finance and Planning, said the Government currently has only limited capability to formulate and implement water pricing policies which promote conservation while still allowing the poor access to water supplies. The UNDP representative believes that alternative funding sources for maintenance programs will be necessary because water-user charges are likely to be inadequate to cover operation and maintenance costs.

The Government expected to subsidize the costs of water supply operation and maintenance in many communities. However, long-term subsidizing is contrary to U.N. Water Conference recommendations for self-sustaining water systems. In addition, according to the draft Decade plan, if current rate collection measures are not improved, additional investments will be inflationary since the growth of population served will cause a consequent

growth in the size of deficits associated with each subsidized scheme. Therefore, the draft Decade plan noted rate collection will have to increase for the Government to be able to generate the internal funds needed to match the international funds required to implement the plan.

A Government official responsible for potable water programs anticipated that the government pricing policy would include recovery of only maintenance costs in rural areas (500 rupees--$31 per well/per year--representing less than 1 rupee--$.06 per family per month). Higher charges were viewed as impractical. Urban projects are expected to include recovery of capital costs as well as operation and maintenance, but this was expected because urban centers have more resources to tap for cost recovery. According to the World Bank representative, the relative financial feasibility of urban projects is a major criterion for Bank support in the urban area.

INDONESIA

The population of Indonesia is estimated to be about 142 million; almost two-thirds live on the island of Java. Unfortunately, the island has poor ground and surface water-development potential relative to other regions of the country. A Government of Indonesia analysis for the year 2000 indicates that the estimated water demand on the island will far exceed the available supply.

About 80 percent of the population lives in rural villages, however, only about 4 percent benefit from piped water systems, tubewells with hand pumps, central rainwater collection, or protected springs. Those without access to public sources obtain water from streams, springs, or wells. In comparison, about 41 percent of Indonesia's urban population has access to piped water supply but problems involve low pressure and intermittent availability. Water entering the systems frequently becomes contaminated. According to a 1976 WHO/World Bank study, the sanitation sector in Indonesia was in poor condition. Only one city had sewage treatment facilities and four cities had sewage disposal facilities. Rural sanitation facilities were even less developed.

The current Indonesian 5-year development plan priorities affecting water resources include food production in the rural sector and, to a lesser extent, providing safe drinking water and sanitation facilities to the population. Planning targets and funding for water supply and sanitation projects are not adequate to achieve the U.N. Decade goal. Drinking water supply targets for 1990 are 75 percent coverage for the urban and 41 percent for the rural populations.

Major external donors to Indonesian development plans are the World Bank, the Asian Development Bank, Japan, and other countries, including the United States through its bilateral program. External assistance for all sectors was about $1.5 billion in 1979.

U.S. mission priorities are consistent with those of the Indonesian Government which emphasize water development for irrigation. The mission has given water supply and sanitation projects low priority even though its urban projects have attracted significant Asian Development Bank financing. Major international development bank activities have included large-scale irrigation projects and other major development. In water supply and sanitation programs, emphasis was on aid to urban areas. As part of the U.N. assistance system, UNICEF plans major water supply activities in rural areas, however, their program is relatively small compared to total rural needs.

There are many constraints to providing clean water and sanitation to the people of Indonesia, including shortages of technically qualified staff, water pricing issues, and coordination between Indonesian Government and donor agencies. In its April 1980 status report on the U.N. Water Decade the Government suggested that donor emphasis on economic rather than social objectives of development is an obstacle to generating interest and support of drinking water and sanitation projects. Another perception offered by a UNICEF official was that most donors are not interested in financing rural water supply and sanitation projects even though UNDP has attempted to coordinate and generate interest in such activities. He thought the key to generating donor interest is a greater Government commitment to U.N. Water Decade activities.

Maintenance problems

An AID mission engineer believes the issue of maintenance is the largest question facing the viability of any water supply project--whether urban or rural. He said that based on his experience, the simple water systems typically used in rural areas (hand pumps and small pipes) require constant attention to remain in working condition.

The 1979 WHO rapid assessment also noted that improved methods of financing operation and maintenance of rural drinking water schemes are needed for the long-term acceptance of rural programs. The assessment noted that feasibility studies for large-scale rural piped water systems are needed to arrange financing and construction during the 1981-90 Decade.

The Director General responsible for Indonesia's urban water supply projects said that ideally, water supply systems should be self-sustaining based on revenues from water users. However, the inability of many urban Indonesians to pay has forced the Government to plan on subsidizing water supply projects, at least initially. Efforts to implement effective water pricing mechanisms (for whatever use) in Indonesia have proved difficult.

In planning for water supply projects, it was noted in the draft AID domestic water and sanitation policy paper that water pricing/self-financing is much more difficult in rural than urban areas because rural people generally have less cash than their counterparts and because they often have traditional water sources

and means of waste disposal still available. In terms of maintaining and operating water supply and sanitation systems, the paper further notes that development planners have ignored this aspect of water and sanitation systems too often. The Director General for Prevention and Eradication of Communicable Diseases said that in Indonesia, rural water systems, by design, do not include water-user charges to cover operation and maintenance. He said Government development budgets do not provide for rural system maintenance--such efforts are viewed as being the responsibility of local villagers through local governments.

TUNISIA

Tunisia has a population estimated to be about 6.1 million, consisting of 2.9 million in the rural areas and 3.2 million in urban areas. Only about 1 million of the rural population resides in large, crowded villages; the remaining population is dispersed in isolated, scattered villages. All of the 3.8 million people housed in population centers which generally have more than 500 inhabitants have access to water either through house connections or public taps. For population centers with fewer than 500 inhabitants, 85 percent do not have access to potable water. These people obtain water from hand-dug wells, streams or buy it from water transporters. A Government of Tunisia official said that even though most of the urban population is served, there is still a great need for increased water capacity in the urban area to meet future demands. To provide for current and future needs, a large investment program is needed.

For population centers with more than 500 inhabitants, the Government plan is to make the best use of the number of direct house connections and increase the capacity of existing water systems to meet future demands. About 64 percent of such population is served by direct house connections and the goal is to have such service extended to 95 percent of the population by 1995.

For rural populations in centers of 500 inhabitants or less, there is no Government of Tunisia strategy. According to one Government official, his Government has agreed in principle to adopt the strategy being used by the U.S. AID mission. Under this strategy, each water source would serve 500 people and the population served would not be more than four kilometers from the source. The official stated, however, that before the strategy could be implemented, a needs assessment, requested for funding beginning in 1981 would have to be completed. One official estimated that to achieve the U.N. goal in the rural area, $25 million would be needed annually for the next 10 years; the average annual funding for the last 4 years was $7 million. Major external donors in Tunisia funding water projects are the World Bank, Saudi Fund, African Development Bank, and the Republic of Germany, as well as other bilateral donors, including the United States.

Government of Tunisia officials believe that Tunisia will be able to meet the U.N. goal. AID, UNDP, and CARE officials, however, stated that the Government is not placing a high priority

on achieving the goal and, therefore, they do not believe it will be attained in Tunisia. Both Government and donor officials agreed that there are numerous constraints, primarily in the rural areas, that must be overcome to achieve the U.N. goal.

The major constraints which the Government officials identified are the availability of water resources and the cost of providing and maintaining water supplies to the rural populations. Water is a scarce commodity in Tunisia and demand for it is expected to exceed available resources by the year 2000.

According to Government officials, the only constraint regarding urban water supplies is adequate funding to insure the expansion of existing water systems to meet future demands. Based on previous experience, they do not anticipate any problems in obtaining the funds.

Government officials recognize that several problems must be overcome if the U.N. goal is to be achieved in the rural areas. These constraints are

--the high cost of installing rural water projects, coupled with no economic rate of return; and
--no maintenance system--including lack of trained personnel, spare parts, and transportation for maintenance teams.

According to one Government official, water projects in poverty pockets in rural areas are a social cost that the Government must bear to mitigate movement to urban areas. Another official believes that integrated rural development programs could overcome this problem. Under these programs, jobs would be created in the rural areas; therefore, the population would be able to pay for their water systems.

U.S. AID mission officials agreed with the constraints which the Government officials identified. However, they also believe that inadequate health education is a major problem in achieving the goal. A recent evaluation of four CARE water projects concluded that sustaining health education has been difficult and the impact of health education teams established under the projects has been negligible. A major problem is that the health programs in Tunisia are designed for curative rather than preventive care. Health education teams are, therefore, not assigned a high priority by the Ministry of Health.

Maintenance problems

According to Government of Tunisia and AID mission officials, maintenance is not a significant problem for urban water projects; however, it is a significant problem facing rural water projects. These problems exist because (1) many of the first rural water projects did not include a provision for maintenance or (2) maintenance for recent projects was not continued. Government and AID mission officials are aware of maintenance problems in the rural areas in Tunisia.

AID mission and Government of Tunisia officials stated that maintenance is not a problem for urban water systems because there is adequate funding and trained maintenance personnel to carry out needed repairs. All water customers pay a maintenance tax to SONEDE--an autonomous public entity--which generates funds for its maintenance program.

SONEDE has four maintenance sections which are responsible for urban water repairs. According to a SONEDE official, they have sufficient numbers of trained maintenance personnel. This official noted that 2 or 3 years ago, SONEDE started a vocational training school for maintenance personnel to meet their need for qualified technicians. SONEDE has also developed a systematic maintenance reporting system which enables them to monitor the maintenance history of the various water systems.

Maintenance for rural projects in Tunisia is still a problem because there is

--a constant changing of maintenance responsibility within the Government of Tunisia,
--a lack of spare parts,
--a lack of trained personnel,
--no preventive maintenance plan for rural water projects, and
--no systematic reporting of maintenance problems.

AID mission officials have some doubts about whether government funding and human resources will be adequate to meet these maintenance requirements. They believe, however, that it is within the government's power to provide these resources if they so choose.

During the past few years, the responsibility for maintaining rural water projects has shifted between the Ministry of Health and the Ministry of Agriculture. In 1979, the local governments were made responsible for this maintenance. The local governments, however, do not have the funds or the trained personnel to handle this responsibility.

The Government of Tunisia has recognized these problems and has proposed some corrective actions. For example, the maintenance budget for 1981 was increased to 190,000 dinars as compared to only 17,000 dinars for 1980. 1/ In addition, the Government plans to form, train, and equip local maintenance teams to conduct preventive maintenance, starting in 1981.

According to AID mission officials, the Government must provide more money for maintenance if the problem is going to be solved. For example, in four recently completed CARE water projects, AID funds were used to establish seven maintenance teams and provide vehicles and fuel and repair costs for a limited time,

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1/One dinar equalled $2.50 in August 1980.

expecting the Government to eventually assume the financial responsibility. Unfortunately, the vehicles were sometimes diverted for other tasks and the financial support for maintenance efforts was not provided. A recent AID evaluation of these projects showed that all but one of the maintenance teams still exist, but their work is not very effective. The report also indicated that 83 percent of the 31 wells visited during the evaluation needed some type of repair.

Maintaining the potability of water sources once they are completed is also a problem. The recent evaluation of four CARE projects showed that only one-quarter of the 31 water points inspected were producing potable water by Tunisian public health standards. The report concluded that the primary reason for this is that disinfection teams are not making regular visits to disinfect the water points.

Finally, maintenance is made more difficult because there is no systematic maintenance reporting system or preventive maintenance plan for rural water projects. Currently, if maintenance is required on a water source, the beneficiaries must relay the message to the local government office. This often is difficult because rural water points are generally in remote locations and there may be no means of communication.

One local official stated that his area has no preventive maintenance plan for rural water sources. He stated that even if there were a plan, he does not have personnel or materials, supplies, and equipment to implement the plan. This official hopes to develop and implement a plan by 1985, but its success depends on whether his office is provided adequate numbers of trained personnel, spare parts, and vehicles.

The need for preventive maintenance was highlighted in a recent evaluation of AID water projects. The report concluded that many of the maintenance problems could have been avoided through routine preventive maintenance. The report found that of 30 sites, only 5 had been visited by maintenance teams within the previous month. The regularity of the visits varied at each area. In one location, a team was making weekly inspections of well sites, while a second team was on a semi-monthly schedule. In another location, sites were visited once a month although those located near the town where the maintenance team was located received more attention. In a third location, the report indicated that pumps were not being repaired promptly because of an irregular maintenance schedule.

MOROCCO

Morocco's population in 1978 was about 18 million; 7 million live in urban areas and 11 million live in rural areas. All of the urban population has at least limited access to piped water, but only 45 percent is supplied through house connections. The remaining urban population must rely on public standpipes. Often, more than 2,000 customers appear at a multiple-faucet standpipe

and many users live more than 500 meters from the water point. Many water systems have reached their full operating capacity.

In the rural areas, only 5 percent of the population has house connections, an additional 10 percent has access to public standpipes, and another 10 percent draw water from public wells. The remaining 75 percent of the rural population depends on traditional sources, hand-dug wells, or rainwater storage tanks, which often pose considerable health hazards.

According to some Government of Morocco, AID, and U.N. officials, water for agriculture is the Government's first priority; potable water is next. Although the development and extension of water supply facilities enjoyed high priority during the 1978-80 3-year plan, the Government of Morocco, faced with severe budgetary constraints, gives preference to improving the water supply in urban areas where limited financial resources could benefit a large segment of the population. The next preference is to provide the large, crowded, rural village with piped potable water. The scattered rural locations have not yet received much attention from the Government. Currently there is little donor assistance to Morocco for water projects. The Government is receiving some assistance from the World Bank, Federal Republic of Germany, and the United Nations.

The only major water project currently being funded is the World Bank's second water supply project. The Bank is providing $49 million and the Federal Republic of Germany is contributing $33.3 million. This project is aimed at improving water supplies for three major urban areas.

During the last 4 years, the U.S. AID mission had only two water projects--both were irrigation projects, although some other projects have included provisions for community water supplies.

According to one Government official, the major problem in achieving the U.N. goal in the urban area is the high cost of installing house connections. A new customer is required to pay for the cost of the connection; to contribute towards the capital cost of the project; and to deposit an advance, covering 3 months of water sales.

Another problem facing the Government of Morocco is the losses it incurs at the rural water supply systems it operates. The operation of these systems does not benefit from the economies of scale found in operating the major urban water systems; as a result, production costs are up to 8 times higher. The Government is not able to charge tariffs in line with these costs because they would be prohibitively high and the rural consumers could not afford them.

The major constraints in achieving the U.N. goal in the rural areas are

--lack of an organization to manage and maintain rural water systems;

--lack of health facilities to insure that the water remains potable; and
--lack of funding for rural water projects.

Currently, no organization is responsible for planning, managing, and maintaining rural water supplies. These responsibilities are shared by the Ministries of Agriculture and the Interior as well as the local provinces.

Ministry of Health officials stated that they lack the necessary facilities to insure that rural water remains potable. They stated they have only 19 laboratories for testing the quality of water, and only 11 are adequately equipped and staffed. In the 1981-85 development plan, the Ministry has requested funds to increase the number of laboratories to 30, one for each province, and to provide adequate equipment and personnel.

According to Ministry of Health officials, a systematic procedure is in place to check the potability of the water supplies for the urban areas. However, because of inadequate staffing and vehicles, these procedures are not always followed. These officials stated that there is no system to check rural water supplies, and it is rarely done.

UNDP and UNICEF officials agree with the constraints identified by Government officials. They do not believe that the Government is planning a high priority in overcoming these constraints. The officials also said that there has not been enough money for rural water projects. The UNICEF Director said that even if funding is substantially increased, the U.N. goal will not be achieved by 1990, but he did say that with increased funding the goal may be achieved by the year 2000.

Maintenance problems

Maintenance is not a significant problem for urban projects, but it is a problem facing rural water projects. Maintenance for rural water projects suffers due to

--lack of adequately trained mechanics,
--lack of spare parts,
--no preventive maintenance plan, and
--no systematic reporting of maintenance problems.

According to an official of ONEP (the Government agency responsible for urban water activities), they have sufficient numbers of trained maintenance personnel. This official stated that ONEP has a training center for maintenance personnel and an in-service training program. Currently, maintenance is conducted on an as-needed basis. In one municipality, preventive maintenance plans are being introduced.

Maintaining rural water projects is the responsibility of the local governments. These governments, however, do not have the funds or the trained personnel to fulfill this responsibility.

Only five provinces have operating maintenance teams in Morocco. These teams were established prior to independence primarily to maintain the windmills. According to a Ministry of Interior official, only one team is fully operational; the other four teams do not have properly trained personnel, adequate inventories of spare parts, or transportation.

The Director of UNICEF stated that the local Governor is the reason for the one operational maintenance team because the Governor has a strong interest in keeping the windmills and pumps operating, so he insures that the maintenance teams have spare parts and transportation.

There is no systematic maintenance reporting or preventive maintenance plan for rural water projects. The Director of UNICEF noted that this was a main reason that an earlier UNICEF rural water project failed. During 1972-76, UNICEF renovated wells and installed hand pumps, but by 1978, approximately 95 percent of the pumps were no longer operating.

The proposed Government project with AID and UNICEF calls for the establishment of maintenance teams. The project proposal calls for a maintenance team to be established in each of the 10 provinces in which the project will operate. Each team will have three people who will be provided with the necessary equipment and supplies.

Though AID presently has no water projects underway, AID officials are nevertheless aware of maintenance problems in other countries and in Morocco (such as an earlier UNICEF project where 95 percent of the pumps are now non-operational). As a result, AID officials are attempting to insure that project proposals, such as the current government proposal for a rural potable water project, include measures to overcome maintenance problems. Beneficiary involvement during the construction/installation phase is one such measure; another measure is health training to insure awareness of the benefits of potable water. Beneficiaries and/or maintenance people must be trained in constructing and maintaining equipment.

PANAMA

In Panama, water supply is not the major problem because a large percentage of the population has access to water. Thus, although important, building water supply systems may not be one of Panama's greatest current priorities and may not be as great a need, as in some other developing countries. However, despite Panama's high percentage of population with access to water, donors do not expect that, for the rural areas, Panama will reach the U.N. Water Decade goal.

Statistics from the Panama water agency show that as of December 31, 1978, 100 percent of the urban population and 64 percent of the rural population had access to water; 94 percent and 26 percent, respectively, had house connections. In addition,

98 percent of the urban population and 80 percent of the rural population have some form of sanitation (sewer system, septic tank, latrines). These are some of the higher percentages in Latin America.

A factor behind the high percentage of the population having adequate water supplies has been the strong U.S. presence because of canal operations. There has been substantial Government effort and U.S. loan assistance in water projects in both urban and rural areas. For example, over 700 rural water systems were constructed during the 1970s.

In addition, between 1962 and 1973, the Inter-American Development Bank authorized loans totaling nearly $14 million for water supply and sewerage projects for rural communities and several urban centers. AID extended five loans totaling $37 million between 1963 and 1971 to support extensive expansion and improve the Panama City and Colon water and sewerage facilities.

Currently, AID has a rural health loan project with the Ministry of Health which handles the provision of water to small, rural communities with populations of less than 1,000. Of the total loan, $4.2 million is being used to build 300 water supply systems, 400 wells, and 900 latrines. When the project is completed in 1981, Panama should reach the goal of 70 percent of the rural population with access to water. Other ongoing water supply projects for system replacement and expansion are being done through the national water agency which serves urban areas and rural areas with populations of more than 1,000. AID has a $12-million loan from the World Bank for its $23-million program.

Those who will not have access to water in the future live in very small isolated rural towns. The per capita cost of serving this remaining group will be higher because these towns are scattered or remote. The AID environmental engineer cited this as the reason that he does not expect Panama to reach the 100-percent goal. He also noted that the United States does not even have 100 percent and that it may not be reasonable to expect reaching 100 percent.

Maintenance problems

Although cited as a problem in conjunction with water projects elsewhere, maintenance has not been a problem with Panama's rural water projects. In a recent AID evaluation of Panama's rural water system, 88 percent of the water systems in a sample visited were operational--a very high percentage according to the AID evaluator. In the rural water systems, the villages are responsible for operating costs and maintenance. Reportedly, the villages have been successful in this regard.

Some system breakdowns occur, but generally the problems are resolved so that systems do not remain inoperable, according to the AID engineer. Various members of the communities are already knowledgeable or are trained at the time of installation

in system maintenance and operation. If the villages do not have the technical expertise to resolve the problem, Ministry of Health assistance is available, though it may be spread thin. In any case, maintenance problems are not common. In addition, due to the number of systems already being installed within the country, the Ministry of Health maintains, or has access to, an adequate supply of repair parts.

Several elements are attributed to the rural water supply success, including project maintenance. One element is community interest. For a project to be initiated, the community must show interest (generally through the local legislative representative) and must participate in the project by providing unskilled labor, feeding and housing Ministry of Health project personnel, and building the storage tank. Other success elements include the use of appropriate technology and standardized engineering designs and use of trained technicians who can provide assistance at a fraction of the cost of engineers.

The AID project official believes that one reason there is community interest is that the AID project has tried to service the people through house connections rather than through community pumps. Although higher in cost, there is more community interest because of personal benefits from house connections. Pumps are found more often to be out of service than the systems providing house connections. The project criterion was to provide house connections only to towns of at least 200 in population, but this was changed so that villages with as few as 25 people could have house connections.

The AID evaluation team did indicate that Panama may need to consider the continued quality and quantity of the water supply source itself. Possibilities exist for contamination, and in towns where consumption is increasing, the amount available from the water source may become inadequate. The existence of a water supply source is essential to having a water supply system and if the existing one is inadequate, the village must find another.

We did note that the AID evaluation which was done is not routine and followup on these projects is not normally done. Therefore, the donor organizations would not be able to systematically identify maintenance problems or rehabilitation needs. The AID engineer on the water project agreed that more followup is desirable but that routine followup on all projects is not practical.

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

ASSISTANT
ADMINISTRATOR

May 26, 1981

Mr. Frank C. Conahan
Director
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Conahan:

I have been asked to reply to your letter of April 27, 1981, transmitting the draft of the GAO report, "U.S. Strategy Needed for Water Supply Assistance to Developing Countries." I appreciate the opportunity to comment on the draft report.

The Agency agrees with many of the conclusions of the report, particularly the emphasis on the importance of maintenance and trained personnel in water supply and sanitation programs. I believe that the Domestic Water and Sanitation Policy Paper that is in preparation will provide ample guidance for Agency activities in this sector.

I.D.C.A. comments and observations on the recommendations of the draft GAO report are attached. I would be most happy to discuss with you any of our comments, or to provide you with additional information.

Sincerely,

Charles Paolillo
Acting Assistant Administrator
for Program and Policy

Attachment: as stated

I.D.C.A.'s Comments on GAO Draft Report

U.S. Strategy Needed for Water Supply Assistance in Developing Countries

General Comments

The GAO Draft Report on U.S. Assistance in water supply in the developing countries is a concise and objective review of the water supply sector that identifies many of the obstacles impeding the provision of improved supplies and sanitation to the poor in less developed countries.

The International Development Cooperation Agency agrees with most of the conclusions and recommendations of the report, but suggests modifications in several. A general discussion of the report's recommendations and conclusions will be followed by specific comments on the text of the report.

Recommendation 1: "...that the Director of I.D.C.A. develop comprehensive policies and strategies affecting U.S. bilateral and multilateral financial support for community water supply and sanitation activities in developing countries...."

A.I.D.'s Health Sector Policy Paper, published in March, 1980, outlined the Agency's policy on water supply and sanitation (pages 23-31). A more detailed Domestic Water Supply and Sanitation Policy Paper is currently being prepared by the Agency for International Development. This policy will also guide our consultations with multilateral organizations providing assistance in this sector. U.S. support for multilaterals' activities in water supply and sanitation will have to be considered in light of the Administration's general policy with respect to growth in the budgets of multilateral agencies.

A. Goals for the U.N. water decade: In the course of developing its Domestic Water Supply and Sanitation policy paper, A.I.D. has been reviewing its objectives in water supply and sanitation as part of the Agency's health goals, and in the broader context of overall development objectives and priorities. It is not clear what kind of goals are intended in GAO's recommendation. Monetary goals? Coverage of population (e.g., a certain percent of the population with access to water supply and sanitation according to a specified timetable during the decade)? For whom should the goals be established? Developing countries? Multilaterals? The U.S.? The report concedes that the goal of the U.N. decade - bringing safe drinking water and adequate sanitation to all the world's population by 1990 - is "overly optimistic."

B. Use of bilateral and multilateral funds for water to help the rural poor: While we agree that principal emphasis in both bilateral and multilateral assistance should be on the rural poor, A.I.D. will continue to support improvements in water supply and sanitation for urban areas, especially with Economic Support Funds. Urban residents in some areas of the world (such as the Near East) are often as much or more in need of improved water and sanitation compared with their rural counterparts. People in rural areas often have access to alternative water sources, and the risk of epidemics due to poor sanitation is not nearly as great among less concentrated rural populations. City dwellers often have little alternative to consuming fetid water or purchasing water from vendors at a price that is often higher than that paid by families

with water piped to their homes. Rapid population growth and migration are swelling cities throughout the developing world, overwhelming the capacity of their water and sewerage systems, and compelling A.I.D. to devote some of its resources to meeting these basic needs of the urban poor.

C. Information on the status of water and sanitation systems; rehabilitation: I.D.C.A. endorses the GAO conclusion that maintenance is at the heart of a successful water supply and sanitation program. Constant surveillance of the operation of pumps, wells, piped water systems, latrines, sewer systems, water purification and sewerage processing plants is sorely needed. We are convinced by our experience that maintenance is one of the major issues in water and sanitation in LDCs, and this point is repeatedly emphasized in the Impact Evaluations of community water projects and in A.I.D.'s draft Domestic Water Supply and Sanitation Policy Paper. Timely and thorough reporting on the condition of facilities can help regional and national water authorities respond quickly to service, repair, and, when necessary, rehabilitate or replace worn out and outmoded systems.

However, we believe that this information is required not only by A.I.D. or other donor organizations, but by LDCs as well since ultimately they will assume all responsibility for the long-term support of improved water and sanitation systems.

We recognize that rehabilitation of existing water and sanitation systems is appropriate in many instances. A.I.D.'s Health Sector Policy Paper specifically states that the Agency will support rehabilitation as

well as initial construction of systems. The draft Domestic Water Supply and Sanitation Policy Paper reiterates this position. A.I.D. has made major investments in the rehabilitation of the Alexandria and Cairo sewerage systems in Egypt (using Economic Support Funds), and has also supported rehabilitation of rural water sources in Tunisia.

The Agency endeavors to ensure that in addition to the certification of maintenance required of every A.I.D. funded project (greater than $1 million), every water supply and sanitation program that receives A.I.D. funding will have a detailed plan for maintenance.

D. Encourage external donors to provide incentives to developing countries that have demonstrated that they will maintain water supply and sanitation projects: I.D.C.A. can certainly encourage other donors to pay greater attention to long-term maintenance arrangements in water supply and sanitation programs they finance. Of course, I.D.C.A. can only suggest that they include maintenance provisions in loan or grant agreements. But we can work with other donors to encourage other policies that will ease the burden of maintenance, such as the use of appropriate technology, increasing community participation in the planning, design, and construction of facilities so that beneficiaries have a commitment to maintaining them, support for maintenance facilities and training of maintenance technicians and villagers, standardization of parts and equipment among donors to avoid proliferation of designs and consequently types of spare parts, and viable financing plans for water and sewerage systems.

E. "Emphasize the need to fund programs for institutional development and training of maintenance personnel...": A.I.D.'s current Health Sector Policy Paper stresses both support to LDC institutions and training of personnel for the purpose of maintaining water supply and sanitation programs. The draft Domestic Water Supply and Sanitation Policy Paper reiterates the Agency's intent to continue support in these critical areas.

Recommendation 2: "...that the Director of the Agency also acquire information on irrigation and hydroelectric power activities which would enable the Agency to develop comprehensive policies and strategies for these major segments of water resources assistance."

The study that was the basis for the report was intended to be an overview of water resources, but contains very little concerning water for irrigation or hydroelectric power apart from the recommendations. I.D.C.A. suggests that in the absence of supporting material on these other two aspects of water resources, the GAO restrict the scope of its recommendations to "community" or "domestic" water supply.

A.I.D. has already issued an Energy Assistance Policy Paper (January 1981) that describes a wide range of energy activities, including hydropower, eligible for A.I.D. support. The paper specifically addresses hydropower (pages 11 and 20) and states that with the exception of small hydropower projects, and support for basic surveys and plans, A.I.D. will leave to the multilateral development banks the financing of the large capital costs of conventional schemes. Accordingly, we urge that the recommendation on Page 34 be deleted.

In addressing domestic water supply, the report frequently refers to "water supply and sanitation", the latter being an essential complement to improvements in water, and part of the objectives of the "International Decade for Water Supply and Sanitation". Unfortunately, the paper does not specifically address issues related to sanitation, which A.I.D. views as an essential element of its water supply programs.

Specific Comments

Page	
i, ii	The U.S. does possess an "information base" for the formulation of policies and strategies concerning domestic or community water supply, but additional information in some areas (such as the impact of improved water on health, and a better understanding of the influence of socioeconomic factors on water and hygiene-related behaviors) would certainly be helpful. A.I.D. is conducting a study of the effectiveness of six water projects in four geographic regions. Indeed, many of the findings of the GAO report were based on these studies.
ii	I.D.C.A. generally agrees with the constraints noted here, but the ability of consumers and LDC governments to contribute the bulk of funds needed for long-term support of these programs is also a critical factor. The level of donor support is important, and may limit the amount of initial, capital construction, but over the long term the LDCs must bear the burden of these programs.
iv-v	In this section of the digest and in the corresponding pages of the full report, GAO appears to be recommending that I.D.C.A. place increased priority on water, without consideration of the broader context in which I.D.C.A. and A.I.D. operate. Is this GAO's intent, and if so, is it appropriate?
v	A.I.D.'s technical staff is working closely with the World Bank and with UNICEF on particular aspects of water supply and sanitation, such as the transfer of technology in the sector, project development in selected countries, and research into the beneficial impacts of improvements in water supply and sanitation.
vi	The recently organized Global Water Supply Unit of WHO is currently collecting information to help assess the condition of existing water and sanitation systems. WHO has an existing network of engineers encompassing almost every LDC, and a core staff in Geneva to collect, analyze and disseminate information on progress towards meeting the goals of the Decade. A.I.D./W technical staff are in frequent contact with the WHO unit. A.I.D. lacks the resources to duplicate this effort, and should not duplicate it even if we could.

Page	Specific Comments
1	The list of uses for community water supply is extensive. These demands must be balanced against availability of more water at a reasonable cost. Many of these demands will probably remain unmet in arid areas of the world.
4	"Clean" and "safe" are used interchangeably throughout the report to describe drinking water. "Clean" water is usually used to describe water in streams and rivers (e.g., EPA's "Clean Water Program"). "Safe" is the preferred adjective when describing drinking water.
5	The potential for hydroelectric power is unevenly distributed among the regions cited and among countries within the regions. In addition, the majority of the potential projects require massive infrastructure investments either to construct the facility or to utilize the power generated effectively. Without qualification these sentences could be misleading.
6	GAO is no doubt aware that the countries selected for the review are not representative of the countries in which A.I.D. works: No African country was included, and Panama is not typical of Latin American countries.
7	The draft report states "IDCA ... has not included water resources development as a separate area for priority attention..." There are two issues here: first, whether or not water resources per se should merit consideration as a separate sector. Should IDCA address irrigation, for example, as an area separate from agriculture? We think not. Second, GAO implies that IDCA should give water resources greater priority than at present. The need for increased funding in this sector must be weighed against competing priorities and likely development assistance funding trends.

Page	Specific Comments
8	Policy papers do not normally identify a particular level of funding for future year activities in various sectors, since development assistance funds, subject to yearly authorization and appropriation, may vary. The report does not specify which problems related to water supply and sanitation were neglected in the draft policy paper on domestic water and sanitation.
9	The statement "...the rural poor are in greatest need..." should be qualified, as discussed above.
10-12	This section of the report places great stress on the funding required from external donors to meet the "Goals of the Decade." The final paragraphs do address the issue of funding contributions by the developing countries themselves. As the draft report emphasizes, the great challenge in community water supply programs is generating the continuing financial support required to maintain these systems over time. Lack of host government commitment to raising these funds - through any one of a number of approaches, including taxes and fees - is a major issue not discussed in any detail in the report.
11	Donors who have made a commitment to increase funding for water supply and sanitation during the Decade also include the Scandinavian countries, Holland and Canada.
13	A.I.D. has consistently emphasized the need for institutional development and training in support of water supply and sanitation programs in developing countries. Through its Water and Sanitation for Health project, A.I.D. has recently advised a number of countries on staff development and the Agency is developing a project called "Manpower Development and Training for Water Supply and Sanitation Programs". A.I.D. is also coordinating with PAHO, WHO, the World Bank, and other donors on common methodologies for developing water and sanitation institutions and technical staff.
14	The draft report fails to mention that the 1978 memo signed by A.I.D.'s Administrator contained 4 caveats conditioning the increase in development assistance for water supply and sanitation. Among them was: that overall A.I.D. levels would increase sufficiently to permit substantial expansion of rural water and sanitation programs without affecting programs in other sectors. The last condition has not occurred.

Page	Specific Comments
18	Again, the greatest need for safe water and improved sanitation is not in all cases in rural areas, most notably in the Near East. This broad generalization should be qualified.
20	Both rural and urban water programs can be justified as "helping satisfy basic needs". The large ESF expenditures for urban water and sanitation improvements are not necessarily inconsistent with a basic needs orientation (as the report implies) because of the extremely serious health risks posed to the populations that lack safe water and adequate excreta disposal facilities in urban as well as rural areas.
20-1	The A.I.D. Domestic Water Supply and Sanitation Policy Paper will respond to the request of the House Appropriations Committee for a strategy statement on water and sanitation, and, for reasons stated above, it should not and will not make any specific financial commitments.
23	The report could assign greater importance to the role of private and voluntary organizations (PVOs) in developing community water supplies. In addition to those mentioned in the report, a number of others (including Save the Children Federation, Foster Parents Plan, YMCA, and others) now provide or are capable of providing assistance in this area. While PVOs may need help in carrying out certain aspects of water and sanitation programs (such as training and building a capability in maintenance), they can be especially effective in implementing program activities at a village level, particularly in rural areas. They work outside and complement government agencies, and build on the capacities of local groups and indigenous organizations.
26-29	This section provides ample justification for A.I.D.'s policy of promoting the use of technology appropriate to given settings, yet the report does not acknowledge the wisdom of this approach. The choice of technology will obviously vary with the specific circumstances, and will have a great impact on the ability of the government and the community to maintain the system.

Page	Specific Comments
	There is an additional factor complicating maintenance. In most LDCs a number of bilateral donors are involved in the construction of water and sanitation systems. Each may have its own source and origin requirements, which leads to a proliferation of equipment, and consequently the need for more training and an unrealistically broad range of spare parts.
37	Item 6 should be identified as a reference to the urban water supply of Damascus, Syria.
38	Item 1 is an exaggeration of the existing situation in Jordan. Shortages are limited mostly to major cities.
39	A major disincentive to the conservation of irrigation water in the Near East, and in Egypt in particular, is the fact that it is treated as a "free good", available without charge.
49	The last paragraph, on spare parts and equipment compatibility, is important, and should therefore be included in Chapter 4 of the main text.

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

DEPUTY ASSISTANT SECRETARY

May 22, 1981

Dear Mr. Conahan:

On behalf of Secretary Regan, I wish to thank you for your letter of April 27, 1981 enclosing your draft of a report entitled: "U.S. Strategy Needed for Water Supply Assistance to Developing Countries" and for the opportunity to comment on it.

I note that most of the subjects treated come under the purview of IDCA and that your recommendations are therefore directed to that agency.

Treasury has therefore focused on those parts of your report which cover the operations of the Multilateral Development Banks. On the whole, I find them entirely satisfactory. Members of our respective staffs have discussed some of the details and have reconciled divergent viewpoints -- with one exception.

This has to do with how allocations of Bank resources for the development of safe water supplies for borrowing countries are made. The review states that the World Bank has no "overall water strategy."

While it is true that the Bank has no global strategy for eradicating the problem of providing safe and dependable water supplies, the Bank does set comprehensive annual lending targets for water supply which are disaggregated and allocated among the Bank's borrowing members. These allocations, as the review itself states, are based on the Bank's economic reports on individual member countries, reports that are prepared by the Bank itself on the basis of economic and statistical data collected within the individual country and from sister organizations, including the United Nations and the International Monetary Fund. On the basis of these data, the Bank staff develops its country specific strategy

for addressing water supply needs. The Bank considers this the most satisfactory approach to the role it can play in fulfilling the need for safe water supplies, and we agree.

I wish to thank you again for the opportunity of commenting on this report.

Sincerely,

Thomas C. Dawson

Mr. Frank C. Conahan
Director
International Division
U.S. General Accounting Office
Washington, D.C. 20548

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