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# WATER SUPPLY AND SANITATION IN RURAL DEVELOPMENT

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WATER SUPPLY AND SANITATION  
IN RURAL DEVELOPMENT:  
PROCEEDINGS OF A CONFERENCE FOR  
PRIVATE AND VOLUNTARY ORGANIZATIONS

Sponsored by  
The National Council for International Health (NCIH)<sup>1</sup>  
and  
The Water and Sanitation for Health (WASH) Project<sup>2</sup>

Held at the Pan American Health Organization  
Washington, D.C.  
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<sup>2</sup>Funded by the Office of Health Bureau for Science and Technology, Agency for International Development, under Order of Technical Direction No. 57, Contract No. AID/DSPE-C-0080 Project No. 931-1176.

## FACULTY LIST

- John H. Austin, Environmental Engineer, Office of Health, Bureau for Science and Technology, Agency for International Development, Washington.
- James E. Beverly, Information Director, Water and Sanitation for Health (WASH) Project, Arlington, VA.
- Ross Edgar Bigelow, Division Chief, Africa/Latin America Operations, Office of Private and Voluntary Cooperation, Agency for International Development, Washington, D.C.
- Abby Bloom, Senior Health Policy Analyst, Bureau for Program and Policy Coordination, Agency for International Development, Washington, D.C.
- Peter G. Bourne, M.D., Assistant Secretary General, United Nations Development Programme, coordinating U.N. Water Decade Activities, Washington, D.C.
- John Briscoe, Assistant Professor, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill.
- Heather Clark, Program Officer, International Voluntary Services, Washington, D.C.
- Bruce Clemens, Engineer, Environmental Protection Agency, Washington, D.C., founder of Agua del Pueblo.
- Sarah E. Coghlan, Research Librarian, Water and Sanitation for Health (WASH) Project, Arlington, VA.
- Stephen Cox, Associate Director for Research and Program Development, Agua del Pueblo, Oakland, CA.
- Eugenia Eng, Assistant Coordinator of the Practical Training in Health Education Project in Cameroon and Instructor in Health Education at the School of Public Health, University of North Carolina at Chapel Hill.
- Bruno Ferrari-Bono, Advisor on Water and Sanitation and member of Water and Environmental Sanitation Team, UNICEF, New York.

Davidson Gwatkin, Senior Fellow, Overseas Development Council, Washington, D.C.

Craig R. Hafner, Senior Project Officer, Water and Sanitation for Health (WASH) Project, Arlington, VA.

William Herod, Washington-based consultant, Church World Service, New York City.

Morton S. Hilbert, Professor and Chairman, Department of Environmental Health, School of Public Health, University of Michigan at Ann Arbor.

Raymond B. Isely, M.D., Associate Director, Water and Sanitation for Health (WASH) Project, Arlington, VA.

John M. Kalbermatten, Senior Advisor, Water and Wastes Unit, Transportation and Water Department, World Bank, Washington, D.C.

C. Payne Lucas, Executive Director, Africare, Washington, D.C.

James McCaffrey, Training Resources Group, Alexandria, VA.

F. Eugene McJunkin, Chief, Division of Water and Sanitation, Office of Health, Bureau for Science and Technology, Agency for International Development, Washington, D.C.

Hilda Paqui, Information Advisor, International Drinking Water Supply and Sanitation Decade, UNDP, New York City.

Fred M. Reiff, Engineer, Division of Environmental Health Protection, Pan American Health Organization, Washington, D.C.

Thomas Roach, Manager, Office of Multilateral Programs, Peace Corps, Washington, D.C.

Hannelore Vanderschmidt, Associate Director, Center for Educational Development in Health and Associate Professor of Education, Boston University.

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## PREFACE

### ABOUT THESE PROCEEDINGS

In order to offer these Proceedings in their most usable form, all presentations have been organized with subtitles so that material can be scanned quickly for the information being sought.

A Functional Index was developed to help find information in terms of concerns PVOs expressed at the conference. The index will be found immediately after the bibliography on p. 132.

### ABOUT NCIH AND WASH

The National Council for International Health (NCIH) is a national organization of individuals and organizations working together to promote more effective United States involvement in international health programs. Its membership--including representatives of government agencies, private and voluntary organizations, universities, foundations, professional associations, business and labor--makes it the ideal focal point for identifying and responding to the health needs of developing countries. The Council is located at 2121 Virginia Avenue, N.W., Suite 303, Washington, D.C. 20037.

The Water and Sanitation for Health Project (WASH) is sponsored by the Office of Health, Bureau for Science and Technology, U.S. Agency for International Development. The WASH Project offers a broad range of services related to water supply and sanitation programs in developing countries. Services may be obtained by private and voluntary organizations through the Agency for International Development in three different ways:

Information can be obtained anywhere in the world by contacting the WASH office directly.

Technical assistance in project design and evaluation, training, and technology transfer and selection can be obtained for work in the United States by contacting Mr. Victor Wehman, A.I.D. WASH Project Manager, Office of Health (S&T), Agency for International Development, Washington, D.C. 20523 (telephone 703 235-9825).



Technical assistance for work in a developing country can be obtained by contacting the USAID Mission in that country, which, in turn, will contact Mr. Wehman at ST/H/WS.

## PURPOSE OF WORKSHOP

The Workshop, which these proceedings record, was planned to strengthen the role and contributions of U.S. Private Voluntary Organizations (PVOs) in their water and sanitation projects in developing countries.

Discussions among the National Council for International Health, several private voluntary organizations, and the Water and Sanitation for Health Project (WASH) developed the direction of the program, which was designed to examine and discuss:

- planning, implementation and evaluation of water and sanitation components of rural development projects, and

- ways to facilitate the cooperation between U.S. PVOs and other organizations in the International Drinking Water Supply and Sanitation Decade.

## ACKNOWLEDGEMENTS

Acknowledgements are given to the following for their contributions in planning the Workshop: the NCIH staff, especially Russell Morgan, Evelyn La Roque, Amy Titus, Josef Bredie and Diane Hedgecock; the WASH staff, especially Craig Hafner, Sarah Coghlan, Maureen Burton and Raymond Isely; and from AID, John Austin and F.Eugene McJunkin.

We wish to thank the following for helping with the preparation of the Proceedings: Marcella Mosher, Barbara Furst, Corinne de Jesus, Johnny Palmer, and Karla Lindstrom.

## Chapter 1\*

### STATUS REPORT: WATER SUPPLY AND SANITATION AT THE BEGINNING OF THE DECADE

Professor Morton S. Hilbert, Presiding

We are pleased to welcome the representatives of Private Voluntary Organizations (PVOs) interested in the field of water supply and sanitation. I would like to express my appreciation to the National Council for International Health for planning the conference and to the Water and Sanitation for Health Project (WASH) for their assistance to the program. I would also like to thank the Agency for International Development's Division of Science and Technology for their support and the Pan American Health Organization for its facilities which are being used for the conference.

#### THE PROBLEM

I would like to recall for the group that one and one-half billion rural and 200 million urban people in the world suffer from the lack of safe drinking water and adequate sanitation. These conditions exact a heavy toll in human suffering by spreading disease, increasing infant and child mortality, and diminishing human productivity. It has been estimated that some 80 percent of the world's diseases are linked to inadequate water supply and sanitation. Between 10 and 25 million people die every year from diseases caused by unclean or inadequate water and unsanitary conditions.

The United Nations, in recognition of this urgent problem, declared 1981 to 1990 as the International Drinking Water Supply and Sanitation Decade, in order to mobilize a world-wide effort to provide safe drinking water and sanitation for all by 1990. It is hoped that this program will have the same success as the World Health Organization's smallpox eradication program.

\* Oral presentations of the faculty form the basis for these proceedings.

## CONFERENCE AIMS

One purpose of the conference is to strengthen cooperation among private voluntary organizations. It is hoped that PVOs will learn more about their parallel efforts in the field of water and sanitation, which will lead to the creation of specialized networks among PVOs.

One theme which we must stress is the need to share resources in this field. In the United States alone we have a large number of governmental and private organizations dedicating their resources to the goals of this Decade. In meeting this global effort to solve the problems of unsafe water and poor sanitation, we should try to improve the use of these valuable resources.

This conference was also planned as a first step in providing an opportunity for private voluntary organizations to train practitioners to be more effective in managing the water and sanitation components of their development assistance projects.

## WELCOME

Davidson Gwatkin

On behalf of the National Council for International Health, I welcome participants to the Workshop on Water and Sanitation.

As the result of a recent month spent in Tanzania looking at that country's significant program in provision of safe drinking water, this topic has become even closer to my heart. In the course of my visit, I realized an awful and significant truth, not surprising to any of you here--that water programs really don't work very well. I am told that many of the problems and challenges in Tanzania are typical of what can be found elsewhere.

If we are to make a persuasive case for expanding our efforts to provide safe drinking water and adequate sanitation, we have got to come up with programs that are truly effective in serving people. This workshop will give us a chance to deal with the practical things that must be done.

Without the cooperation and assistance of a large number of people and organizations, this workshop could not have happened. AID and the WASH Project have been particularly central to our efforts. The World Bank has been equally helpful in providing some of the copious documentation it has developed over the years. Our thanks, also, to the Pan American Health Organization for kindly allowing us to use its facilities.

I wish to thank a few of the many people who have helped, particularly John Austin and Gene McJunkin, of AID, Professor Hilbert, for agreeing to chair the meetings, Evelyn La Roque of NCIH, and Amy Titus of WASH whose work has been essential to the many tasks required for the completion of a successful workshop.

Once again, I thank you for being here, and I share your anticipation for a very profitable three days.

## THE WATER SUPPLY AND SANITATION DECADE: A CONTEXT FOR CHANGE

C. Payne Lucas

I have prepared some remarks based on materials from the World Bank and other organizations that traffic in this thing called water. But I'm going to put aside my prepared presentation and talk briefly about what I feel about the Decade for Water and Sanitation. In all candor, I must say I think that the Decade is several decades too late, because it comes at a time when resources are scarce. This has led many PVOs to conclude that a good program is a funded program, and this is certainly one of the worst things that could happen.

### PROBLEMS OF WATER AND SANITATION PROGRAMS

All organizations working in water and sanitation projects over the past two decades know that they have not done well. PVOs working on water projects continue to face a number of problems.

#### Host Government Commitment

For those of us working in Africa, and I suspect this is true elsewhere, we are not sure that governments are as serious about water projects as they might be. Who is in charge? Few ministries of health have a person with special responsibility for water problems. Most ministries of health have pitifully small budgets compared with more politically powerful ministries. There simply has not been the priority and political capital in health and related sectors that can possibly compete with other ministries. This continues to be a serious handicap.

#### Some Technical Problems and Past Mistakes in Water Programs

With less money and less commitment than we would like, it is important to learn from each other to avoid repeating past mistakes.

## Wells

In past water programs, wells have dried up or caved in. Besides the waste of resources, this is an especially bad experience where villagers have contributed labor and may be asked to contribute again. They lose faith in the technical competence of outside organizations.

Wells have been sunk where salt water or no water was found. The state of the art is advanced enough so that a certain predictability can be achieved. But this costs money, and with money limited, adequate planning of the project is often left out.

Improperly built wells continue to be built, often lacking a lip. This makes no sense. Animals drink from puddles and contaminate this water which in turn contaminates the well. Now here is a simple thing that doesn't cost much money. We have the knowledge needed. It is a matter of information sharing, but we don't always learn from each other.

## Pumps

The landscape in the third world is littered with pumps that do not work. When you talk to people there and say you can't come up with a pump that villagers can install and repair, they can't understand why this is true for a country that can send people to the moon. Throughout this time we have not even been able to offer several standardized designs for handpumps that can be easily put to use in developing countries.

## WHAT'S AHEAD FOR PVOS

As we learn from our past problems and mistakes, we have to face up to finding the help we need and to making some hard choices during this Decade for Water and Sanitation.

## Technical Help is Still Needed

PVOs need a pump that is inexpensive, simple enough to repair and install, that is widely applicable, and that works. Is this a research problem or a problem of information dissemination? What about storage tanks? Do we get them from London? Should they be inflatable, or should we build them from the ground up?

## Research Needs

We need the results of disciplined research to end the debate over the best way to purify water. Is chlorine best? Should a sand filter be used? With their limited resources, PVOs have no way to end the confusion. At the same time, we must urge more organizations to undertake research in the many areas where we continue to need accurate technical information.

## Difficult Decisions Ahead in Developing New Projects

Because we are going to have to do more with less money, PVOs are going to have to be more rigorous in their choice of projects. Otherwise, we will, in fact, be trapped into thinking that a good program is a funded program.

We should approach the donor community with proposals for funding only when host governments' requests meet our rigorous criteria. PVOs can expect occasional charges of neo-colonialism and cultural imperialism, but we should be honest with host countries and say, "These are our resources. Do you want them?" We should admit that we have clean-up problems at home, too, and it is not just their problem.

There will be less money and just as much need in the years ahead. This is one of many reasons that PVOs should know what others are doing. Limited funds will offer the strongest temptation to develop projects inadequate to the need or only in those sectors where money is easiest to find, a temptation that must be resisted.

When we mount health and agriculture programs, we must include the water component from the very beginning. The truth is that many water programs are ill-conceived and are often tacked on afterwards because the donor wants it. Unless the water program is really integrated in a project, there is very little hope for its real success.

Simply putting in wells is not enough. A thorough and aggressive health education and sanitation program is required to continue the benefits of potable water. The education segment of water programs is often omitted and is the primary reason for their failure. We all know what happens when you start talking to donors about nutrition and health education and communities cleaning up their environment. We have to make the point again and again that money spent for water programs is often a complete waste without education and sanitation programs to make them effective.



As with health education, it is difficult to get support for maintenance or even training people in maintenance. These aspects of water programs are absolutely essential. But are they sellable? What do PVOs have to do in order to attract the private sector, the big donors, the private banks and the World Bank to this vital aspect of water projects?

### NEEDED: THE WILL TO OVERCOME FRAGMENTATION

As I have said several times, in looking at these problems, we have got to find out what each other is doing. It's not always a case of money.

#### PVO Strengths and Needs

In the face of many problems, we PVOs tend to underestimate our own strengths. Our flexibility, low cost, low overhead and examples of self-help are most appropriate for developing countries. Many of us have the additional strengths and resources of our international organizations which allow for large, high impact projects and widespread influence. But, as I've said, the right hand does not know what the left hand is doing.

PVOs need, most of all, a complete and purposeful fusion of will. This will to succeed must be built on the knowledge of each other's successes. What projects have been most successful? What research has been applied most fruitfully? Which projects are being undertaken by other PVOs and need not be duplicated?

#### Program Strengths and Needs

Even when knowledge and technology exist, they are applied in a fragmented and spasmodic fashion. For example, rural development is seen apart from urban development, to the detriment of both. Africa, Asia, and Latin America are looked upon as different preserves, adding to further fragmentation of information and successful effort.

More than one and one-half billion people in the world need the simple life supports of clean water and effective sanitation. They will continue in this state until we can come together to change this situation.

The dialogue about water up to this point has been "polluted." We need to clean up these muddy waters of rhetoric. We need a game plan that makes sense for the Water and Sanitation Decade. It's time to start. I am confident that we can achieve our goals.

## THE UNITED STATES COMMITMENT TO THE WATER DECADE

Abby L. Bloom

I would like to shift slightly the focus of my address today to try to respond to a very few of the questions that were posed by Dr. Lucas. I'd like to give you some idea of the thinking that's been going on within AID over the last two years, at the beginning of the Decade.

### THE EFFECT OF PVOS' WORK ON AID

I want to say first that it's an honor and a pleasure to meet here today with you and to thank you for the work that you have been doing in water supply and sanitation overseas. Perhaps unknown to you, your work has been very influential in forming AID's thinking about this important sector.

As an example, about a year ago a number of us came up with what we thought was a very brilliant idea, the need to somehow incorporate domestic or potable water supply and sanitation into rural development activities, more specifically, irrigation programs.

After a couple of months we found that in Central America, Agua del Pueblo was well along the way to implementing exactly this kind of activity. And half way across the world, the African Medical Research Foundation was doing the same thing in southern Sudan.

From my own perspective, then, I think that the activities of private voluntary organizations have a lot to teach those of us who work in the sometimes unwieldy, very large organizations, like AID.

### HOW AID VIEWS BENEFITS OF WATER AND SANITATION PROGRAMS

As I mentioned, AID has just about completed a two year process of looking at what the Agency is most capable of doing in water supply and sanitation in the developing world. This process has caused us to think long and hard about a number of basic issues relevant to water supply and sanitation.

What I'd like to do is address three key issues for you today and tell you what our conclusions have been. However, I'd like to start off by telling you how we view water supply and sanitation in terms of the benefits that might accrue to people in developing countries.

### AID Involvement

As a general introduction, you may know that AID is involved in water and sanitation activities through its health programs, but AID also has a substantial program in the water supply and sanitation sector as part of its housing activities, and as part of activities that take place under a special account known as the Economic Support Fund. Most of these latter activities are urban water systems. In terms of funding they represent the bulk of what AID is doing and most of them take place in the Near East.

Finally, and increasingly, we hope, AID is involved in water supply and sanitation through integrated rural development activities.

### Benefits Seen

#### Direct

We believe that improved water supply and sanitation systems have both direct and indirect benefits. Among the direct benefits is the convenience factor. Quite simply, increased supplies of more conveniently located water results in energy and time savings.

Most of these savings accrue to women and children who are the principal seekers and bearers of water in the developing world. For example a study that was done about two years ago in Sudan showed that placing wells in the villages could save women up to six hours a day fetching and carrying water.

Another direct benefit that is very striking is improvement in health, particularly with waterborne and waterbased diseases. Better access to improved quality water can make a significant difference.

## Indirect

Energy saved can be crucial for women--Sometimes I think that indirect benefits are not fully taken into account. I recently talked with Richard Cash, a physician who is currently in the International Health Program at Harvard, and shared with him an idea which he has also been thinking about and will apparently discuss in a forthcoming article. I said we've been getting a lot of criticism because, while it's true that more convenient water supply and sanitation may save time, many people feel that time is not worth anything. So what if it saves time and energy? And besides it's time and energy of women and children that's being saved. His response was what I had surmised all along. For women, particularly during very perilous periods of their lives, like pregnancy and lactation, the sheer saving of calories, maybe even several hundred calories from not having to seek water, can really make a critical difference in their nutritional status.

Time saved used to generate income--On the other hand we do know from examples that time saved has been used profitably in other activities, some of which can generate increased income.

In some countries, the time saved has been used for increased labor in the fields, resulting in more agricultural production. We also know that both the time saved and accessibility of water close to the home have been used for cultivating home gardens. This was found to be true in an evaluation we recently did in Thailand.

Girls more likely to go to school--We also surmised that because water fetching and carrying is a function that takes up a lot of time for girls, that with the time saved and girls no longer having to stay home just to carry water perhaps they will have a greater opportunity to attend school.

The indirect benefit that may accrue, as we've seen, is that on the whole, children of women who have been able to get a primary education are healthier than the children of women who have not had three years of education.

## MAJOR ISSUES IN WATER SUPPLY AND SANITATION

I would like to share with you three major issues that we see arising in the water supply and sanitation sector. I don't think any of this is new to you. In fact Dr. Lucas has kindly given us the background.

## Operation and Maintenance

The first issue, operation and maintenance, I'll deal with quickly-- looking at several of its aspects.

### Technology

We know that this is a critical element of successful water supply and sanitation activity. We also feel that we can perhaps do a better job of assuring adequate operations and maintenance through a variety of activities. One is obviously the choice of technology. Dr. Lucas has addressed this point.

### Training

Another possibility is the training of community members, wherever possible, in the maintenance and repair of water systems. I also include women, as they have the most to lose when systems break down. They are the ones that have to resort to the long walks to obtain water.

### Funding

We also believe that operation and maintenance may be more successful where monies are kept closer to the community. Our general feeling is that where maintenance funds are far removed from the community, they somehow don't trickle back again as they should, and we are probably better off keeping those resources closer to the community.

### Standardized parts

And finally, another point that Dr. Lucas mentioned is the standardization of equipment and parts. This last recommendation is a lot easier to recommend rhetorically than to implement because, as we well know, in many of the countries in which we work, there are ten, twelve, seventeen, or twenty donors involved in water supply and sanitation activities. For whatever reasons, all of us tend to go off and order equipment that originates in our own countries.

## Finance

The second key issue in water supply and sanitation is the issue of financing. Now, while it is true that the cost of an individual water system can be very low, in the aggregate, the cost of providing water to the unserved and underserved in the world is, in fact, very high.

Most often, investment costs are paid by external donors. However, the recurring costs, as we have seen, can be a major problem. The landscape of broken pipes in the developing world is ample evidence of this difficulty.

## More Realistic Criteria

As a result of the review that AID has done, we have come up with some general criteria for situations where we think water supply and sanitation investments are merited.

The first obviously, is where need is evidenced by disease prevalence, insufficiency of water, or inadequacy of sanitation. A second situation is where there is some kind of demand and there is a willingness to pay through fees or other contributions, whether from local communities, or the national government.

## Community Commitment

If water and sanitation systems are to be long-lived, the community must show a commitment to shoulder the recurrent costs of the systems, and, to the extent possible, the investment costs as well. Where inadequate water and sanitation pose a severe public health hazard, the national government can demonstrate its ability to support investment costs, and the community can support the recurrent costs, AID will help finance the system. Only in extremely unusual circumstances, and only in the short-term, will AID support programs where the community cannot cover the recurrent costs of the system.

While at first these criteria may seem rather harsh, they are really realistic. Resources are tight and it doesn't make much sense to be investing money in drilling wells, in creating urban water systems when we know that the investment is short-term and will only provide water for one or two years. If the system falls into disrepair, that investment is lost.

## Community Participation

The third and final issue that I would like to address is that of community participation. Recently we had a chance to look at a new well that had been drilled.

Site Selection--The pump had not yet been installed, but the system looked very impressive. The well was adjacent to the community and as we walked back into the community to look at the traditional water source, one of the community leaders confided in us and said, "We are not going to use that well." We were rather taken aback and asked what he meant. He said, "You know, they didn't ask us where that well should be installed, and that's a terrible location."

The well was located on a hairpin curve and even though this is rural Togo, there is a paved road, and cars come speeding around there at 90 kilometers an hour. "We usually send our kids to fetch the water, and we are not going to send them to that dangerous place," he said. Well, that was quite sobering. Obviously, the community has to be involved in site selection.

Understanding the costs--If the community is expected to come up with the fees for the recurrent costs of the water system, they have to understand those costs at the outset. You can't just inform them afterwards what they are going to be expected to pay. In fact, we believe that projects should be requested or formally supported by community leaders or by some representative community group. Where this kind of support is lacking, the community should be bypassed.

Training--As was mentioned earlier, programs should include plans to train community workers in maintenance and operation. And wherever possible, it's advisable to go through existing indigenous organizations rather than creating whole new committee organizations.

Education in Water Use--Additionally, we agree that it's very important to give the community an education in proper hygiene, water use and water conservation. The waste of water is not only a squandering of a very valuable resource, but waste water, which collects in pools, can be a health hazard as well.



## SUMMARY

To summarize, I've just tried to give you an overview of several of the key areas where we think there are a number of outstanding issues that really need attention over the next decade. Looking back over the various rationales for supporting water supply and sanitation programs in developing countries, the arguments that they lead to improved health and nutrition, time savings, and even increased income are very, very compelling.

AID has been involved over a long period of time in the field of water supply and sanitation. We are facing the same kind of budget crunch as all of you are, and we are looking for ways, as Dr. Lucas said, to do more with less. That requires a lot of creative thinking.

At a recent conference on water supply and sanitation that AID held in Togo for health officers and in a similar conference in Thailand, a spontaneous recommendation of members of the group was to try to include water supply and sanitation, domestic water and sanitation, as part of integrated rural development activities.

It's something that we've been thinking about for some time. There are several difficulties inherent in that approach, but we're looking at it and we're hoping that while resources may be dwindling for aid over the upcoming years, at least our commitment and our dedication won't be waning. Thank you very much.

## THE INTERNATIONAL DRINKING WATER SUPPLY AND SANITATION DECADE

Peter G. Bourne, M.D.

### ROLE OF WATER IN PEOPLE'S LIVES

Mr. Chairman, ladies and gentlemen, it is a very great pleasure for me to have the opportunity to address this distinguished group today.

#### Effect of Waterborne Diseases

As many of you may recall, a devastating earthquake occurred in Italy at Thanksgiving last year in which 3,000 people lost their lives. There was a dramatic outpouring of concern and sympathy all over the world with large amounts of money, food, and other necessities being donated for survivors. While that was a worthy example of the international community's ability to respond to disaster it is perhaps worth noting that on that same day 30,000 people or ten times as many died throughout the world from waterborne diseases. That number died not only that day, but the next day and every day. We have with us every 24 hours a tragedy which is in effect 10 Italian earthquakes, and yet it is a tragedy which remains silent in the minds of most of the world's population. In addition, approximately 15 million children under the age of five die in the world each year and 29 out of 30 of those children die in the developing world, the majority of them die directly or indirectly as a result of contaminated water. In addition, half of the hospital beds throughout the world are filled with people suffering from these conditions. The lack of clean water and sanitation is the single greatest remaining barrier to good health for the majority of the world's people.

The health consequences of inadequate water and sanitation seriously afflict the billion people living in absolute poverty in the world, especially women and children, who must walk three or five miles to collect the gallon or two of water necessary for a family's daily survival. Water touches every aspect of development including the raising of livestock, the growing of crops, the development of light industry, and even the development of hydroelectric power.

## Role of Water Recognized by the United Nations

Recognizing the extraordinary role that water plays in the lives of poor people throughout the world, two major world conferences, the HABITAT conference in Vancouver, British Columbia in 1976 and the World Water Conference in Mar del Plata, Argentina in 1977 called upon the United Nations to establish a decade long program to provide clean drinking water and sanitation for all. A feeling was expressed at those meetings, articulated by British economist Barbara Ward and American anthropologist Margaret Mead, that the lack of adequate clean water could no longer be tolerated in today's world and that a specific timeframe had to be set for ending this condition for a quarter to a half of the world's population.

The Decade was launched at a unique one day special session of the General Assembly on November 10, 1980 which drew an overwhelming attendance, with ministerial delegations from 15 countries sent to New York especially for that one day. The speeches were still in progress at 8:00 p.m. when discussion was ended.

## ENTHUSIASM FOR DECADE CONTINUES

One year later it is worth assessing where we stand. This is a time of terrible financial austerity, yet the initial enthusiasm is maintained. Although the degree of activity varies within countries and regions, approximately 60 countries have ministerial level committees which are preparing National Action Plans, ten-year blueprints for achieving the Decade's goals. Many organizations have pledged their support to the implementation of the Decade. Within the U.N. system there have been endorsements by more intergovernmental bodies than for any other initiative of the United Nations Development Program.

The efforts of the U.N. system are coordinated by a Steering Committee for Cooperative Action chaired by the Deputy Administrator of UNDP and made up of representatives of the World Bank, UNICEF, WHO, the Food and Agriculture Organization, the International Labor Organization, UNESCO, HABITAT, UNEP and the United Nations itself. At the country level the U.N. Development Program Resident Representative is the focal point for the Decade as he coordinates in-country activities working closely with the various ministers involved and relying on the technical back-up of the representatives of WHO, UNICEF, and the other U.N. specialized agencies.

## STATE OF PROGRESS IN WATER SUPPLY AND SANITATION

### Regional differences

#### Asia

It appears that the Decade has taken off most vigorously in the Asian region as many of the countries are at a stage in their overall development where the provision of clean drinking water and sanitation fits very well with their overall development process. In addition, most of those countries have relatively strong institutions and economies, and significant numbers of technically trained people.

#### Latin America

In Latin America a different situation pertains. Following the initiative of President John F. Kennedy at the Punta del Este in Uruguay, the 1960s became the Water Decade in that region of the world. Many of the major nations in that region have achieved relatively high levels of water and sanitation coverage in the urban areas. It is more difficult, in some instances, to get those countries to place the same priority on water and sanitation for rural populations than is possible in many Asian countries, where the attention of government leaders is more recently focussed on the problem as a nation-wide problem.

#### Africa

In Africa, the situation is a mosaic of success and serious problems. A number of countries like Malawi, Kenya, and Niger appear to have tremendous potential for achieving the Decade goals. At the same time there are serious problems in some countries as they lack fully developed government institutions and trained personnel and have weak economies. Yet it is in this region where I think some of the most exciting success stories for the Decade will come.

#### Arab States

In the Arab states there is again a patchwork of progress. In the rich nations it is clear that the Decade goals are likely to be achieved

regardless of the U.N. initiative, while in others we are seeing lesser degrees of activity.

### A Useful Indicator of Progress - Eradication of Guinea Worm

As the Decade has gotten underway, I have been concerned about demonstrating the magnitude of progress being achieved. I felt that it might be hard to demonstrate a very rapid decline in infant mortality rates nor would it have much public appeal to say we have been able to raise the percentage of people provided clean water from, for instance, 28.3 percent to 39.2 percent. I felt that we needed some more vital and visible indicator of our success. In addition, it has often been difficult to get people to associate clean water with improved health.

In conjunction with the Atlanta Center for Disease Control, we have initiated as a sub-goal of the Decade an effort to eradicate the disease, Guinea worm. This is the only disease transmitted exclusively by drinking water. Approximately 20 to 40 million people, in a band across sub-Saharan Africa through the Middle East and into India, are afflicted by this tissue-inhabiting round worm which causes severe debilitation secondary to skin ulcerations and arthritis for a period of about 90 days. The disease is transmitted when people with ulcerated lesions on their legs, through which the parasite lays its eggs, stand in water which others will subsequently drink. This debilitation occurs in most instances during the planting season, so that where it is endemic, agricultural production drops approximately 30 percent. By eliminating the so-called step wells and preventing the collection of water from ponds and rivers by infected people, the disease can be completely eradicated.

It is our hope that as the Decade progresses we will be able to announce periodically the elimination of Guinea worm from various countries where it is currently endemic. This is something which has in earlier years been accomplished throughout the Americas and in the southern part of the Soviet Union.

## THE ROLE OF THE UNITED NATIONS

### Promote Support

It is the job of the United Nations to create the overall framework, the promotion, the technical assistance and the general momentum required to make the Decade a success. A major public relations program has been launched to publicize the Decade. Some excellent publications have been produced, as well as a film, "Journey for Survival," which has already won a number of international film awards and been nominated for an Academy Award. Despite this, we have not created the public awareness that we would like and we are turning increasingly to other organizations like your own to help build support for the program. By setting a timeframe, we have placed a special political priority on the program. Its success depends on mobilizing local political support.

### Help with Cost

The Decade program is clearly going to be expensive. Eighty-five percent of the cost must come from developing countries themselves. However this percentage will vary significantly from country to country and the poorest nations will depend on their ability to mobilize external resources. The U.N. system, and particularly the World Bank, must play a vital role in helping to ensure that the necessary resources are forthcoming. Half of all the unserved people in the world are in India, Pakistan, and Bangladesh, and half of all the expenditures should be in those three countries. In most cases, the problem is not lack of money, but the ability to absorb it with good projects.

The financial question is primarily one of priorities. We spend \$240 million a day on cigarettes - more than enough to pay for the entire Decade not to mention the \$1,400 million spent every day on armaments.

## MOBILIZING OTHERS

### PVOs/NGOs

I feel very strongly that we must mobilize many other segments of society in order to increase the level of activity in connection with

the Decade, for the U.N. system cannot do it alone. I have made a special effort to involve the non-governmental organizations interested in development. As a result, a number of organizations have made a strong commitment not only to support the Decade but to give it a high priority in their own financial and programming agendas for the next several years. Among them are the World Scouting Movement, Church Women United, the Associated Country Women of the World, Oxfam, CARE, and Church World Service.

### The Professional Community

We feel that the involvement of professionals in the water field is absolutely vital. They have a unique opportunity to contribute not only their technical knowledge but also to help build public awareness and momentum for the Decade.

### Developing New Organizations

Perhaps one of the most encouraging developments of the Decade to date is the creation in Britain of a special new organization called WaterAid. Created under the leadership of David Kinnersley and the British National Water Council, it is a coalition of professional and non-governmental development organizations such as Save the Children, Oxfam, and the Voluntary Service Organization. Together they are committed to raising public awareness, raising funds and sponsoring a variety of conferences and technical assistance activities. Similar support groups are now being developed in the Netherlands, Denmark, Belgium and Ireland, where the foreign minister is, by training, a hydrologist.

WaterAid is considering the creation of twinning arrangements between communities in the developed world and those in developing countries, which would encourage exchange of personnel and ideas throughout the Decade. We strongly endorse this approach which is also being pursued by the International Water Supply Association and by the United Towns organization based in Paris. We hope the example set by WaterAid in Britain will be a model for other donor nations and particularly for professional organizations in the United States.

## Private Industry

A number of developing countries have strong economies and are quite capable of buying products and services on the international market. We feel very strongly that there is a major role for private industry in the Decade, and we would like to see a major involvement of private industry in achieving the Decade's goals. We are encouraging corporations in the water and sanitation field to look at the potential market that exists in developing countries. We have also encouraged U.N. representatives at the country level to help private industry find its most effective role, including indigenous private industry. A local company in India is now producing 40,000 handpumps a year.

## ESSENTIAL INGREDIENTS FOR SUCCESS

### Accepting Priorities of Developing Countries

Because this program will have its greatest potential effect in improving the health of people in the developing world, including life expectancy and infant mortality, we tend to assume that it can be sold on this basis. From a practical standpoint this is not the case. At the village level, the connection between clean water and sanitation and health is poorly appreciated.

Even at a national level, health benefits alone are rarely enough to justify major government expenditures, especially in competition with other pressing needs. At the local level, access to water, which saves individuals walking miles every day, is a far more valid selling point than dubious long-term health benefits. At the same time, national leaders are more easily persuaded to support this program if it is defined within a context of the development of all water resources, including water for irrigations, livestock raising, and even hydro-electric power. As a result, while not losing sight of the primacy of the Decade's health goals, we have, for tactical reasons, stressed these other elements.

### Manpower Development

Central to the entire Decade program is the issue of manpower development. Major capital investments in water and sanitation systems are frequently wasted because of the lack of trained individuals to provide adequate maintenance. Training is required at all levels,



ranging from the village worker who is taught to change a washer on a standpipe to government officials who must design major projects for external funding. We are particularly emphasizing the training of people in-country and the development of indigenous training institutions. We also are encouraging governments to train and make available jobs for a significant number of women. In some countries where the Decade goals may not be achieved by 1990 we believe that the creation of a cadre of well trained individuals will set in motion a process that will eventually guarantee full coverage for all the people.

### Community Involvement

We have repeatedly seen that those projects which are most likely to fail are those that have been carried out by governments with no community involvement. As a result we are placing a major emphasis on getting governments to involve the community to be served in every phase of the planning, implementation, and maintenance of projects. UNICEF has been particularly successful in implementing projects with heavy community involvement.

### Health Education

While I stated earlier that the effective selling of the Decade depends very much on the emphasis of the non-health aspects of water supply, it will not be a success in improving health status unless a major emphasis is placed on health education. There is ample evidence that merely providing water can have little or no impact on infant mortality and other measures of public health. People must be taught first to use the water appropriately, in adequate amounts, and to understand the connection between personal hygiene and health.

### Sanitation

This Decade has a dual emphasis on water and sanitation. There is a tendency to stress the water aspect because it is so much more a felt need than sanitation. Also, sanitation tends to be more expensive than water, and the technological alternatives are not as clear cut. Much greater behavioral and cultural barriers must be overcome in gaining acceptance for sanitation programs than water. Where excreta is seen as an agricultural input rather than merely as something to be disposed of, a system of sanitation is much more readily accepted.

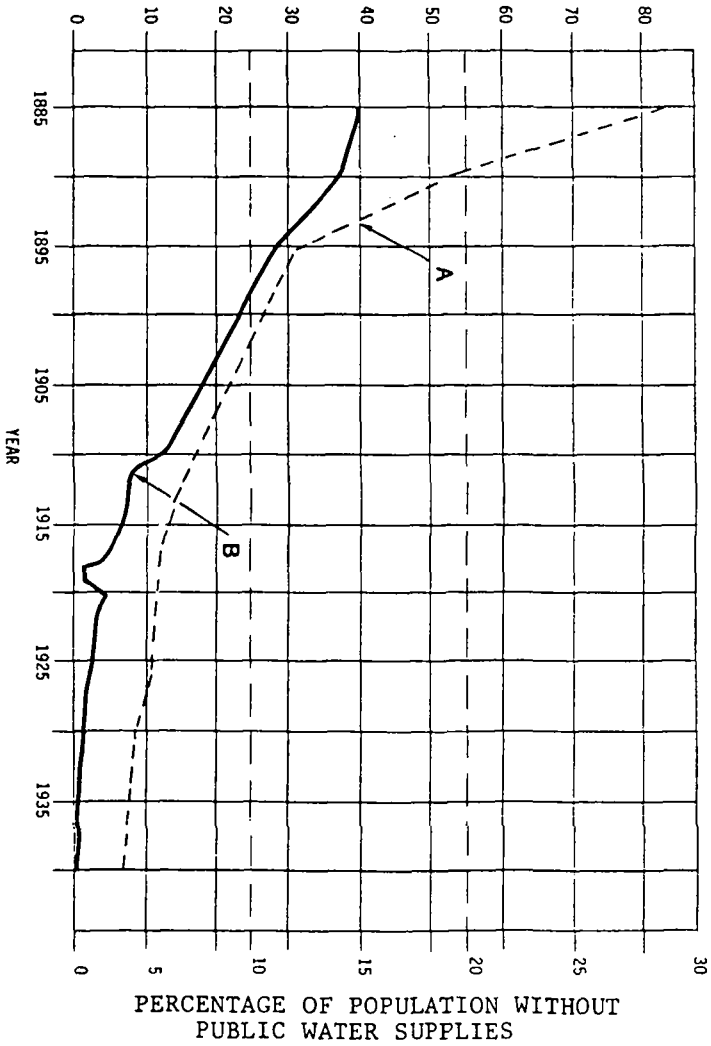
## THE DECADE'S GOAL AS A RALLYING POINT

We recognize that in every instance we may not achieve the Decade goal of 100 percent coverage for all people by 1990. However, we do anticipate that this will occur in a significant number of countries. We also believe that by establishing this goal we make it something to strive for, a vital rallying point, and a way of unleashing the emotional energy that is essential to improve the quality of life for people in the developing world. At the heart of the Decade program lies our ability to train adequate numbers of people so that developing countries can meet their own Decade goals. Then, even if the goal of 100 percent coverage by 1990 is not completely achieved we will have set in motion an irrevocable process that will guarantee that even if it takes an additional two or five years, the goals of the Decade will ultimately be reached.

One hundred and fifty years ago cholera was rampant in Europe and in many parts of America. Life expectancy in the industrialized cities of northern England was seventeen years. What revolutionized the health of people in this part of the world and banished those diseases that we now see as only something existing in developing countries? It was, of course, the development of clean water and sanitation systems. Within our life time we can achieve the same advances for the entire world. But it will only happen if we have the will to make it do so.

TYPHOID FEVER DEATH RATE  
PER 100,000 POPULATION

RELATION OF TYPHOID FEVER DATH RATE TO  
PERCENTAGE OF POPULATION WITHOUT PUBLIC WATER SUPPLIES IN  
THE STATE OF MASSACHUSETTS, USA



A = POPULATION WITHOUT PUBLIC SUPPLIES  
B = TYPHOID FEVER DEATH RATE

## THE ISSUE OF TECHNOLOGY SELECTION

F. Eugene McJunkin

I'll only give you the questions, not the answers. It is an old professorial trick. Before I begin talking about technology, I want to give you three caveats or warnings.

### THREE CAVEATS

#### Technology Is Easiest to Provide

First of all technology is only a part of providing rural water supply and sanitation in the developing world, and it is perhaps the simplest part of the task. Rural water supplies need supporting institutions and infrastructure, access to financial resources and specialized skills, and community support and use. That is, use of the water, which is sometimes overlooked.

In the setting of PVO projects, in particular, the human interface with technology is perhaps the most complex task. In fact, you could say rural water supply and sanitation is a marriage of technology and of economic and human resources. Having said this, I should also note, however, that the wrong technology can be a crippling burden, a real handicap to the long-term and short-term success of water supply.

#### An Adequate Water Supply - The Goal

The late Dr. H.G. Baity who was the first Chief of Environmental Health of the World Health Organization said it this way, "The task of supplying safe and adequate water to a majority of the people is an enormous one and will take a long time. In view of this situation, it becomes logical to employ the limited funds available to give adequate water to the many, rather than a perfect supply to the few."

Some of the technologies that I will talk about are a long way from being perfect. But we hope they will be improved and that they also are compatible in the long term with a better supply. It's being questioned in the United States how good our own supply is, but I don't think these arguments are relevant to the developing world.

## No General Rules

A third warning; my remarks could be considered general rules. Most of them should be prefaced by the Latin phrase that economists like to use, ceteris paribus which means "other things being equal." However, each situation is unique. In fact, the one general rule I want to leave with you is that there is no general rule.

## SOURCE SELECTION

All right, let's look at source selection in water supply. This is a key decision, particularly from the point of view of technology. It is often the single most important decision. It commits you to a long string of additional decisions. I think we should always look at the alternatives and not seize on the first one.

For selection of sources, some of the check list alternatives are groundwater sources, such as springs and wells, surface water sources such as lakes and streams, and other water sources, for example rain water, harvesting, infiltration galleries, but probably not desalination, unless we are in an OPEC country.

### Ground Water

Look at ground water first. Other things being equal, we want to get a water source that does not require treatment. We want to try to keep the technology as simple as possible and require as few skills as possible. Nearly always, if available, for a small community or a group of homes, the best choice would be a spring, a spring that could be captured and protected from contamination.

This quite often is the cheapest and provides an adequate water supply. The second choice we probably would want to look at is wells, dug wells or drilled wells or some other type of wells.

### Surface Water

Only after we have checked out ground water resources should we move to surface water sources. The surface water source we would like to find, again, is one that does not require treatment. One of the

sources that is sometimes available is a lake. With a judicious selection of the intake in a large lake, we may well be able to provide water with little, if any, treatment.

Another source is upland streams. In fact you will see a film showing the use of upland streams in Malawi. This is an excellent example of an intelligent selection of a source. I think Peter Bourne discussed Malawi's success, and I think part of it is its fortunate availability of upland sources of water.

## Quantity and Quality

### Per Capita Needs

Now in checking out the source, we want to look at several things. One is the quantity of water. Unfortunately I was unable to hear Abby Bloom this morning, but in the policy paper we say that we need generally for health reasons a minimum of some 40 to 50 liters per capita per day.

We need for physiological survival, depending on the size of the individual, the climate, and so on, from one to two and a half liters per capita per day. But from a health point of view we really see increased benefit with increased quantity of water up to about 50 liters per capita per day.

### Level of Service and Costs

Secondly, and looking at the quantity, we also might have to have some idea about the level of service we are going to provide. Are we going to provide water from a central water point? That is, are the people going to come to a well or spring or public standpost, collect their water, draw it from the well, and carry it back to their homes?

This has certain advantages. One is cost. It is usually cheaper. However, we find health benefits increase as we move the water closer to the home, making it more convenient, for example, yard and patio connections. We find an increase also in health status as we move water to house connections, that is water inside the home. Water inside the home, incidentally, cannot be considered without also considering what you do with waste water. If we fail to make adequate provisions for it, we can actually introduce a health hazard.

As the level of service we incorporate varies, the costs of these vary a great deal. In fact the difference between a central water point and a house connection is often a several-fold difference.

Of course, costs vary along with the local situation. So the question is, what kind of resources do we have both for the initial construction phase and also for the long-term operation and maintenance costs and, I should add too, replacement fees.

## Quality

### Biological Quality

We want to look at the quality of the water in selecting the source. Is this water safe? What is the biological quality? Is there a health hazard? The biological quality, including the question of bacteria, viruses, and other parasites, is the key quality issue in rural water supplies in the developing world.

For many years, incidentally, it was the key water quality issue in the United States. Of course our success here in controlling epidemics of communicable disease in water systems has been so good that we don't give it much public attention anymore. However, the real threat in the developing world is bacteriological quality, not chemical quality.

### Physical Quality

We are concerned with the physical quality in the sense of taste, color, and temperature because they affect user acceptance of the water supply. Other things being equal, we want water without a taste and without odor.

The one thing we occasionally come across, from a chemical point of view, are some constituents of water which are very difficult to remove. For example, abnormally high concentrations of fluoride can be injurious to health, in which case it is generally much cheaper to select another source than it is to remove the fluorides. Nitrates in water, if occurring naturally, are often an indication of pollution as well. High nitrates may cause methemoglobinemia in infants--that is cyanosis, oxygen starvation of red blood cells.

## Sanitary Survey

Another element in assuring quality is the sanitary survey--that is, a physical inspection of the water shed. When we select a water supply in Fairfax or Montgomery County, we look around, and we take a lot of samples. We take them back to the laboratory and run an elaborate analysis. Well, in the situations we are referring to, we are lucky if we get one sample.

Even if we have a sample, it is only for one point in time. It's like going out the front door and you see it is raining. You do this once a year, and you come back inside and write up the climate of Washington. You say it is a very rainy area, as it rains a hundred percent of the time.

Actually, it is more important to look at what are the potential sources of contamination. Do we have a water supply intake just below a sewage outfall or below or near latrines which are not operating properly. Those are examples.

## Long-Term Reliability

The third point we want to look at is the long-term reliability. If there is one fault I see with some PVO projects it is the failure to look at the long-term reliability--that is, the quantity available during drought or even during the dry season.

This may require a review of historical records or seeking out people who have been in the area a long time and have observed the source. A hydrological analysis, particularly for larger communities, may sometimes be required.

## Long-Term Cost

In considering source selection, there is the cost, and by cost I mean the life cycle cost. That is, not the construction cost alone, but also the recurring cost of operation and maintenance.

Generally this means, again to repeat myself, that we should avoid water that requires treatment, if at all possible. We should avoid pumping, if we can. We will have to build in, even in the simple systems, some formal system of operation and maintenance.



## PUMPS

The fourth element in the selection of the source we want to pay particular attention to is the energy problem of withdrawing and transporting water. That is pumping. Other things being equal, we should look as hard as we can for a system that does not require pumping.

### Value of Gravity-fed Supplies

Dr. Bourne has touched on some of the problems of pumping. Gravity systems are to be preferred. The example you have seen is again an excellent one. Failing the availability of gravity systems, perhaps we should look at an old technology, hydraulic rams.

### Hydraulic Ram

A hydraulic ram is a kind of a pump, but once you have the ram, it is a "freebie." You don't have to add electricity or gasoline or diesel fuel. It wastes part of the energy in the flowing water and uses that wasted energy and wasted water to pump some of the water to a higher elevation.

These devices are very durable. It is not unusual to find that they are 50 years old and still working. They were widely used in the United States in hilly rural areas, prior to the development of the electric pump promoted by the Rural Electrification Administration.

Sears Roebuck Catalogs before World War II sold hydraulic rams. They were quite common on farms in the eastern United States. One reason they disappeared after electrification came in, even though the farmer already had it and it didn't require fuel, was the farmer's wife. She didn't like one element of it--the noise. It makes a real thump during the pumping cycle. Rams cannot pump water from wells.

### Manual Pumping

Also moving up the ladder so to speak, we should consider manual pumping, that is, the use of hand pumps. The adult pumper of the

hand pump could be considered a one-tenth horsepower engine. That engine is easier to maintain than an electric motor or a diesel engine.

Hand pumps in wells have a great attraction. One is the cost. In some countries, Bangladesh, for example, UNICEF has provided water by using hand pumps in wells for less than \$3 per capita. Of course, that is a rather unique situation in the Gangetic Delta, but hand pumps in wells can generally be provided for community use for somewhere between \$3 and \$300 per capita. That is a hundred-fold range of course, so you have to look at each situation.

### Underestimating Hand Pump Maintenance

However, there is one problem with hand pumps, and that is the tendency to underestimate the problem. I think that is largely responsible for some of the stories you have all heard about the failure of hand pumps. Installing a hand pump is not a "parachute drop", as Dr. Bourne said, you cannot put it in and forget it.

I think we all are learning this lesson or should have learned it by now. The farm yard pumps that were used until recent times were developed for family use in the United States and Europe. And even though hand pumps are made in the developing world, they have been largely copies of these pumps. We have come to realize that a pump design for community use has to be quite different.

### Developing a Better Hand Pump

#### AID Hand Pump

AID actually triggered much of the current hand pump development back in the late 60's when it financed studies done at the Battelle Laboratories in Columbus, Ohio. The final product, known as the Battelle Pump, was actually never put into production.

There have been developments in recent years that have taken variants of this pump and moved to the field-testing and modification stage. Local manufacture of these pumps has occurred in some nine countries around the world.

### IRC and ODA

Hand pump technology has been greatly aided by the development and distribution of information by the International Reference Center for Community Water Supply in The Hague. Also there have been some hand pump testing evaluation programs on a large scale sponsored by the Overseas Development Administration (ODA) of the United Kingdom. They had 12 different pumps tested in a laboratory in England, and that information is being put to good use.

### World Bank/UNDP

The World Bank, with a UNDP-financed project, is now looking at hand pumps in about 20 countries and testing them in the field. They are typically testing four different models in each country and installing some 50 of each to be tested. That will lead to a great deal of information that can be used for better decision making than we had in the past.

### Private U.S. Manufacturers

The advent of the Decade has also encouraged private manufacturers to look again at the manufacture of hand pumps. One hand pump many PVOs are familiar with is the Dempster hand pump. The Dempster was tested in the program at ODA. The results of that test, which were not particularly good, plus the advent of the Decade, have resulted in Dempster taking a second look, and I think they are going to redesign their hand pump.

Another private firm in the U.S. that's gone into the market is Robbins and Myers Pump Company of Dayton, Ohio. They have developed a pump called the Moyno which shows good promise.

### Local Manufacture

However, ultimately, I think, in the larger countries in the third world, local manufacture is the long-run answer.

As an example of this, there have been some interesting new developments recently, and we now are beginning to see some success stories. The Mark II hand pump in India is such a success story. It is now locally made to Indian national specification. There is competi

tion now between the manufacturers which helps keep the price down. There are some 15 manufacturers of this pump in India. Part of the success of the pump has been the development of quality control by its manufacturers. Another element has been the creation of effective maintenance systems, not just in the village, but backed up by Regional Offices of the various State Departments of Public Health Engineering.

### Motorized Pumps

I will just speak very briefly about motorized pumps. Electricity is the power source of choice where you can get it. Failing that, in choosing other options, diesel motors and generators are probably the best petroleum-based option, gasoline bringing up the rear. I don't think wind has that great a role for drinking water supplies and solar pumps are still far off in the future.

### Redundancy for Reliability

In thinking of PVO projects I have seen, there is often a slender budget, so the question is to minimize the cost. This has often meant the installation of only one pump. From the point of reliability, redundancy is greatly in order, that is, the provision of two or even three pumps.

## WELLS

One of the questions that came up in the recent AID health officers conference in Togo with host country officials in Africa was this: when do you use a dug well and when do you use a drilled well? There is a great empathy for dug wells because they are labor intensive, use contributed labor and can really get the community involved.

### Dug Wells

#### Limitations

Of course, dug wells are necessarily large diameter wells. They also have limited depth; it is rare to see one over 200 feet deep. Dug

wells are also more subject to contamination and each well takes a long time to dig. A dry hole is extremely discouraging. Dug wells are not feasible in hard geological formations.

### Hazards

There is also a hazard to people during the construction. Many people have died of suffocation or carbon monoxide poisoning in dug wells. They are also subject to cave-in during digging. One of the things often overlooked is the danger of dropping things in from the top on workmen down in the hole. Even after they are built, if they are not properly protected, it is not at all unusual to find stories of children and animals who have died by falling into the wells. Another factor is psychological. It is difficult to start a deep dug well program in an area which is not accustomed to dug wells. People don't want to go down in this hole if they are unfamiliar with it.

### Water Table

If the depth of the water table is excessive, that is a problem. Another consideration is the soil there. The dug well in soft soil, which has what engineers would call a low angle of repose, will cave in, and you have to line the thing all the way down as you go, which is expensive.

The fluctuations in the water table make a difference. It means that the well may have to be dug and then re-dug during dry seasons or drought and deepened again and again, and this increases the cost again and again.

### Constraints

Another thing that is often overlooked is that sometimes the resources of the implementing agency may be the limiting constraints--in terms of skilled personnel, the foreman, the masons for the lining and covering of the well, and so forth.

Well, how do you choose? Sometimes your choice is made for you. The classical engineering textbook approach is to cost out everything. However, dug wells obviously don't work very well where you are digging through rock.

## Drilled Wells

Drilled wells on the other hand are very capital intensive. They require well drilling rigs which are generally imported. They may cost up to half a million dollars or more. They also require greater skills to operate and maintain. However, you can dig holes more rapidly, especially in rock. They don't really have depth restrictions, and drilled wells are less subject to contamination.

Also, in some areas, well drilling is a chancey thing and dry holes are not uncommon. Where you have had several dry holes in an area, it tends to dampen enthusiasm for digging new ones, which of course is understandable.

Of other opportunities for well drilling which merit examination, one is horizontal wells. UNICEF has been pioneering this approach in some areas. Of course, this is an ancient technology which dates back several thousand years.

Another option is a use of galleries, that is, digging a well and then getting water in it by digging laterally out from the bottom. This is commonly used in river beds, for example, where you have porous soils and can, through this mechanism, avoid the necessity of water treatment.

## WATER TREATMENT

### Chemical Disinfectants

In using surface water sources we should also, of course, make sanitary surveys. We should be very judicious in the location of the intake and, as I said before, attempt to avoid treatment or at least attempt to avoid treatment other than disinfection.

Now, looking at what PVOs can do, disinfection I think is a water treatment process that is well within their capability. By disinfection I mean the destruction or inactivation of water-borne biological agents of disease. Boiling is well known as a process, but it is really impractical on a continuous basis.

There are many chemical disinfectants: chlorine, iodine, bromine, ozone, silver nitrate, hydrogen peroxide and others. From a practical

point of view, chlorine or chlorine compounds will generally be the disinfectant of choice.

Small rural water systems generally use powdered or granular hypochlorites, rather than gaseous chlorine which is used in larger systems. The hypochlorites are also available in liquid form, but in most situations in villages and in developing countries, granular or tabular form is much to be preferred and is generally available in most countries with some planning. It is easily added to water through solution feed mechanisms which are both proprietary and also locally made. It is a relatively inexpensive technology.

### Slow Sand Filter

In the time I have, I want to focus on one treatment technology which may have some interest for PVOs. The standard water treatment technology for turbid water uses rapid sand filters, which involves mixing of chemicals, flocculation, sedimentation, coagulation, sedimentation and then a fairly complex filtration process through sand, known as the rapid sand filter process.

Here is one option that is much simpler--the slow sand filter. Water filters through sand and also through a biological film that grows on the top of the sand filter. It filters at a much slower rate than the conventional sand filter, about 30 to 100 times slower, which means then that it requires about 30 to 100 times the surface area, which means that a slow sand filter for the same amount of water is much, much larger than a rapid sand filter. One might say that it is land intensive.

It is also labor intensive and can be operated with far less skilled labor than required for a conventional rapid sand filter plant. However, the one constraint is that it requires water of low turbidity.

For those of you who know Jackson turbidity units (JTUs), slow sand filters require raw water with less than 50 JTUs. However, it also does not require chemicals, so you avoid some of the resupply problems and some of the maintenance problems.

The slow sand filter is simple to design, construct, operate, and maintain. It needs few imported materials under the right hydraulic conditions and can be operated readily without power. However, it is limited to water with only moderate turbidity, requires a large land

area, is subject to freezing, if you are working in Nepal, and it is more sensitive to algae, which of course is a problem in many tropical waters.

## SANITATION

I haven't said anything about excreta disposal. I don't think PVOs should get into the business of central collection systems, such as sewers and wastewater treatment plants.

There are fairly well-known technologies of excreta disposal at the family level. There is a good bit of information available for the technology needed for one of three processes in which you isolate the excreta, remove it, or destroy the pathogens in it. What you are primarily trying to do is prevent human contact with the excreta or to prevent the excreta from contaminating drinking water.

It has already been mentioned that this is, to a large extent, a social problem. There is probably nothing other than sex that has more complexities or taboos associated with it, world-wide, than human excreta disposal.

## AN AVAILABLE TECHNOLOGY

This is a gallop through the technology double time. One of the things that I find, very frankly, is that PVOs have very limited technical staffs when it comes to water supply. They need help.

However, much of this technology is not that complex. There are no differential equations involved nor any of that stuff that some engineers like to play with. But one of the information sources that you should be aware of is the Water and Sanitation for Health Project of AID--that is, the WASH project. I think you are going to meet several of the staff members, and I hope they will blow their own horn about the information that they have collected and that is available to PVOs as well as, of course, to other agencies.

A lot of this literature, incidentally, is fugitive literature. You don't call up McGraw Hill and say, send me something on hand pumps. They don't have it. However, WASH can get it, and another good source is the International Reference Center for Community Water Supply in



the Hague. They have a nice manual on hand pumps, even if I say so. (I wrote it). They also have some excellent manuals on slow sand filters which actually go to the stage of construction and drawings, and they have the only published manuals on public stand posts.

At any rate, good luck in the next two days and thank you.

## INFORMATION DISSEMINATION

James Beverly and Sarah Coghlan

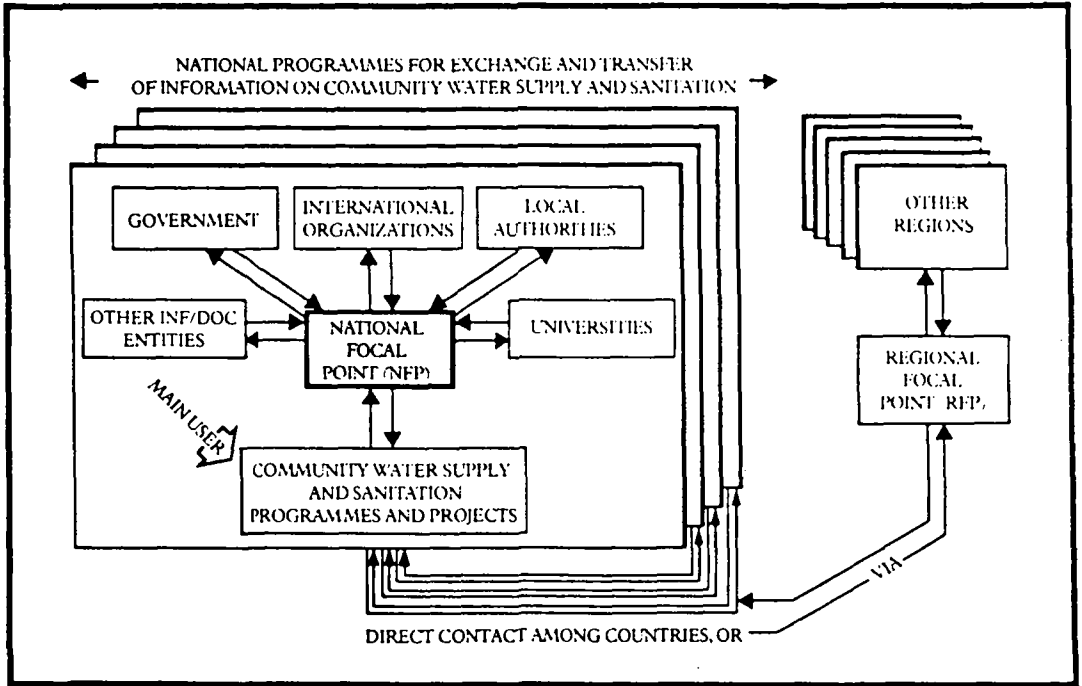
We would like to present a list of information resources useful for PVOs, especially their headquarters staff. The kind of material included is very valuable for planning and for responding to requests for information from the field. This list appears in Appendix A.

PVOs should be aware of the resources of the International Reference Center for Community Water Supply and Sanitation (IRC) and its Program on Exchange and Transfer of Information (POETRI). Organizations should contact IRC in The Hague, directly, for information on the current status of POETRI and for information on the distribution of a "standard library" on water and sanitation planned to be available to all developing countries. The structure of POETRI is presented in the following chart.

WASH maintains a library of some 2,000 documents relating to water and sanitation and an information and distribution center which offers two types of material. These are:

1. WASH publications, both technical and field reports. The current list is reprinted in the Appendix B.
2. Publications from other organizations available through WASH to AID supported organizations, though they are limited in supply. The Distribution Center list is found in the Appendix C.

# IRC PROGRAMS AND ACTIVITIES



## Chapter 2

### EVALUATING WATER SUPPLY AND SANITATION PROJECTS\*

#### SUMMARY OF BACKGROUND PAPERS

Two speakers presented evaluation methodologies. Participants assessed these techniques in light of their own experience and their attempt to apply them to the several case studies presented.

Dr. Hannelore Vanderschmidt highlighted methods that use feedback to correct problems as a project progresses and additional methods which assess the product and benefits of a project. Heather Clark developed an evaluation process that involved beneficiaries as evaluators and allowed for immediate identification of problems and possible solutions.

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\*The case studies used in the workshops are available upon request from the WASH Library.

## EVALUATING VOLUNTEER PROJECTS: A METHODOLOGY

Dr. Hannelore Vanderschmidt

There is a need for a simple methodology that can be used to evaluate volunteer projects without using complex mathematical formulas but which can still obtain useful information to improve projects. Two concepts will be developed: formative evaluation, which uses feedback to correct problems before they become serious, and the concept of summative evaluation, which looks at the product of a project, its benefits, and the likelihood of benefit continuation.

### PURPOSE OF EVALUATION

#### Formative Evaluation

The major purpose of formative evaluation is to gain feedback which will provide information before serious or irremediable problems occur. Feedback may be obtained formally or informally through staff meetings and progress reports, through conversation, and through visits to project sites.

At the beginning of the project, formative evaluation helps assess the equipment, manpower, etc. on hand or needed. During the life of the project, it can give an accurate answer to such questions as, "Is the project on schedule?", "Are listed tasks being accomplished?"

#### Instruments

The method and instruments described were developed, field tested, and then published as Vanderschmidt and Lent, Systematic Project Design, A Handbook for Volunteers, Center for Educational Development in Health, Boston University, 1981.

The book is written at the sixth grade level for speakers of other languages for whom English, French or Spanish is a second language. It has been translated into Spanish and French.

## Standard Forms

Standard recording/reporting forms\* were developed to attain compatibility. Planning activities use Forms One and Two. Form One helps obtain basic data for a situational analysis, while Form Two helps develop a needs assessment. Through negotiation with village leaders, the needs assessment is drawn up which will indicate the villagers' priorities and the kind and amount of help they will provide.

Form Three summarizes the project's tasks, activities and timetable. Major tasks of the project are listed. "Who is responsible?" "What services and supplies are needed?" A timetable is established to keep the project on target. Form Four is an instrument to check progress throughout the life of the project.

Formative evaluation is a useful tool for managers and workers, as it offers one effective way a project will meet its objectives.

## Summative Evaluation

Assessing the product and the impact of the product are the purposes for which summative evaluation is used.

The Product or Benefit is stated as measurable outputs. These include, direct benefits, and the extent to which the project met its objectives. "What are the direct benefits?" "Did the project meet its objectives?" "How can we measure if objectives are met?"

Product Impact or Benefit Continuation indicates the potential that benefits will be sustained after donor resources are withdrawn. Follow-up or evaluation of impact data can be obtained inexpensively through an instrument such as those distributed to participants.

Benefit Growth indicates the prospects for future development in related activities by the same population based on the success of the present project. Though hard to measure and harder to attain, it is an important goal of volunteer projects. The concept is dealt with in The Development Impact of Private and Voluntary Organizations: Kenya and Niger, by Development Alternatives, Inc.

\*See Appendix D.

Form five is a guide to troubleshooting while benefit continuation is addressed in Form Six "What follow-up is occurring?" "What is the project impact in the long run?" "Are facilities being used?" "Are trained people able to perform the job?"

## EVALUATING A WATER AND SANITATION PROJECT

Heather Clark

I plan to describe an evaluation technique that turned out to be an important tool for identifying problems, obtaining communities' participation in solving problems, and maintaining program effectiveness. The evaluation process involved beneficiaries as evaluators and allowed assessments and needed changes in the program during the implementation of the project.

### BACKGROUND

The project, a Water Resource Development Program in Honduras, was implemented by the national Evangelical Committee for Development and Emergency (CEDEN) in collaboration with International Voluntary Services (IVS).

The project's goal was to provide potable water to 20 communities per year for three years in two regions of the country. The systems were installed as part of an overall community development project with the aim of reducing the high percentage of water-borne disease characteristic of many rural villages.

### THE EVALUATION GOALS AND RATIONALE

#### Major Goal

The major goal of the full scale evaluation was to include the beneficiaries as evaluators of the project. Their views and their awareness of difficulties and needs could be invaluable. The evaluation process was also seen as a training tool that could have a long-term impact. The evaluation process would give the participants experience in critical thinking and, through this experience, strengthen the communities' ability to create or maintain community organizations and solve problems at the community level.



## Subsidiary Goals

In addition to the involvement and training of community representatives, it was hoped that the following could be assessed:

- the efficiency of the community organization to implement the water and latrine system
- the immediate effects of the water project in areas of health
- the present state of accomplishment
- needed action based on recommendations to improve the program.

## TECHNIQUES USED

### Pre-meeting Discussion Guide

A questionnaire-discussion guide was developed with community involvement (Appendix E). It was used first as a tool for data collection. Community leaders used the questionnaire as a guide for leading discussions in the community.

### Regional Two-Day Evaluation Meetings

Participants at the evaluation meetings included two community representatives from each project, CEDEN regional staff, water programs national staff, and an outside evaluator. Community representatives considerably outnumbered staff.

### Techniques Used

- Expectations and results were listed.
- Participants were divided into groups on the basis of the type of project and its state of progress. These groups were asked to identify problems and analyze causes. Because participants in each group came from different communities, they were able to exchange ideas and experience. The questionnaire used in the villages was used again as a discussion guide.

- A plenary was held for the sharing of problems.
- The working groups were reconstituted and asked to make recommendations.
- Another plenary was held to present proposed solutions.
- A further session was held to analyze recommendations and to decide who would be made responsible for implementing the recommendations.
- An evaluation of the evaluation meeting was held.

## RESULTS

The entire evaluation process had valuable immediate results for villagers and CEDEN staff. It also developed the changes that needed to be incorporated into the program.

### Immediate Results

- The group judged that the evaluation process became an effective tool for community education.
- The participants and staff were able to assess the level of impact the water program had on communities and their organization. (For example, 50 percent of villages had developed complementary projects).
- CEDEN program personnel became aware of elements in the program that would have gone unnoticed. Because participants were able to target their concerns and offer recommendations, the evaluation process was an invaluable mechanism for enhancing CEDEN's effectiveness.
- Project delays were related to inadequate planning, lack of materials, and lack of volunteer workers from communities during the agricultural season.

### Changes Being Incorporated into the Program

- Two social promoters, one for each region, have been hired to do follow-up work. They have contact with the communities, lead discussions, and act as liaison between the communities and the organization.
- Further training and help is being offered to help develop administrative skills in the community. A simple administrative manual is being devised. Training courses are being offered in bookkeeping and the skills needed to administer the community revolving fund.
- Changes in the maintenance program have been instituted. One of the well-drillers has been retained to maintain pumps and start a training course for individuals in the community for pump maintenance.
- More thorough initial explanation will be made to communities about the costs of the program, likely problems, etc.
- In reviewing annual objectives, greater allowance will be made for differences among communities, like population, type of system, depth of drilling, etc.
- Future work in communities will emphasize gravity-fed systems and attempts to combine systems to serve more than one community.

## RESULTS OF EVALUATION WORKSHOPS

### ISSUES

What types of evaluation of water supply and sanitation programs are appropriate for PVOs? Given our commitments, our goals, and our resources, which evaluation methodologies are likely to be most productive? We considered this the most important evaluation issue facing us.

### FINDINGS

Formative evaluation holds most promise for use by PVOs. This evaluation form allows for a progress check and for program correction. Its demands, as presented by Clark and Vanderschmidt, are well within the resource and technical capabilities of most PVOs.

Formative evaluation aims at identifying problems, resolving them, and using obvious indicators of project success. This would provide a tool much-needed by PVOs to gauge effectiveness of ongoing projects in order to improve current project implementation.

We are concerned with identifying goals that will help produce useful on-going evaluations. Objectives should be quantifiable wherever possible. They should be consistent with each other and with the projects' stated goals.

The assumptions on which projects are based must be stated, known and accepted. Assumptions are implied in any stated goals for a project. Often, these assumptions are unanalyzed, unevaluated, and unnoticed. This neglected aspect can cause failures for an otherwise successful project.

Sophisticated aspects of ex ante and ex post assessment should be done by organizations with greater financial and technical resources than are available to most PVOs. We are referring especially to assessments for benefits of a project in relation to its cost.

These assessments, though they may be very costly, must be done, most especially for those benefits which are not easily quantifiable. Funding agencies and governments will only become more efficient in their use of resources if sophisticated benefits assessments are adequately performed.

## Chapter 3

### THE IMPLEMENTATION OF WATER SUPPLY AND SANITATION PROJECTS\*

#### SUMMARY OF BACKGROUND PAPERS

Steven Cox and Bruce Clemens presented a philosophy and methodology of implementation. They saw a water and sanitation project not as an end in itself but as a process that involves the beneficiaries so that a community can go on to self-initiated projects afterwards.

In order to allow for successful development of water and sanitation projects they have identified four elements that are indispensable for successful implementation. These are

- Techniques for community participation which accurately reflect needs and establish the likelihood that villagers will care for the system and which will also reduce the cost of implementation.
- Inclusion of all complementary activities needed to address all aspects of the problem, whether reforestation or training community members in bookkeeping and maintenance skills.
- A structured methodology, especially to avoid making commitments before feasibility assessments are completed.
- Appropriate field staff, who generally must be trained. (The curriculum of a training program was presented.)

\*The case studies used in the implementation workshops are available upon request from the WASH Library.

## IMPLEMENTING A WATER AND SANITATION PROJECT

Stephen B. Cox and Bruce Clemens

### INTRODUCTION

We are pleased to be here today to tell you about our work in Agua del Pueblo, a private non-profit organization founded in Guatemala in 1972, to provide technical assistance for rural water and sanitation projects. We have worked in highland Guatemala, generally using spring-fed, gravity-flow systems.

I would like to emphasize that the methods we will discuss were developed for use in the specific geographic, cultural, economic, and technical setting in which we work. Much of what we describe may be applicable in other contexts, but we are simply trying to describe what has worked for us.

### THE PHILOSOPHY ON WHICH OUR METHODS ARE BASED

We believe that a village water supply project should never be seen as an end in itself. Given the priority assigned to water projects by most villages without clean water supplies, these projects offer an unparalleled opportunity for translating village enthusiasm for the project into ongoing community development skills. We involve the beneficiaries in every step of project implementation and train villagers in such essential skills as project planning, community organization, payments collection, elementary bookkeeping, as well as operation and maintenance techniques. With these skills, they can and do identify, plan, and undertake self-initiated community development projects after the water project is completed.

In short, each Agua del Pueblo project is treated as the first step in an ongoing self-reliant community development process.

## ATTRIBUTES OF A SUCCESSFUL APPROACH TO PROJECT IMPLEMENTATION

During our nine years of work on rural water and sanitation projects, we have become aware of four elements that are absolutely essential for successful project implementation. These are: extensive community participation, a comprehensive understanding of the variety of activities needed to complement water and sanitation investments, a carefully structured methodology, and the employment of appropriate field personnel.

### Why Community Participation is Important

Participation is important for several reasons, which will be obvious to those who have worked in rural villages.

When a project is planned with the participation of the beneficiaries it is far more likely to reflect their real and perceived needs than one planned and imposed by water program personnel. Beneficiaries almost always have very good ideas about the level of service they want, the proper location of tanks and faucets, and many other things. Since the water project will be successful only if the beneficiaries use it, they must be consulted in the planning phase to ensure that the system is built to reflect their needs.

Participating in the construction of the project gives villagers a much clearer idea of how the system works and how to care for it. This experience, coupled with carefully designed training to teach maintenance skills, greatly enhances the probability that the villagers will be able to care for the system themselves, once it is completed. Evidence for this is the fact that all projects built in a participatory manner by Agua del Pueblo since 1972 are fully operational today and are being maintained by their users.

Properly managed participation can also reduce project costs by

- reducing the time wasted in the field by paid program personnel as they wait for local materials and community labor to materialize;

- reducing costs associated with the provision of ongoing operation and maintenance services by the water supply institution; and



- perhaps most significantly, reducing the ultimate capital cost that must otherwise be borne by the program through village participation in project financing. Agua del Pueblo makes low interest loans available to its client villages. These loans are repaid to a revolving fund, and this method of recycling capital allows Agua del Pueblo's limited resources to stretch much further.

Finally, participation involves project beneficiaries in experiences which allow them to develop skills necessary for undertaking subsequent community development projects on their own. For example, the villagers of Pacul used their experience in the management of their project loan to negotiate another loan from a different institution. This loan was then used to build a small-scale irrigation project which has led to significant increases in crop yields. The irrigation project is typical of the community-initiated improvements undertaken by village water committees after water project completion, cashing in on skills learned by participating in the water project.

### The Importance of a Comprehensive Approach

To be successful, a project must be planned in a manner which carefully considers the variety of complementary activities needed to address all aspects of the problem. For example, to maximize the potential health benefits of a water project, the program must subsume complementary activities like health and hygiene education, as well as basic sanitary services--pit latrines in Agua del Pueblo's projects. Many water-related disease transmission cycles will not be effectively interrupted without these activities.

Different technologies will require different complementary activities. For example, in Agua del Pueblo's gravity-flow systems, reforestation must be included to ensure that the watershed around the spring will not change in ways that would result in diminished spring flows over a period of time. Similarly, projects using diesel pumps require serious attention to establishing procedures to keep fuel, spare parts, and other essentials on hand.

Regardless of the technology, a comprehensive project will also involve a maintenance program which includes, at a minimum, training of villagers in operation and maintenance skills and establishing a locally managed fund for operation and maintenance expenses. The fees collected for the fund should be managed by the village water com-

mittee. Agua del Pueblo's committees, for example, collect thirty-five cents per family per month for the local operation and maintenance fund.

### The Importance of a Structured Methodology

In rural water and sanitation activities, as in other development fields, it is as important to carefully plan the correct sequence of events as it is to include all necessary events in the implementation plan.

One basic point about the proper sequence of events should be emphasized. Programs must not make project commitments before reliable feasibility studies are completed, including cost estimates and technical assessments. If commitments are made too early, they may have to be rescinded when projects are subsequently shown to be unfeasible. When this happens, the delicate process of developing cooperative habits within the village is destroyed. Those local leaders who promoted the project lose face, and the villagers lose faith. They will be much less willing to take seriously subsequent development opportunities.

Specific steps in the Agua del Pueblo methodology are summarized in Appendix F.

### The Necessity of Appropriate Field Staff

Perhaps the most vexing obstacle facing PVOs attempting to implement participatory village water projects is the lack of appropriately trained field personnel who can perform the wide variety of administrative, promotional, educational and technical tasks required for effective projects. Traditionally, civil engineers have been called upon to perform many of these tasks. Although highly qualified technically, the cultural gap between the engineer and his clients often precludes effective communication which is necessary for participatory projects. Moreover, engineers are a scarce and costly resource in many Third World nations.

Fortunately, the technologies required in most rural communities are simple enough to permit the training and employment of paraprofessional rural water promoters/technicians who are able to perform the

technical tasks required for undertaking a water project, as well as the promotional and educational tasks which are so essential for participatory projects.

Agua del Pueblo has developed an intensive, six-month training program for these rural water technicians (called TARs, from the Spanish term Técnicos en Acueductos Rurales). The first class of 16 TARs graduated in July 1981, and a second class of nine TARs will graduate in May 1982. Upon graduation, these paraprofessionals are able to promote, organize, design, and construct rural water and sanitation systems with a minimum of supervision. Agua del Pueblo is confident that the use of technicians like this will help bridge the serious manpower gap which now exists in this sector. A list of training modules can be found in Appendix G.

### IMPLEMENTATION ISSUES AT THE PROGRAM LEVEL

Up to this point, we have confined our remarks to issues involved in the implementation of individual village projects. Of course, most institutions active in rural water and sanitation are involved in more than one project at once. Consequently, there is another set of issues that must be addressed at the program level, a program being an activity which includes a number of individual projects.

#### Participation

Just as the participation of beneficiaries is essential for effective project implementation, so is the participation of staff members in planning and management essential for effective program administration. "Top-down" approaches, in which all administrative functions are controlled exclusively by top staff, normally result in inefficiency, because field staff are not given an opportunity to apply their experience and insights to the planning of program activities. To avoid these mistakes, Agua del Pueblo stresses democratic decision-making in which all staff members participate.

#### Orderly Program Monitoring

Agua del Pueblo has borrowed from the methods of industrial engineers and operations research analysts the tools of critical path activity planning and line-of-balance logistical planning, to monitor project

progress and to ensure that essential materials and other inputs are in place on time, thus eliminating most avoidable delays.

### Managerial Training for Nationals

Agua del Pueblo strongly believes that one of the objectives of any development program should be the training of national managers and the devolution of responsibilities to them. In this way, the developing country is helped to enlarge its corps of indigenous managers. Over the last five years, we have trained managers for our Guatemalan programs, and all Guatemalan operations are now run by nationals.

## RESULTS OF WORKSHOPS ON IMPLEMENTATION

### ISSUES

From our point of view as PVOs, we identified issues in implementing projects. These issues might best be seen as constraints that arose in our work with donors, host governments, our own organizations, and the communities in which we worked.

#### Donors

In working with donors, we found that we are often under considerable pressure to spend money on a schedule that fits the donor's aspirations but does not fit the project's needs. Donors often push a project through or ask us to do so, even though there is no real commitment by the government.

Closely related to these two constraints, we found that donors are often more interested in the product they are funding than the process by which the project goals are achieved. If either the PVO or donor has a commitment to community participation and to strengthening indigenous institutions, this constraint is especially difficult to deal with.

In some instances, donors impose financial limitations relating to loans, purchase, origin of material, and so on, that make for difficult and costly implementation.

#### Host Governments

In looking at agencies at all levels of host governments, we found that implementation is made more difficult by the conflict between the government's goals and a community's goals, central control of funds for local expenditures, and inadequate planners or managers in public organizations on whom we must rely.

## Our Own Organizations

When we considered our own organizations, we found two constraints of major importance. The first is the lack of adequate planning for implementation. Aside from the technical skills needed, a lack which we feel can be remedied, we see that we do not devote the time required, at all levels and in all situations, to effectively plan implementation.

The second major constraint is our difficulty in selecting materials and technologies for the situations in which we work. Closely related to this are the problems that develop as we acquire and manage local resources, a source of real difficulty.

In implementing projects, we often see that our aspirations and methods are not consistent with our objectives. This constraint develops because we often are not aware of our own assumptions, or if we are, we tend not to be explicit about them.

We are sometimes unhappy with the management skills of the local PVOs with whom we work. At the same time, we wish to keep a low profile, have a successful project and yet have good relations with the communities, the government, and other agencies at work in the country.

## Communities

We felt that the major constraint in our work with communities is their desire for the end result of the project regardless of their ability to participate effectively. This ability depends, to some extent, on our capacity to help them develop the elements needed for productive participation, leadership, trained people for successful task management, funds, establishing mutual awareness of our expectations, and assessing potential for community cohesion and participation.

## FINDINGS

Our major findings related to 1) the need to allow adequate time for planning and cooperation, 2) the identification of obvious elements that result in successful projects, and 3) the larger, continuing problems that seem beyond the scope of most PVO efforts.

## Time

Time costs money. Substantial amounts of time are needed to work with donors, to develop understandings with host governments, to adequately appreciate and assess the communities with which we hope to work, and, within our own organizations, to adequately plan for effective implementation and evaluation.

Expressions of the need for time for sufficient involvement of all collaborators surfaced often. We saw that time is needed during the implementation process for developing relationships with other organizations and with country counterparts, especially managers in local PVOs. Time is needed for an adequate assessment period because often we know too little about the situation in which we work. Time is needed to develop an effective education program for villagers who will use the water and sanitation system that has been developed.

Even where we were aware of the need to build time into implementation schedules and into the planning process, we tended not to because of the many competing demands on our time and money.

## Identifying Obvious Elements for Success

We found that we could identify elements in the implementation of projects that were largely within the capability of most PVOs. These elements include:

- developing clear measurable objectives
- carrying out an adequate pre-assessment of communities, especially their commitment and expectations
- choosing "easy" projects first to allow success to build upon success, by choosing projects and communities where there is ease of access and manageable logistics, by starting small, and by being honest with the community
- relying on local funding and local control for the advantages of self-reliance and for the possibilities of recouping some of the investment
- pre-planning operation and maintenance costs and training needs related to them

- engaging in ongoing evaluation
- training of staff, both headquarters and field.

### Long-term Continuing Problems

We found a group of problems that we saw as long-term and largely beyond the ability of PVOs to affect substantially, if at all. Among these we cited

#### Within countries

- the need for trained manpower at all levels
- programs of continuing and adult education
- frequent staff changes in host country agencies
- the upward mobility of technicians and their frequent lack of empathy with rural communities
- underdeveloped infrastructures.

#### Within our own organizations

- lack of experience in project design
- learning how to sustain the community process
- lack of technical leadership.



## Chapter 4

### PLANNING WATER SUPPLY AND SANITATION PROJECTS\*

#### SUMMARY OF BACKGROUND PAPERS

John Briscoe presented a planning matrix which would help identify feasible technical alternatives and their likely consequences. This process leads to additional procedures that would help select an appropriate program in view of possible alternative costs and the likely commitment of all contributors, including the community.

Eugenia Eng described a set of techniques that would allow us to identify, help organize, and work with village leadership. Use of these techniques would result in effective community participation to identify village concerns, resources, and commitment. It would also offer the potential for structuring needed educational programs and establishing the basis for continuation of benefits.

She also presented a format for working toward three types of goals: ultimate, instrumental, and performance, in terms of underlying assumptions, inputs, activities, outputs, logistics, and end of project status.

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\*Case studies used in workshops on planning are available from the WASH Library upon request.

# PLANNING A WATER AND SANITATION PROJECT

Eugenia Eng

## INTRODUCTION

It is a truism, particularly forceful when working cross-culturally, that there will always be discrepancies between the intentions of providers and the needs of consumers in health-related community development programs. The main concern of your project may be environmental health, and your chosen strategy may be wells. However, the main concerns of the villages you have targeted may revolve around an inefficient market system for buying and selling food.

There are obviously two sets of priorities, which are not necessarily mutually exclusive, for the intentions of providers and the needs of consumers are usually related to community development. Providers and consumers are both concerned with too many babies dying, too many people suffering from intestinal disease, inadequate diet, low agricultural yield, etc. The discrepancy lies in the perceptions of what is considered the best solution--a ready supply of good water or better access to a marketplace. The latter solution is less directly related to health but is most certainly related to development--improved nutrition, more financial security, better accessibility to resources, etc.

The challenge of planning is to choose intervention strategies which are intrinsically adaptable and responsive to this universal problem of matching the intentions of providers to the needs of consumers. And it is a veritable challenge because program planners working in developing countries not only have very little statistical information available to them to make informed decisions on what perceived needs of a given population are, but also do not have the resources at hand to gather the information needed at the village level.

Two other situations compound these difficulties. The intentions and perceptions of upper- and mid-level officials of the national government are probably as discrepant as your own from the needs of village populations. Moreover, these same officials may no longer be in the same position to support the program when it is ready for implementation. As an example, in the Cameroon, the USAID health office and the Cameroonian Director of Public Health, who had invested

much time and effort in the writing of the original planning document, were both replaced by the time the funds were appropriated and the project staff was in place. Their replacements had to be oriented and then persuaded to accept the project strategies as valid and workable.

The ideal would be to elicit the perceptions and commitment at the village level to support the development of a program plan. From this basis, a program or project would reflect to local government and funding agency decision-makers the needs, ideas, strengths, and opinions of the village communities. This is a reversal of the traditional planning process which is to convince, cajole, or threaten village populations in order to gain support for the ideas and activities of funding agencies and government officials.

How do you do this in a credible and acceptable manner? How can you plan a program that is clearly defined with objectives, inputs, outputs, and end-of-project status which at the same time is flexible and adaptable to the as yet unknown needs of the targeted communities?

I will be using a project in the Cameroon to illustrate points throughout our discussion on planning.

#### PLANNING AS A SOCIAL EXPERIMENT

When you conceptualize planning as a social experiment, you are doing several things. You are building in evaluation from the first. You are allowing for program modifications throughout the implementation by feeding back into the program reactions and input from staff and communities. You are conceptualizing planned change as an ongoing process rather than a static project with a beginning and an end point only. You are building in incentives for staff and communities by allowing them to feel a sense of progress as they move up the hierarchy of objectives.

In this process it is imperative that three types of goals be identified for each project. These are the ultimate goal, the instrumental goal, and the performance goal. Each of these goals has underlying assumptions which are arranged in a hierarchy. The lowest ranking assumptions need to be true in order for the higher ones to be true. These assumptions are additive/cumulative.

Equally important, criteria must be established to show that objectives are met within a time frame. Input, as well, must be planned to show which resources are necessary.

## The Project Example

### Ultimate Goal

To increase the number of health-related development activities identified and undertaken by rural populations.

### Underlying assumptions

- Changes in personal patterns of individual behavior and relatively simple changes in residential environment are effective in altering the cycle of infection and re-infection common in developing societies.

- Basic knowledge and skills that are involved in the initiation and maintenance of disease control efforts, in which people themselves take primary responsibility, will lead to beneficial change without constant intervention by health workers.

### Instrumental Goal

To develop and implement a nationally coordinated practical health education training system which responds to the needs of rural populations in Mefou and Kadey.

### Underlying assumptions

- With limited training, a broad range of professionals and community people can take an active role in health promotion activities.

- An essential barrier to the realization of improved health status has rested in problems health workers have had in translating technical knowledge and action in terms of the motives and needs experienced by the villagers themselves.

- Training programs can contribute to both the availability of health education manpower and to the spread of health education services among the populations when designed to equip personnel with skills acquisition rather than knowledge retention.

- Training programs which encapsulate health issues within a community organization and development framework will focus on citizen action as the prime source of change.

### Performance Goal 1

To develop an effective program of village health committees implemented in Kadey and Mefou.

#### Underlying assumptions

- Preventive action requiring technical awareness as well as individual and community cooperation demands that the entire community rather than only those individuals or families at highest risk be considered the target.

- The village health committee is a means for stimulating and supporting organized, informed citizen action in solving community health problems.

### Performance Goal 2

To develop an effective in-service training program for health and other workers in Kadey and Mefou.

#### Underlying assumptions

- In-service training of village health workers in practical health education skills will encourage broad-based participation.

- In-service training of everyone who provides any kind of service to the village will encourage each one to play some role in health promotion.

## Criteria to Show that Objectives Have Been Met

- 40 itinerant agents trained and in the field with means of transportation.
- 240 committees established of which 80 percent are rated active.
- 160 health workers and 30 Peace Corps Volunteers (PCVs) trained and effectively implementing programs of health education in 16 health centers.
- Training materials and design developed and utilized in 4 MOH in-service training programs.
- 25 workers from other services trained of which at least 8 utilize training to undertake specific health activities.

## PLANNING AS PROBLEM SOLVING

You will notice that water and sanitation program planning has not been mentioned specifically, and this has been done purposely. It is necessary to understand the generic process of program planning as that of planning for change, regardless of what the content of your planned change is. All intervention programs are intentionally bringing about planned change through external influence--changes in knowledge, attitudes, and behavior. Water and sanitation programs are no exception.

You are introducing innovations, suggesting possible beneficial solutions to the problems experienced by people. How easily or readily the change is accepted will depend on socio-cultural factors like the community's:

- history of planned change in the past
- perceptions of the status quo
- attitudes toward change
- adaptability of the innovation to everyday life
- amount of risk involved in terms of resources and social status.

The planned change process can be conceptualized in the following way:

Recognition of the problem —> Identification of the innovation —> Implementation —> Institutionalization.

Programs planning for change usually fail in the first stage. Because they do not take into consideration:

- perceptions of the people toward change
- degree of dissatisfaction with status quo
- who is dissatisfied and why, and
- available options.

Frequently, planning fails to take into account the culture and the social structure of the community, which help to explain existing behaviors, decision-making patterns, and social support patterns.

In other words, we need to know who we are working with, and, from among them, who can form a base to work with in developing strategies of change which would:

- be tailored to fit cultural values and experiences
- help others perceive a need for change
- improve their competence in evaluating new ideas
- concentrate efforts on opinion leaders in the beginning
- anticipate social consequences and prevent those which would be undesirable.

A planning technique would be to build into your design an Action Oriented Community Diagnosis to be conducted in the beginning. It is called action oriented because one doesn't wait for survey results before taking action. The entire process of an action oriented community diagnosis is an intervention in itself. It is one of the techniques of community organization as well.

This technique involves the community in the development of specific strategies based on their own assessment of needs, available resources

within and outside their community, and identification of the range of possible solutions.

At the same time, project staff would be learning about the community's social system as they observe it in action. Technical assistance would be in the form of facilitating the decision-making process, revitalizing the roles of existing social support networks, linking the community to available outside resources, and providing technical knowledge and skills to help them make informed choices about problem solving. By offering a range of strategies that have been tested in different communities, the government can also make better decisions about extension and expansion after the life of the project.

By viewing planning as a problem-solving process, one is in essence mobilizing community resources and stimulating community organization. This is not to say that communities are not organized, for they have been dealing with problems, surviving, and coping long before we arrived. What we can do is focus on their strengths to enable communities to feel more confident and be more efficient in bringing about beneficial change.

Following are the detailed steps needed to conduct an action oriented community diagnosis.

#### Steps in Conducting an Action Oriented Community Diagnosis

1. Identify the population you plan to work with.
2. Determine the factors you believe will help broadly distinguish between the communities existing in the population. These factors could be ethnicity, socioeconomic status, etc.
3. Talk to others who have had experience working with these broadly defined communities and ask them for names of individuals who may be knowledgeable about their respective communities.
4. Meet with each individual personally, telling him/her that he/she had been recommended as someone who is knowledgeable about the community and that you are interested in finding out the needs of the community to develop a program of action.



5. Ask them about

- past community efforts in dealing with problems and who was involved
- what they perceive to be community needs now
- names of people who should be involved if the community needed to get something done.

6. Repeat steps 4 and 5 until you have a list of names of people who have been repeatedly mentioned as the movers and doers of the community.

7. Have one of these people call a meeting of this core group to discuss with you the needs of their communities.

8. Share with this core group the information you have gathered thus far on perceived needs. Clarify your role as a resource person to work with them on developing and implementing a plan of community action and not to provide a service per se. Ask if anyone else should be included as a member of this core group.

9. Come to an agreement on the priority of needs, how realistic they are for the community to deal with them, and what resources are available for meeting them.

10. Design with them a more detailed plan for assessing their first priority to find out

- who in the community feels this is a need
- who is affected most
- what are the perceived causes
- who is willing to work on solving the problem, etc.

The key is to allow the core group to take the lead regarding the methodology. As a resource person, you can offer choice of methods, but let them make the decision. As the needs assessment is carried out by them, you will be learning about decision-making patterns, social support systems, communication networks, etc.

## PLANNING AS INSTITUTIONALIZATION

It is important to graft intervention strategies and innovations onto the daily experiences of village life. But it is equally important for government technicians and administrators to support the program goals, activities, and overall approach. These professionals should also be involved in planning as decision-makers, as social experimenters, and as problem solvers.

From the national, regional, and village levels, appropriate technical and regional authorities need to participate in the definition of their roles in the program. Without their support and supervision, the program can never be fully integrated into national policy.

It is important that everyone involved in the program have a clear idea of the existing service delivery system and know the:

- responsibilities of personnel
- financial and human resources available
- hierarchy of accountability
- basic and in-service training offered.

Also participants should work out answers for the following:

- Who is best suited for front line work?
- Who is best suited to supervise?
- Who is best suited to coordinate?
- Who is best suited to monitor?
- Who is best suited to make decisions?
- Who is best suited to make policy?

For each of these questions, answers must also be found for the subsidiary questions: What should be their role? What additional training would they need? Who should train them?

To institutionalize a program it is most productive to think of the program as a pilot rather than a demonstration. What is the degree to which it can

- be continued and sustained?
- be duplicated in other parts of the country?
- be extended on a national basis?
- continue to evolve as the economy develops?

These are crucial questions that a national government must answer in order to plan for development and self-sufficiency without constant technical and financial assistance from external sources.

Unless we actively involve the government in the planning process, we are doing a great disservice, because we are not transferring knowledge and skills needed to make more informed decisions. Neither are we providing a model for the community participation approach.

# SOME TECHNICAL ASPECTS OF PLANNING WATER SUPPLY PROJECTS IN RURAL AREAS OF DEVELOPING COUNTRIES

John Briscoe

## INTRODUCTION

Given the limited time available and the substantial amount of material to be covered, it has been decided to cover only the planning of a rural water supply program and not the sanitation program. It will be necessary to emphasize at the beginning the incorrectness of such a separation in a practical situation. I am prepared to furnish information on planning of sanitation programs along similar lines.

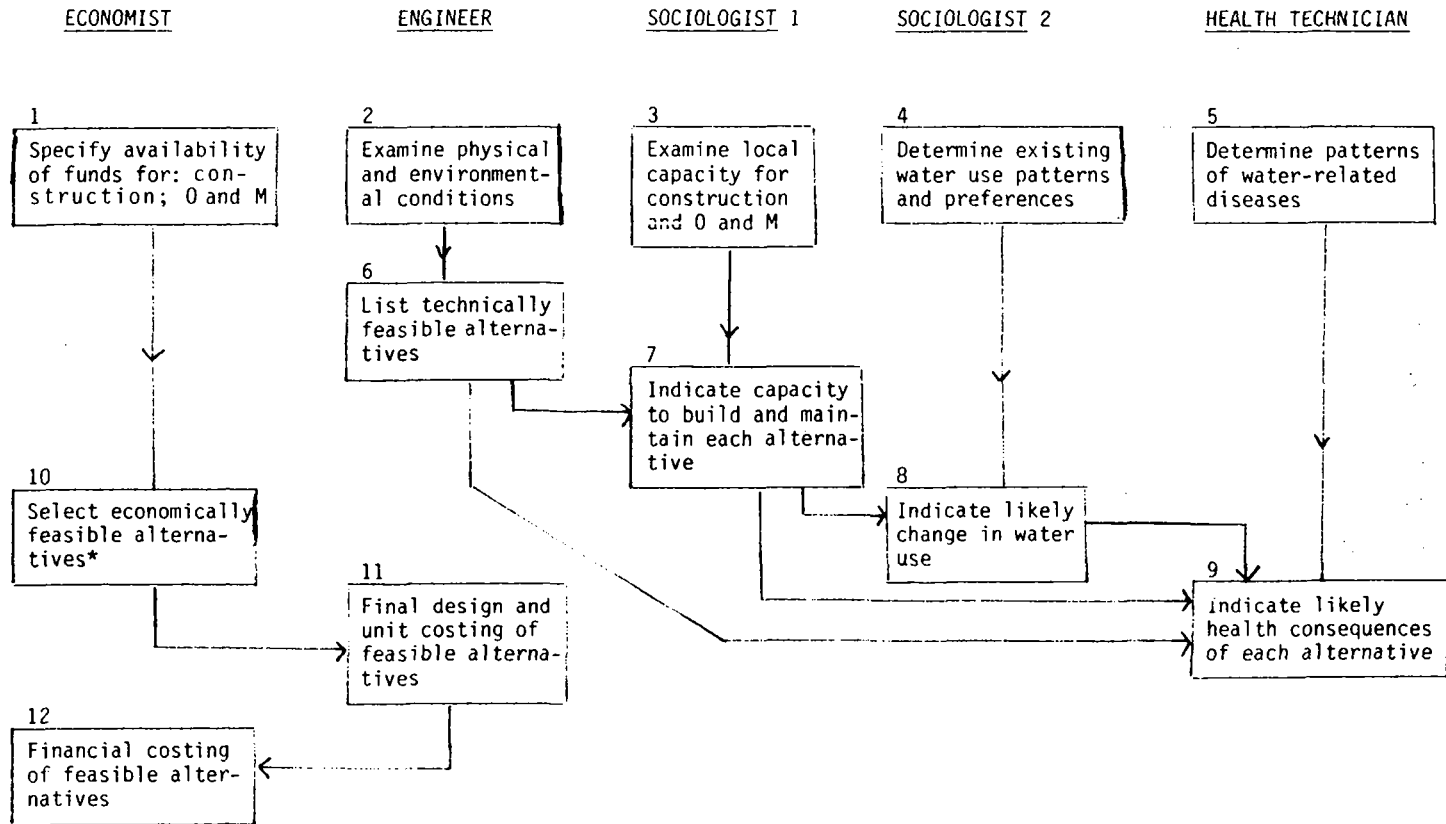
We will discuss the planning of a rural water supply program in a developing country on the basis of the following model (Figure 1). In the model the local community, ideally through its elected officials, is heavily involved in each of the exercises indicated by a box with double lines. Note that the classifications "economist," "sociologist," etc. are meant to indicate the type of individual and function rather than the specific discipline (see Figure 1). Throughout the presentation the general discussion will refer to the cases with which the author is most familiar.

Before discussing more narrow technical aspects involved in rural water supply planning, we feel it important to note that the problems involved in such planning are not predominantly technical, as they are in large cities. Rather, they are predominantly organizational, political, and managerial.

## ASSESSING EXISTING LOCAL CONDITIONS

### Funds for Construction, Operation, and Maintenance

Unlike cities, rural communities reluctantly accept the principle of paying for water. In financing an urban scheme, all of the required funds usually come from the community itself in the form of water rates. In rural communities, typically about 80 percent of construction costs come from outside of the community, with the remaining 20 percent coming from direct participation.



\*Representatives of the various ministries and local communities involved choose the alternative to be implemented. A plan is drawn up and commitments made by each party to their fulfillment of their part of the plan.

Figure 1: A MODEL FOR PLANNING RURAL WATER SUPPLY PROGRAMS IN DEVELOPING COUNTRIES

Development finance from donors for construction is generally relatively easy to obtain, while recurrent funds for operation and maintenance must usually be taken from the government's own, often limited, sources of revenue. This is an important factor in the disequilibrium between the construction of water supply systems and maintaining them. Voluntary agencies can make an important contribution by focusing on operation and maintenance.

### Physical and Environmental Conditions

This includes an examination of:

- climate, topography, geology, hydrology
- population distribution
- state of existing water supply system.

### Local Capacity for Construction, Operation and Maintenance

- historical background of local institutions
- existing regional structures for supporting local government
- community organization including local cooperatives, village betterment committees, and political parties
- statutory powers of local institutions
- availability of skilled and semi-skilled manpower for construction, and operation and maintenance.

### Existing Water Use Patterns and Preferences

- the effect of different factors (such as distance, type of source, perceived quality and ownership) on use of water for drinking, cooking, washing, bathing, and cattle watering.
- the time spent in collecting water



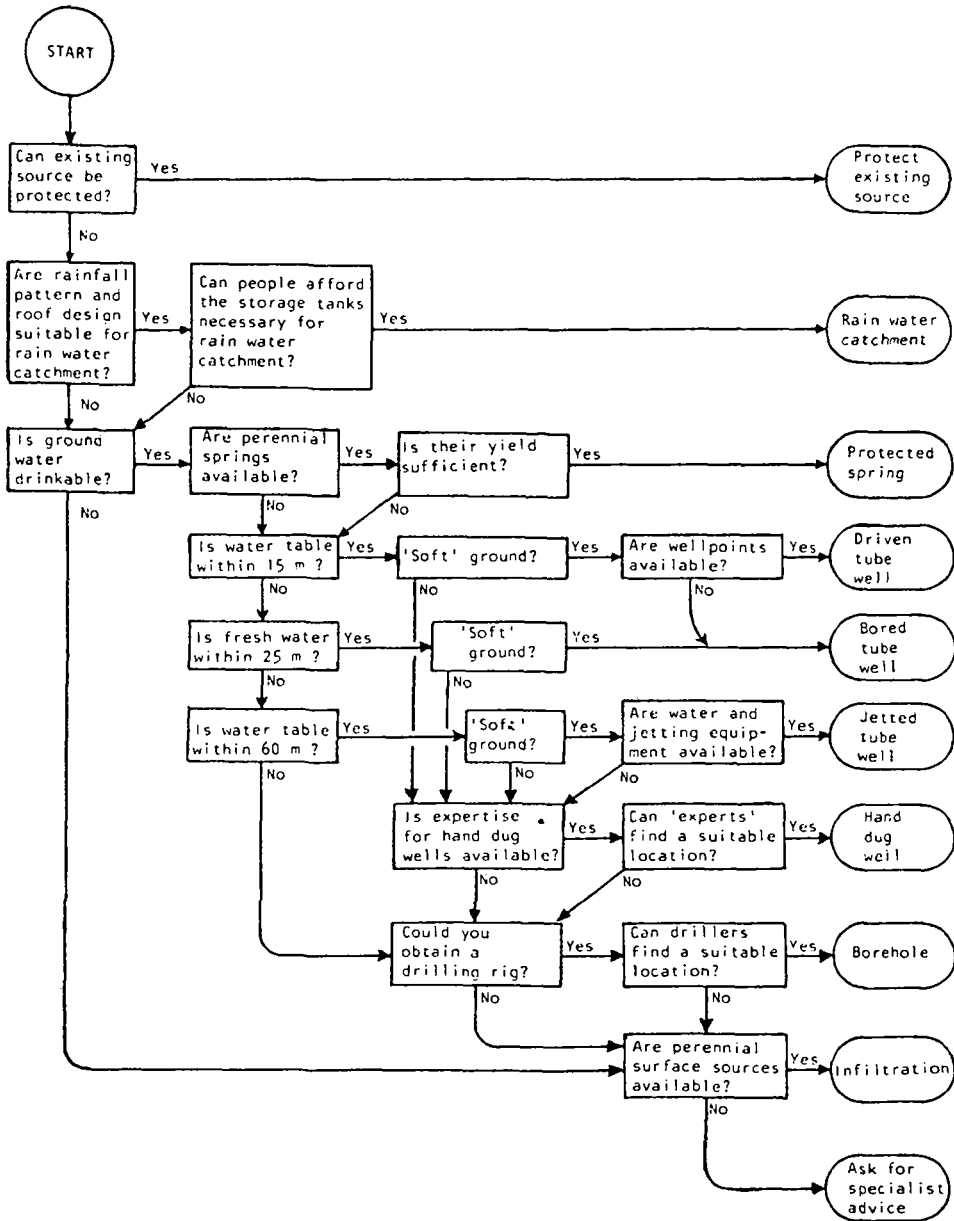


Figure 2. Choosing a source of water. Follow the arrow corresponding to your answer to the question in each box.



### Indicate Capacity to Build and Maintain Each Alternative System

As outlined above, the engineer has done an analysis of the availability and reliability of the equipment and materials necessary for construction, operation and maintenance. The sociologist examines the capacity of the local and regional governments to undertake the construction, operation, and maintenance of each alternative in view of the assessment of local conditions. The sociologist specifies the material, such as vehicles and tools, as well as human and institutional resources necessary for each alternative.

### Indicate Likely Changes in Water Use

In light of the information gathered in looking at water use patterns and subsequent investigations in the community, the sociologist indicates how these patterns are likely to change. Is the population likely to use the water from the new source? Will they continue to use their old sources for some purposes? How much time will be saved, and how much more or less reliable will the system be in light of assessed capacity to build and maintain alternative systems?

### Indicate Likely Health Consequences of Each Alternative

The health technician can assess the likely health consequences of the water supply project once the following are known: the changes in the quantity and quality of water used for domestic purposes, the exposure to water, the changes in habitats of the transmitters of water-based diseases (e.g. snails) and for the vectors of diseases such as malaria.

## SELECTING A PROGRAM

### Appraising Economically Feasible Alternatives

On the basis of the availability of funds for development and recurrent expenses, the costs of each technically feasible alternative are determined. These costs are estimated for a range of service levels and for a variety of assumptions about the staging of construction. In the table below (Table 1) we present some typical costs for rural water supply schemes.

Village population	Service level <sup>a</sup>	Assumed daily per capita water use (liters)	Daily village water use (cubic meters)	Water source	Treatment	Typical costs (U.S. dollars per cubic meter) <sup>b</sup>				
						Source works	Treatment	Storage and distribution	Total	Cost per capita
1,000	PH	40	40	Well	None	70	—	195	265	10
1,000	PH, HC <sup>c</sup>	100	100	Well	None	28	—	176	204	20
1,000	PH	40	40	Clear surface water	Chlorination	10	10	195	215	9
1,000	PH, HC <sup>c</sup>	100	100	Clear surface water	Chlorination	10	8	176	194	19
1,000	PH	40	40	Contaminated or turbid surface water	Filtration and chlorination	10	200	195	405	16
1,000	PH, HC <sup>c</sup>	100	100	As above	As above	10	150	176	336	34
10,000	PH	40	400	As above	As above	5	40	158	203	8
10,000	PH, HC <sup>c</sup>	100	1,000	As above	As above	4	18	108	130	13

a. HC = House connections; PH = Public hydrants provided at one for each 100 population.

b. Costs are at 1973 levels and for illustration only.

c. Each 50 percent of total.

Table 1. Hypothetical Capital Cost Implications of Service Levels and Treatment

From this table we note the substantial increases in per capita cost associated with house connections rather than public standposts, treatment of the water, and smaller systems (i.e. economies of scale).

### Final Design and Unit Costing of Feasible Alternatives

Rural water programs have a strikingly high number of repetitive units such as water tanks, standposts, pump houses, etc. There are substantial economies in using standardized designs. Where standardized national designs exist, these should be used. Where they do not exist, they should be developed, at least for the project. Every attempt should be made to ensure that equipment, drilling rigs, vehicles, pumps, faucet, etc., used in the project have been chosen nationally as the standard and that there will be a reliable supply of spare parts. The capacity to undertake repairs should be considered.

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### Costing of Feasible Alternatives

This strictly technical task involves costing in terms of local and foreign components.

### Choice of a Program

On the basis of the above steps, a list like the following is drawn up.

Level of service	Reliability of supply	Construction requirements Govt. Comm.	O and M requirements Govt. Comm.	Health Conse- quences
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Alternative 1

Alternative 2

This information is then presented to representatives of the various ministries and other agencies, such as relevant foreign voluntary agencies and representatives of the local communities.

The most desirable alternative is chosen and commitments are made to a concrete plan. A further decision is made to choose which alternative, if any, is to be implemented. Targets are set for construction, for operation and maintenance, for the organization of the necessary institutions, and for the training of the required personnel.

Each of the institutions participating then makes a commitment in writing to fulfill its part of the overall plan by the specified dates.

## RESULTS OF WORKSHOPS ON PLANNING

### ISSUES

What are the major components needed for planning successful water and sanitation projects? We discussed inadequacies and successes of planning as reflected in our own experience and the case studies presented.

### FINDINGS

#### Techniques for Planning

Strict sequencing of activities and formative evaluation techniques were chosen as most useful planning tools. The concept of ultimate, instrumental, and performance goals, each built on stated assumptions, was found especially useful for dealing with the long-term problem that all PVOs face: how to become aware of their assumptions in order to develop effective program goals.

#### Identifying Goals

Within the context of water and sanitation projects, we found that identified problems should be translated into goals. These latter are best delineated in terms of resources, both technical and human, which can then be more effectively planned for.

#### Technical Resources

The selection of materials and techniques claimed less of our attention than did the planning of logistics and unforeseen needs as they arose in the field. We found that careful planning of activities might avoid some of our logistical problems.

## Human and Institutional Resources

### At the Village Level

Some of the issues we face most commonly at the village level included questions like: Should we start with villages most likely to succeed or most in need? Who takes responsibility for what and when? What should we accept as an indication of success?

We found that the action oriented community diagnosis, developed by Eng, might well produce the information and support needed at the village level. Use of these techniques could indicate:

- village financial resources
- use patterns and relevant values and behavior
- historic water provision and use
- more accurate information on water tables
- estimates of equipment available and needed
- training needs for construction, operation, and maintenance
- information on the existing situation (demographic, health, socio-economic) and the likely effect of the new water programs.

### Beyond the Village Level

We found that functions should be carefully identified so that program plans are realistic in their projected reliance on available human and institutional resources. Some relevant questions that should be answered in the planning process are:

- Which persons and institutions can best handle more than one function?
- Who carries out the health segment of the project?

- How is responsibility divided for training for:  
installation and maintenance workers?  
health workers? and  
financial and organization needs of villagers?
- Who will supervise and monitor the functions above?
- Who will contribute funds for each of the above?

We found that, in general, water and health projects would best contribute to institutional development by identifying personnel needs and developing specific training programs to meet them.

### Difficulties

In dealing with concrete problems met in projects, we offered several recommendations. First, it is necessary to find informal ways to get accurate census information, especially in assessing the community's ability to pay for the project. Since surveys create suspicion and waiting for results produces lack of interest, it is urged that projects search out "historic" use and water source patterns and the community's past experience in self-help. These efforts may produce invaluable information.

Local materials should be sought out as important priority elements and not as last-minute substitutes, and projects should be developed accordingly. The costs of all available energy sources should be assessed before committing a project to a given technology.

## Chapter 5

### DONOR RESOURCES

Fred Reiff

#### INTRODUCTION

I have been asked to speak about several things, especially the Pan American Health Organization's (PAHO) program for the International Water and Sanitation Decade. First, no program, especially a health program, exists in a vacuum. This has been learned over quite a few years. Anyone that thinks he can do something in isolation is wrong--a point we must remember.

#### PAHO'S PROGRAM IN GENERAL

##### Technical Cooperation

PAHO is the Regional Office of the World Health Organization, and its program is basically one of technical cooperation. It is not one of financial assistance.

One important function is the transfer of know-how from one person or group to another. We try to strengthen the ability of individuals and communities to deal with perceived health needs.

##### PAHO's Past Work in Water and Sanitation

PAHO and its predecessor organizations have been giving a high priority to water related diseases and sanitation since its founding in 1902. In 1961, at the Charter of Punta del Este, they established a goal of providing water and sewerage service to 70 percent of the urban and 50 percent of the rural population by 1971. In a sense, PAHO has had a Decade already, and 78 percent of the urban and 24 percent of the rural population was reached by a water supply in that period. The booklet which you received, (Environmental Health Activities of the Pan American Health Organization) summarizes the ongoing activity.



## The Impact of Water and Sanitation

You have been given a table and a graph. The table clearly shows that in Latin America diarrhea was the major cause of death.

To determine if improvements in water supply and sanitation have a significant effect, look at Costa Rica, the country for which we had the best statistics. For the period from 1940 to the present, you will see that as the proportion of the population receiving water increased, the mortality rate decreased. In fact, the two graphs are almost mirror images of each other. In addition to the massive water program in the 60's, there were great efforts in housing and electrification throughout that time. Although water supply is not the only factor, it obviously is important.

## PAHO AND THE DECADE FOR WATER AND SANITATION

### Continuing Our Main Thrust

PAHO will continue to cooperate with countries wherever and whenever possible and try to work through existing institutions. By developing workshops, special studies, training programs, and information services, we will be increasing capabilities in each country to operate and maintain its water systems. Our goal, as always, is to help existing institutions become stronger and more productive.

To accomplish the goals of the Decade for Water and Sanitation we will continue to cooperate with other organizations like German Technical Assistance, the Inter-American Development Bank, and the World Bank. PAHO will also be working with the Inter-American Association of Sanitary Engineers and other non-governmental organizations to develop information and education programs.

### Emphasizing Special Programs for the Decade

PAHO will be emphasizing training and training of trainers. We hope to achieve a multiplier effect by training people who in turn will train others.

Information exchange will be emphasized because one of the biggest problems in Latin America is access to good information. Red Pan-americana de Informacion y Documentacion en Ingenieria Sanitaria y

Ciencias Ambientales (REPIDISCA, the Pan American Information and Documentation network on Sanitary Engineering and Environmental Sciences) has been established to develop a computerized system of information. With headquarters in Peru, it is gathering information from different member countries and organizations. Though it has been in existence only a short while, it is already being used quite heavily. PVOs can have access to this information.

I want to call your attention especially to the International Drinking Water Supply and Sanitation Decade Directory published by WHO. It is a good source of information on various countries and donors.

### Role of PVOs

One last but very important consideration. I want to remind you of the value of PVOs. Unlike large organizations, PVOs can bring to projects their ability to act rapidly and move quickly. PVOs have done some excellent work throughout the world.

I would admonish PVOs about two things. First, try to utilize projects to strengthen existing organizations in countries. Though difficult, it is important to long-term success. Don't work in a vacuum.

Second, don't overlook the value of a good small project. I have seen projects in Peru, for example, that were still functioning well after 20 years. They were done by PVOs.

In closing, let me say that we don't fund PVOs, as we are not a funding agency. We cooperate extensively with them and make our information available to them. We may be able to recommend contacts in the areas in which you will work, and this might prove, at times, very useful to you.

## UNICEF

Bruno V. Ferrari-Bono

It is an honor for me to express UNICEF's appreciation for the kind invitation to participate in the NCIH/WASH Workshop. The decision by the United Nations to devote its energies to the Decade for Water and Sanitation is surely a "shining moment in the history of humanity." Because of its orientation, UNICEF is deeply involved in the work of the Decade's goals, especially in rural communities and peri-urban slums.

### EXPERIENCE AND COOPERATION WITH PVOS

UNICEF's first field projects included water and sanitation as a component of primary health care projects. In Latin America, we received valuable support from PAHO and from PVOs, especially in Central America and the Caribbean.

### UNICEF Funds and PVOs

UNICEF is an organization supported by voluntary contributions, with 77 percent of its income coming from governments and PVOs contributing 16 percent of UNICEF general resources.

In May, 1981, the UNICEF Executive Board approved commitment of 23 percent of its general resources to water and sanitation projects and 65 percent of a special fund which is made up of expected contributions from UNICEF national committees, PVOs, and bilateral aid. In all UNICEF will spend 36 percent of its general and special funds for water and sanitation projects.

It is important to see that while UNICEF plans to spend about \$60 million each year for the next three years on water and sanitation projects, PVOs will be spending about \$150 million or two and one-half times as much.

## UNICEF and National Committee Projects

The activity of UNICEF national committees is intense. They assume, in some cases, the entire financial support of water and sanitation projects in some countries like Honduras, Rwanda, and Thailand. Similar support is received from PVOs in Guatemala, Kenya, Nepal, and other countries.

UNICEF is increasingly joined in its own projects by PVOs willing to work in water and sanitation activities.

In emergencies like the Managua and Guatemala earthquakes, UNICEF develops close links with PVOs on the spot, unplanned. The program is analyzed day by day. Cooperation develops simultaneously with a number of organizations.

In ongoing programs, cooperation develops along these lines. There is

- 1) an interchange of ideas through direct contact,
- 2) an exchange of publications,
- 3) a human resources exchange in order to obtain external expertise,
- 4) direct cooperation in program implementation at the field level which can be
  - financial, for expenditures in supply, support services or cash expenditures, or
  - sharing a program at field level, but working in different components of such programs.

## POLICIES AND INSTITUTIONAL FRAMEWORK

### UNICEF's Unique Role

Working in rural and peri-urban areas calls for a different approach from working in urban settings. In several countries, UNICEF's work has been a starting point for later development of large-scale national efforts. In some countries, water and sanitation personnel structures were built up by multiplier effects from the first UNICEF

inputs in training programs. In other countries, it has led to or has been supplemented by large-scale inputs from bilateral and other major sources. But it is also clear that UNICEF could not accomplish its goals without the support of PVOs

### Safe Water--The Most Economical Way to Improve Child Health

It is easy for UNICEF to justify its work in water and sanitation because it is young children who are most vulnerable to diarrhea and other diseases caused by unsanitary conditions. The provision of safe water, supplemented by environmental sanitation measures, is the most effective way to improve the health of children. Water and sanitation programs are always seen as components of health programs.

### Other Benefits Often Overlooked

We would like to broaden "sanitation" from the confines of latrine construction and expand it to mean the protection of water from the well to the home, its appropriate storage and use and personal, domestic, and food hygiene.

We must not overlook other benefits of sufficient water. It lessens the drudgery of mothers and children and allows more use of their time for other things, child care or farm work for mothers, school attendance for children. By increasing the possibility of irrigation, the availability of water can also lead to a better supply of food for the family.

### Safe Water--A Leading Edge for Other Development

It is important to realize that water supply and sanitation facilities are often among the first tangible services that reach children and their families. In many underprivileged areas, water supply is often the starting point for self-reliant local efforts. Safe water has the potential of becoming a "leading edge" around which other services can be gradually organized.

Let me say again, some of the most effective cooperation between UNICEF and PVOs could be working together, but in different components of an integrated effort to promote child health.

## Manpower Training and a New Relationship

To accomplish the objectives of the Decade, intense training programs must be implemented. A private professional association, the Inter-American Association of Sanitary Engineers, will cooperate with UNICEF and PAHO to formulate a regional training program by developing courses and teaching mid-level personnel in water and sanitation.

This new dimension in cooperation is likely to grow as UNICEF has recently received offers of cooperation from some private enterprises and private groups in order to train people in well drilling and development of water systems.

## EXAMPLES OF COOPERATION IN SMALL WATER AND SANITATION PROJECTS

### Kenya

Contributions for Water and Sanitation projects have come from PVOs around the world, like International Planned Parenthood Federation, UNICEF Committees in the United Kingdom and the United States, and other donors who have sent contributions through UNICEF. The projects are also supported by local PVOs in Kenya. The overall objective is to support the government's efforts in bringing water and sanitation to the entire population by the year 2000.

### Zaire

PVOs, especially missionary organizations, have developed grassroots activities and have contributed funds for investment expenses and operating expenses. UNICEF has contributed some equipment and logistical support, while the villagers have contributed their labor. In one system, more than 100 sources have been tapped and through a distribution network, water is now provided for 130,00 people.

### Rio De Janeiro

UNICEF was requested by the Municipality to help the community development of a "favela" or shantytown. Water and sanitation is one of the components, and Catholic groups, a Swiss Foundation (Terre des Hommes), and several local associations are cooperating. In addition, communal work is being contributed to build a sewage channel.

## Pakistan and India

Jaycees are involved in a sanitation project in Karachi. In India, various PVOs and UNICEF are working closely with local PVOs. The Betul movement in India will be remembered for its earlier involvement in development of the Indian Mark II PUMP.

## Guatemala, Thailand, Nepal, and Mexico

There are many other examples of such cooperation but I shall mention just a few. The Boy Scouts were active in Guatemala after the earthquake and are now active in Nepal. Girl Guides are working in Thailand with refugees from Kampuchea and have trained young people in first aid, sanitation, and hygiene.

In 1973, in the highlands of Chiapas in Mexico, drinking water systems served only seven percent of the population. By 1979, coverage had reached 45 percent through the work of the government, UNICEF, and many PVOs as well, among them Catholic and Protestant missionary groups whose members spoke the indigenous Mayan language. Young engineers who were volunteers from the U.S. and sponsored by CREO acted as technical advisers. In 1980, the Spanish UNICEF Committee agreed to underwrite 30 percent of the cost of bringing drinking water to an additional 45 percent of the population. The remaining 70 percent will be paid for by the government and local communities.

## CONCLUSION

Cooperation is the word that should appear in bold type when the idea of a water and sanitation project is raised. Their objectives cannot be reached except through common effort. We in UNICEF expect to join our work with the aspirations and efforts of governments, communities, and the good will of our colleagues in private voluntary organizations.

## THE AGENCY FOR INTERNATIONAL DEVELOPMENT

Ross Bigelow

Let me emphasize the fact that I speak for a part of the Agency for International Development which works with private and voluntary organizations, or, as they are called more generally around the world, non-governmental organizations. I will try to address two questions. One has to do with money and the other with learning from past experience.

### FUNDING

#### AID and PVOs

The Agency for International Development operates as a bilateral agency supporting government-to-government programs throughout the world and has done so for many years. A number of these programs have been water projects.

AID has worked with private and voluntary organizations and indirectly supported water projects, primarily through grants. We have a priority in the area of water and sanitation and health which has been and will continue to be emphasized.

In the last fiscal year, over \$200 million was channelled through private and voluntary organizations for development, population, disaster programs, as well as other humanitarian assistance programs. At the moment, about 13 percent of the resources available for international development activity are directed through private and voluntary organizations. Only a portion of that is for water projects.

#### The Office of Private and Voluntary Organizations

Our office has no set criteria relating to sectors or to geographic regions. We respond to requests from PVOs for different activities. Water and sanitation projects are given the same priority as other projects.



We have a fairly active matching grant program, and I noted that among the PVOs participating here that quite a number have received funding for rural development programs. I would guess that something less than \$20 million a year has gone to water projects through PVOs. I think that the amount given in the future will reflect the demand for water project assistance rather than any priority we might set. As our resources become more limited, we will look for projects that we judge can be sustained over a period of years, whether water projects or any other.

PVOs should note that within AID, the Health Office has set a high priority on the improvement of water supply and sanitation. Their support of these projects will go, in part, through private voluntary organizations.

## EVALUATING PAST PROJECT EXPERIENCE

### Sources of Information on Past Experience

A number of publications have been produced recently that evaluate past experience in water and sanitation projects and offer help in developing new ones. VITA and CODEL have jointly produced "Environmentally Sound Small-Scale Water Projects: Guidelines for Planning." The American Public Health Association has provided a monograph on "Environmental Sanitation in Integrated Health Delivery Programs." The Technical Assistance Information Clearing House (TAICH) in New York has produced many publications including some that deal with water resource development.

AID has produced an "AID Impact Evaluation Series" for a number of countries. Additional country evaluations are being completed now. A recent AID Issues Paper deals with policy toward rural water supply. An AID sponsored conference will be held in late January 1982 which will assess various evaluations of drinking water and related sanitation projects. A report will be available through Dr. Daniel Dworkin in AID's Evaluation Office.

## What We Have Learned from Our Experience

### A role for PVOs

We have learned that PVOs have a role in the development of water and sanitation programs as they have unique advantages in their work. They are already at work throughout the world in remote areas. They bring their own financial resources. And finally, their years of experience are important in their future work.

PVO experience can be, and at times must be, enhanced by technical assistance from others and by other resources available from donor organizations.

## Problems Highlighted by Evaluations of Past Experience

### Motivation for Water and Sanitation is Low

The question is, who wants clean water? The expressed need for it is low in many parts of the world. Is it something being superimposed by foreigners? Does it involve an implicit paternalism?

There are educational and cultural problems too. We know that some villagers will run to the wells to fill their containers if they know a disinfecting team is about to arrive. How do we convince them to use totally unpalatable "clean water?"

### Maintenance Problems are Worldwide

Water projects often use imported pumps and other materials. For many reasons, replacement parts are often difficult or impossible to get. Unless pumps work and unless there is access to that water that has now been covered, water is more difficult to get than ever before. Frequently donor agencies insist on procurement policies that compound this reliance on imported supplies.

### Keeping Water Clean

There are many possibilities for contamination of safe water once it leaves its source, though the likelihood is less if there is a piped

supply. Even though the well project itself may be successful, the problem of safe water for the user may still persist.

### Creating a Sense of Ownership in the Project

Too often the beneficiaries of water and sanitation projects are not involved from the very beginning. We have found that without a sense of participation, a sense of responsibility for the success of the project, its benefits are much less likely to continue, whatever other difficulties there may be.

Perhaps we have overlooked the longer term impact of these projects on children. According to the teachers, children were cleaner and healthier after the projects were completed. Children are quite likely to recognize that other people feel that clean water is important, and this can make a difference.

It seems, then, that health education may, in the long run, pay as many dividends as actual water resource development projects. When PVOs are involved in health education as a component of health projects, they should work hard to enhance this greater awareness of the value of safe drinking water.

Now, I have gone on longer than I should. I thank you for the opportunity to do so.

## UNITED NATIONS DEVELOPMENT PROGRAMME

Hilda Paqui

Thank you, Mr. Chairman. Although I am here as a United Nations official, I am also here as someone who carried water on her head as a child. I cannot tell you how many times I was late for school because I had to fetch water first. I could not give that as an excuse for being late, so I would still get a beating at school.

Although I have come a long way from my rural beginnings, things have not improved there. Things really have not improved much back there. Quite recently I was in Ethiopia to talk with rural people because I am responsible for formulating the information program, and I wanted the benefit of their input.

While visiting a village, I realized I needed to use a bathroom. There was no bathroom in sight, or pit latrine, for that matter. Of course, I had used "bush latrines" before and was ready to do so again, except that it was after the harvest season, and there was no bush in this area. So I asked my guides, what do people do? They said, well, they just go. I said, wait a second, what about the women who need extra privacy. They said, oh, women go under cover of darkness, early in the morning or late in the evening. And there I was at 12:00 noon. It was a three-hour, uncomfortable trip before I could get to the next town to take care of the matter. So, this meeting is of special significance to me because serious minded people are interested in devising ways to deal with the problems of adequate water supply and sanitation.

### UNDP AND PVOS

UNDP and other organizations of the UN system are becoming increasingly aware of the potent role that PVOs can play in the development process in identifying needs and achieving results. Through meetings, workshops and ongoing consultations at the country level, we have tried to forge closer collaboration among people in the UN system and bilateral and multilateral as well as non-governmental organizations.

Representatives of UNDP are at work in 113 developing countries. They are engaged in ongoing consultations with PVOs operating there, as well as the host governments.

I want to point out that it is not by accident that the International Water Supply and Sanitation Decade has that particular title. The emphasis is on "international," because the United Nations was aware that it could not do it alone. Only if we are serious about effective collaboration can we be successful.

## STEPS TOWARD AN EFFECTIVE COLLABORATION

### Decade Donor Catalog

The Decade Donor Catalog is a listing of bilateral and multilateral organizations, banks, and funds which are or could be involved in the Water and Sanitation Decade, or are involved in projects which are in the same sector. PVOs will be included in the catalog.

Sixty selected PVOs which are operational or donor PVOs have been invited to participate in a survey by providing profile data about themselves. I know that some of the organizations represented here have received this questionnaire. Please respond, because if we are to work together on this effort, we want to know who you are and where you are going. Of course, we must tell you the same things about ourselves. We are especially interested to know what the indigenous non-government organizations are doing. We know much less about them, and it is you, the international PVOs, who can put us in touch with them.

### Project Referral System

The Donor Catalog is part of a newly created Project and Program Information System for the Decade also known as the Project Referral System. The system is described in the booklet issued by WHO entitled "Project and Programme Information Systems" (for a copy of the Project Data Sheet contained in the booklet see Appendix I). Projects proposed by governments, PVOs, and others in need of assistance will be matched with donors listed in the catalog.

## New Cooperation Guidelines

Another important result of the survey will be its use as a basis for cooperation guidelines that will be issued to all the UNDP representatives in the 112 countries I have mentioned. In this way, results will help shape UNDP's further PVO strategies in Decade-related activities, an important reason for helping us with the information we need.

## Dialogues and Workshops

In an effort to strengthen our work with PVOs, structured group dialogues have been held by the UNDP Decade coordinator, Dr. Bourne, with selected donor PVOs in North America and Europe. Many more will be held to exchange information and develop a systematic plan for UN/PVO collaboration.

We are also trying to strengthen cooperation through participation in workshops like this one. An encouraging result of such participation has been the creation of national action committees in developed countries to support the Decade. Dr. Bourne has already discussed this important development. In some cases, these committees combine PVOs, business and industry and research and training institutions. The first to be formed was WaterAid in the United Kingdom. Its planned activities include twinning of towns in the UK and developing countries for the purpose of water development, public fundraising and assistance to small self-help projects in developing countries. Denmark, Finland, Hungary, and Ireland are known to be in the process of forming similar organizations. It is hoped that many more will be formed in the near future.

The question raised by the keynote speaker is an important one. How are we going to get Uncle Sam, the Rockefellers, and the Fords of this country to give more active support to the Decade? Perhaps part of the answer can be found in a consortium of NGOs and industry to create a powerful lobby to get these institutions moving.

## FORGING COOPERATION WITH PVOS OPERATING IN DEVELOPING COUNTRIES

Though I have been talking about working with PVOs at the international level, we are especially interested in working with those in developing countries, both external and those which are indigenous to the country where they are operating.

## Women as a Special Group

If the Decade is to succeed, it will have important implications for women as they spend a lot of time and energy hauling water. At the same time, women have important implications for the success of the Decade, as they are responsible for family welfare. We have been given a mandate by the United Nations General Assembly to effectively involve women in the Water and Sanitation Decade.

One of the most successful examples of women working effectively has taken place in Kenya, where they have worked so successfully with non-governmental organizations. In 1975, rural women identified water as a priority. They were able to procure funding through leading Kenyan and external non-governmental organizations, in particular the Alberta Chapter of the Associated Countrywomen of the World, which raised funds publicly in Canada. This money was matched by the Canadian International Development Agency and was in turn matched by the Kenyan government. UNICEF made a financial contribution to this effort. Six or seven years later, the project has benefited close to five million people. By women mobilizing in this way, they have shown us how we can, in fact, have successful projects even though there is less money to go around. Efforts are underway to have this phenomenal experience shared with women in other countries on a technical-cooperation-among-developing-countries basis.

## Workshops and Information at the Country Level

UNDP will be holding workshops for indigenous PVOs at the national and possibly sub-regional levels in Southeast Asia in order to facilitate information exchanges and improved cooperation among them as well as with government and UN system Decade planners and thereby strengthen PVOs' roles and contributions in national Decade structures and programs.

Our information office has developed an information kit that includes an action guide to help PVOs and others in their own internal planning.

There is also the Decade film "Journey for Survival" which is available through UNICEF National Committees or UN Information Centers in each country. The film is a good way to start a meeting for a group seeking ways to support the Decade, because there is a genuine lack of understanding of the problems. You may flush down a toilet tissue with 25 liters of water and not think much about it. But 25 liters of water

has to last a family of four a whole day in a developing country. If the public understands this, we may be more successful in our fund-raising efforts.

### Special Effort to Contact PVOs in the Field

I want to mention that whenever we have gone out on field missions we have made a special effort to contact those PVOs working in the area to find out what they are doing and what their problems are. In our limited way, we can act as brokers between PVOs, the governments, and other agencies of the UN system.

### CONCLUSION

Although the record of UN/PVO collaboration in the past has not been very good, we are now making a conscious effort to improve that record. But, we cannot do it alone. You have to meet us halfway by telling us what you are doing and what you plan to do so that you can really become part of the Decade for Water and Sanitation.

We should not be talking just of joint funding. Important as it is, there are other areas of collaboration. You have acquired many skills over the years. So, let's share data and objectives, structures and projects. Let us pool our resources and make this Decade a success.



## UNITED NATIONS DEVELOPMENT PROGRAMME

Peter G. Bourne, M.D.

Long before the Water Decade came along there were many water and sanitation programs supported by the UN, AID, and governments of developing countries. What is different about the Decade from what was going on before? The answer is that we have transposed something that was basically a purely technical, bureaucratic entity into something that is now a politically charged entity.

When you say, "This is no longer a tolerable situation," you set a time limit beyond which this condition can no longer be allowed to exist. You endow the sector with political currency that forces people who have power, both in developing countries and in developed countries, to pay attention in a way that they didn't pay attention before.

PVOs can become the catalysts that activate governments to give a high priority to the Decade so that people with the technical expertise have the support they need to implement the programs necessary for its success.

There are two things, specifically, that I think PVOs can contribute. First, by increasing the percentage of their budgets they allocate to water and sanitation, they are following the lead that we have given in creating the Decade. They are in effect saying, yes, this is a valid priority that's been set. When you share this priority, you are communicating an extremely important symbolic message to developing countries.

The other important thing that PVOs can do is to mobilize the constituencies that you have in this country. Each one of you represents, in many instances, many thousands of people in this country and often in other countries. Some of you reach completely separate constituencies from anyone else. You can play an extremely important role in educating the American public about the importance of this Decade for Water and Sanitation.

To just give you one simple example, Save the Children has a Christmas card program somewhat similar to UNICEF's Christmas card program. The central theme of their Christmas card program this year is the Water

and Sanitation Decade, and this means that they have brought the Decade and its importance to the attention of their many thousand supporters across this country.

Now to the second item. Although we are obviously very committed to the linkage of water with health, we have to deal with the problem the way that we find it on the ground and at the village level. As Mr. Bigelow pointed out, most village people don't make the association between water and health.

People in most villages in the world want water and are committed to such programs because they want reasonable, easy, convenient access. This is something that has to be recognized, and it is around this issue that you mobilize financial support, contribute labor, and the variety of other community elements that are essential for the program's success.

Similarly, at the national level in a lot of developing countries, health is not a very high priority. Telling government leaders that providing clean water is going to improve people's health doesn't necessarily sell the idea very effectively to them. They are interested in water for its economic consequences and, in most instances, that means water for irrigation and the improvement of agriculture.

Whether we like it or not, that is the way it is. If we want the Decade to be successful, I think we have to be realistic and link our efforts to provide water for human consumption to the water priorities that already exist--that is, the agricultural sector. To develop the Decade's program to fit the perception in many developing countries requires us to think in terms of their total water resources.

This is something that I think PVOs often understand better than the UN, because PVOs tend to focus more on integrated development than does the UN system, with its various fragmented organizations each focusing on just one sector.

Thank you.

## THE WORLD BANK

John Kalbermatten

Mr. Chairman, what I would like to do, in fact, is simply make some suggestions. I have some ideas about what PVOs could do, but I have some very definite ideas of what the Bank could do, and that is essentially what I would like to tell you.

### BANK ACTIVITIES FOR THE DECADE

#### Finance

We in the Bank have financed water supply and sanitation projects for about 20 years now. It was a sector that grew very slowly until the very early 70's. Our lending rarely exceeded \$100 million a year, though we now average something like \$700 million to \$1 billion a year in water supply and sanitation lending. We lend generally something like 35 percent to 45 percent of the value of a project.

As far as the Decade is concerned, we anticipate that our program will grow to some extent, not as much as some of us in the sector would like, as there is a certain competition among the various sectors in economic development. Over the Decade we might be making available an average of \$1 billion a year.

#### UN Joint Activities

In addition to funding water supply and sanitation projects, we are also participating in some of the UN organizations' joint activities. In cooperation with WHO, we have allocated substantial resources to a program that is assisting countries in Decade planning, in identifying projects, and in coordinating studies that hopefully will lead to actions in support of the Decade.

## Lending for Peripheral Activities

We are also trying very hard to lend for water supply and sanitation projects that include peripheral but very important aspects that will make these projects effective. I am referring to activities that can help provide the necessary motivation, information, and education so that people understand why they should use clean water or why they should use a latrine.

A tremendous amount of money has been invested over the past decade in facilities which no longer function efficiently or at all. Most Asian cities have interrupted water service, and interrupted water service is a danger as we all know. In many places you find sanitation facilities out of order or so filthy that nobody wants to use them. This is a serious problem because money has been invested with little or no benefit to the recipients.

Last year we invited various PVOs, UN agencies, and others to a meeting to decide how water supply and sanitation investments could be more effective. Unfortunately we did not receive clear-cut answers that the Bank could incorporate into its funding for water and sanitation projects. This is an area PVOs might consider of some interest.

## WHAT CAN PVOS BRING TO PROJECTS WHICH LARGE ORGANIZATIONS CANNOT

### Limits of the Bank

The Bank is known by and large as an organization that finances large, massive projects. Some of you have accused the Bank of doing things wrong, being insensitive to the needs of people, and so on. You know those criticisms as well as I do, although I am at the receiving end of them.

I think we all plead guilty to having disregarded some of these aspects in the past. But I believe that over the past few years the direction of water supply and sanitation lending has changed dramatically. Better than most organizations, the Bank has come to understand that money is not the major problem in developing water supply and sanitation.

The problem is basically a lack of understanding, a lack of trained staff, and a lack of community participation. In some of these areas, a large institution like the Bank cannot be very effective. There is

no way that an institution like the Bank can devote the time and attention necessary to effectively establish village water supplies because our major purpose is the transfer of large amounts of money to developing countries.

### PVOs' Strengths

PVOs have the advantage of being grass roots organizations that can have direct contact at the village level. I think it would be largely for the Bank and other lending institutions to provide funds and for the PVOs to act as the agency implementing and designing these projects.

### Supplementing Each Other

We have specific roles to play. The Bank's function is to transfer massive amounts of funds. We deal with governments, and we do not apologize for that, as it is the only way we can participate in the improvement of the economies of these countries.

Many PVOs, in contrast, do not deal with governments. In fact, some of them have made it rather clear to me that under no circumstances will they ever be associated with anything that smells even vaguely like government approval. This is a problem, but I think that it can be overcome.

### Possible Role of Governments

There is no reason why it should not be possible, at least in a fair number of countries, for governments to channel funds which they receive from the Bank through either municipal or state organizations to those communities where the PVOs work. It does not have to be a transfer of cash from the Bank to PVOs. I don't think that will ever happen. But, there are ways in which one could consider a transfer of funds to local PVOs.

### Large Organizations Need to Know PVO Successes

We know very little about the actual successes that PVOs have. We do come across good projects, usually by accident. We occasionally hire some staff of PVOs as consultants to prepare Bank projects. If we find

out somebody is doing a good job in some country, we try to replicate or infuse some funds through the government to enlarge the scope of these projects.

### PVOs Need to Disseminate Information

I think there is a need for the PVOs to disseminate information on successful project implementation. I had the occasion yesterday to talk to our friends from Agua del Pueblo in Guatemala. They explained how they organized a community which includes, among other things, the presentation of a play on how a community implements a water supply project. It would be interesting for someone to videotape that kind of an effort so the rest of us who do not go into villages can see how one can organize communities.

### Bank Can Urge Countries to Use PVOs

We in the Bank will never organize, but we can tell governments how they can go about it. We can even suggest to governments that they ought to use private voluntary organizations for that kind of effort as they are more likely to achieve results in creating rural water supplies.

### PVOs Can Ask for Joint Support

PVOs who work in countries implementing water supply and sanitation projects can, if they choose, suggest to governments that they use some Bank funds to support PVOs or to support the communities where PVOs work in water and sanitation programs.

### Bank Lending Is Flexible

We have lending programs that have fantastic flexibility. We make sector program loans that lend a certain amount of money, \$50 million to \$100 million, to a state organization responsible for all water supply and sanitation in a given area. We do not look at every one of these projects. In fact, when we make such a loan we don't even know where some of those projects are going to be. They are being developed by an organization or by the community.

I see no reason why projects developed by PVOs should not get into that pipeline. Unless people like me happen to know that a PVO is working in Rajasthan or in Gujerat or wherever, there is no way that I could suggest that such a project be included. But the PVOs who are on site can inform the government, and the government can ask the Bank. We have no problems with that. There are opportunities, but we must try to inform governments as they are the ones who decide how funds will be used.

### How the Bank is Working with PVOs

The Bank has many programs with PVOs, including a committee which attempts to inform PVOs of our work. We also hope to organize some meetings specifically on water supply and sanitation, so we can tell you where we are active, where we are making loans, and where loans are being developed. You must also inform us where you are working so that our project officers can ask themselves the question, "Is this an opportunity to bring PVOs in?"

We are perfectly willing to tell you how the Bank operates and how projects are being prepared. If any one of you feels that a day-long session would be useful on just how these projects come about, we will be happy to arrange it so you will have a better understanding of the Bank's process.

Those are short-term considerations. In the long run, it is not really that important whether PVOs and the Bank can establish an immediate, direct relationship. I said before, money is not the fundamental problem. There is not a loan in the water supply and sanitation sector that the Bank has made that has proceeded according to the time schedule which we have agreed upon with the government. Why? Because people have to implement the projects and, for many reasons, they are not ready for the projects.

### SUMMARY

Sometimes we push because we want to get the money out. Sometimes the government pushes because they want to receive the money. One could do far more if there were enough people capable of implementing these projects.

Our lending program goes up and down. In rural areas lately, it has been going down because our people have been discouraged with the lack of permanent success of the water supply projects which we have financed.

Let's remember that in the long run the greater the number of people that you can motivate, or that you can train, the greater will be the funds that eventually flow into that sector because it will become an attractive possibility for investing funds.

Thank you.



## DISCUSSION

We would now be glad to have you ask questions of the panel.

SPEAKER: I would like to ask Dr. Bourne to give his ideas on what is impeding popular support of the Decade in the United States.

DR. BOURNE: I have asked myself this question on several occasions, because the success here falls very far short of what has been achieved in the European countries, and it is certainly not from lack of trying.

The general level of awareness and interest in development issues in this country is substantially lower than it is in most European countries, and a lot of that has to do with our absence of a colonial past. I think that is the most significant reason. There just is not that interest in what is happening in the developing world. People just don't care.

I think also we have logistical problems in a country this large. Water service responsibilities here are extremely decentralized, whereas in Britain, for example, you have got, I think, ten water authorities. The heads of those water authorities can be brought together in London on a few hours' notice. Most of the PVOs are based in that same city, so you can almost instantaneously have a meeting of all the key people. And that kind of thing is virtually impossible here.

Also we have worked particularly with professional organizations that had a pre-existing awareness of this area because it is their area of professional expertise. Though they have a great deal of professional interest, they don't have the kind of grass roots network that is really necessary to mobilize grass roots support.

Also, although PVOs have, in fact, probably been the most viable component of this effort so far, we really have not been able to jell that as effectively as we might. I hope this meeting might be one of the beginning steps in helping to do that.

MODERATOR: Are there any other questions? Yes.

SPEAKER: I heard the figures for the amount of money that PVOs are investing overseas, but I am very curious to know how many people are working at the grass roots level.

MR. BIGELOW: American PVOs have, in many cases, extensive networks of people in the field. In other cases they don't have a physical presence at all and operate more as a funding agency or work through indigenous groups.

Maybe the question ought to be, how many people are out there who are committed and interested, going beyond PVOs to indigenous organizations, local governments, and so on. So, there are quite a number of people who would be involved. As far as the PVOs themselves, tens of thousands with respect to American private and voluntary organizations.

SPEAKER: I would like to hear from three or four of the organizations just to get an idea of the order of magnitude; let's say AFRICARE, CARE, Peace Corps, to name three.

SPEAKER: I speak for CARE on this matter. We don't have numbers readily available on the number of people world-wide. I myself work in the African region, and I can tell you the countries where we have projects and approximately the number of international staff in each. Those people are not in every case working on our water projects only. Currently we have water related projects in Africa, in Tunisia as mentioned by Mr. Bigelow. That will be phasing out soon. We have a fairly large operation there, although there are only two or three international staff there, and a very large Tunisian staff, both at the operational level and at the managerial level.

We also have programs in Sierra Leone and Liberia which are also small projects where only one or two or three internationals have roles in the water supply project. We will have both wells projects and spring improvement projects in those countries. So once again the international presence is quite small. The biggest water supply projects in Africa at present are in Mali where we have several large projects too, funded under grants from AID, and one that is just getting underway, financed by the Dutch government.

We have got something on the order of four international staff dealing with the management. Again, most of the actual field work is done by national staff people.

We have also got a Kenyan water supply project. In that project we have an international presence of three people, but they are more involved in the administrative and supervisory sort of role. All the technical inputs are provided by the government in Kenya, and all labor inputs are provided by the village.

We also have two wells projects in Cameroon, where we have three to four people involved in the wells and health education components of those projects. So overall we are talking about 12 to 15 international people in Africa working on our projects, but much larger national staff contingents. We also have projects in Latin America and Asia. I could not give detailed information on what we are doing there, but we could get that information for you.

SPEAKER: You do have a lot of counterparts, so you do have a multiplier effect. This is what I was driving at. As Dr. Bigelow pointed out, it is not only the immediate staff that counts but the counterparts and where you are located within the institutional framework within the country.

MODERATOR: Yes, you have another question?

I wanted to respond to that question also for AFRICARE, similarly to CARE. We make a great effort to build on the abilities and the resources of the countries in which we work in Africa, and we try to keep to a minimum the supply of expatriates.

We do work with the governments of African countries, and we also cooperate with any number of other organizations, including governmental and nongovernmental organizations. In terms of personnel, we have about 40 people in Africa, some of whom are generalists representing AFRICARE and working with African governments in developing projects while others are technicians.

Our biggest concentration of people in water and sanitation projects is in Somalia where we have a number of mechanics and sanitary engineers. But otherwise, to the largest extent possible, we try to build on the people that we find in the countries.

MODERATOR: There was another question back there.

SPEAKER: Some of the more successful projects involving community participation have been rural development projects where funds are not set aside specifically for one sector but are available for different villages that want a water system or a bridge or a school.

It seems to me that when funds are available to respond to the expressed need of a community that is already motivated, it can have a much greater degree of success.

I am wondering, shouldn't there be more effort to involve integrated rural development monies or projects in the Water Decade? Is it possible within the organizational framework of the Bank and others?

MR. KALBERMATTEN: It is not only possible, I think it is desirable. And when I refer to the fact that recently the percentage of water supply components has been going down, it is a reaction to the complications which so many of these rural, so-called integrated rural, development projects have run into. We shy away from the designation "integrated" because some of us have called them Christmas tree projects. Anybody that had a good idea that could be added to the project sort of hung it up on the tree like a Christmas decoration, and some of our trees have not been sturdy enough to support all those decorations.

So we have become more selective. In the process of being more selective, Mr. Friedman, in particular, has developed a guideline for our colleagues who handle these rural development projects in order to give them more confidence in water supply and sanitation projects. I think we are seeing a return to rather heavy financial allocations to water supply and sanitation as part of our rural development efforts. This time, I hope we can sustain it because it is built on a somewhat stronger foundation than we had in the past.

But indeed, I don't think it makes much difference in the rural areas around what one builds a project, as long as it is built around the community's participation. And if the community wishes to build a rural access road and then maybe a school and then water supply, that is perfectly all right as far as we are concerned. If the community wishes to start with water supply first, of course, those of us in the water sector are delighted.

But, I think the important thing is that the community be involved and that the funds are indeed available. And they can be made available. There has been a great increase in the number of projects that are sector program loans which provide funds so that the communities that are the most interested, sometimes the most capable, do have access to funds to undertake those projects.

MODERATOR: Are there other questions?

SPEAKER: I would like to comment on Mr. Friedman's questions concerning involvement of staff overseas in water and sanitation projects. I am associated with the Peace Corps, and we have approximately 380 volunteers in 30 countries working on water and sanitation programs.

We have an additional 900 volunteers working in health, education, and community participation in approximately another 50 countries. These volunteers are supported by about 50 staff who manage some of their activities and also provide program support.

One issue that we look at in putting these volunteers in the field is the involvement of counterparts in our programs. These counterparts either come from the government with which we are working or the communities.

I would like to say, also, that we do appreciate the support from PVOs, from UNICEF, from the World Bank, from the Pan American Health Organization, and from other organizations. We are always interested in knowing what other organizations are doing and what resources they might have that we can work with where we can provide technicians and community development personnel.

MODERATOR: Are there other questions?

SPEAKER: Yes, thank you. With reference to the identification of projects that might be funded directly or indirectly through the Bank, I believe Ms. Paqui held up the brochure from WHO on the project identification program. If I remember correctly, there are several examples of how to describe a project that would be channeled through WHO, and I don't know who else, to obtain funds.

Could you speak to that, Ms. Paqui, and how it might get to the Bank or to other possible donors?

MS. PAQUI: Yes. As you correctly point out, in this project and program information system, which I prefer to call the project referral system, there is an outline or a model for a project proposal. This is linked with our donor catalogue. There is a donor catalogue, again, which WHO has issued, and it is updated from time to time. When WHO Geneva receives proposals, they match them with the donors in the catalogue so we do have a mechanism already.

MODERATOR: Yes. Mr. Kalbermatten?

MR. KALBERMATTEN: We do get these forms at regular intervals in duplicate sets. One set is sent to all regional staff responsible for projects. I keep one set in our office for reference.

This means that you, the PVOs, should use this very form to discuss a proposed project with the government or other donors. Governments are encouraged to use that form to talk to various embassies, bilateral aid agencies, and so forth.

The idea is not that the governments come to WHO or the Bank, but that they use a similar format. It makes it easier for all of us to understand when we see the same kind of description all the time. Also, the intention was, and we all cooperated in preparing this particular format, to provide all the information that bilaterals or donor agencies or financial institutions are interested in, but not more.

MODERATOR: There is a question there in the second row. Yes.

SPEAKER: PVOs also have to answer questions regarding cost-benefit for a project. In the areas where we design our projects, usually the people with the greatest need have the least to pay for what they need.

We still have not been able to come up with a formula which we could use to explain to AID, Lilly, or anybody else, the cost-benefit in putting in a well for \$10,000 for a community whose yearly per capita income is \$30. How do we answer that so that we can satisfy the Bank or any other donor?

MR. KALBERMATTEN: Let me make a very categorical statement of that, and I am prepared to be quoted, including to Mr. Clausen if you will.

During the time that I have been active in the Bank, about ten years now, it has never turned down a project because we could not demonstrate a satisfactory economic rate of return. That is usually, in the economists' parlance, how one determines the effectiveness of a project. We know that it is practically impossible to demonstrate, on the basis of a quantification, the benefits of a project. We have never turned a project down because the economic rate of return was too low.

Now, what we insist upon is that a project be least-cost to provide an identified demand, because we do not wish to finance a project that costs more money than is absolutely necessary. We are also looking very carefully at how much the community can, in fact, afford. We do not wish to finance projects which are unaffordable. We believe that a

community ought to attempt to provide services at tariffs which are affordable to individual groups, that is, that someone who has a low income should be able to buy sufficient water for basic needs at a cost he can afford.

But what about rural areas, where people don't even have a cash income? How can they afford it? Institutionally the Bank, and quite frankly, I personally, would not ever recommend the installation of a water system that cannot be maintained by the community. Governments never have money when you need it, whether it is the United States or Zimbabwe or whatever.

Don't depend on the government to operate or provide for the cost of maintenance of a rural water scheme. Design a project that a rural community can operate itself. We finance all kinds of rural water supply systems where the government, in fact, provides grant money for the construction.

In the ten years I have been associated with Bank projects, I have never had one turned down for that reason. If there is one, come and see me.

MODERATOR: Are there other questions? Yes, in the second row on this side.

SPEAKER: It has been my impression, and please correct me if I am wrong, that the Bank does indeed have all sorts of loanable funds subject to certain criteria at the community level.

Let's assume further that many, if not all, of the PVOs and Peace Corps representatives here today are indeed successful in meeting these criteria.

My question is: what comparable effort is taking place at the ministerial level? That is where the reluctance takes place, or the priority is not being dramatized to the same effect. In the final analysis all of the support at the community level is not going to amount to very much unless there really is comparable support at the top. Because the bottleneck is usually at the top of the bottle, isn't it?

And, who is working on that problem?

MODERATOR: Mr. Kalbermatten?

MR. KALBERMATTEN: You are indeed asking the most difficult question to answer. We work on it in a variety of ways. It is for us in the Bank probably the most frustrating area of our work. It is a frustrating area because we from the developed countries have been phenomenally successful in convincing our colleagues in developing countries that they should insist on nothing but the best, and we have never really sat down and examined what is the best.

As a consequence, the best is identified as the same solution that is acceptable to the inhabitants of New York or London. To convince a minister to provide his communities with a water supply system or a sanitation system that does not include house connections, multiple type house connections in water, or a water-borne sewage facility is sometimes almost impossible.

We are trying. We have made, I think, over the last couple of years very, very significant progress in many countries where even ministerial planners and finance ministers are accepting the fact that just as in our countries, it might be better to start with lower service standards and then upgrade them. But, it is not an easy task, and everyone in the Bank who deals with water supply and sanitation faces that particular issue every time we start developing a project.

The only thing I can say is, it is an effort that is continuing. We have to talk to the ministers; we have to talk to our fellow engineers. I sometimes find that a minister says, I would like to have known this years ago, because my engineers say it is not possible.

We have done a lot of damage, I believe. I think we are the ones who have to make just as great an effort in educating or in providing information that leads ministerial planners to conclude that they can have water and sanitation systems at lower cost. Basically the answer I get is we are not going to provide water supplies in the villages because we cannot afford it. People feel very strongly about it. They believe it. I think it is important for us to demonstrate, in fact, that one can crawl before one walks.

This might not be a satisfactory answer to you, but there is no short-cut solution, and all we can do is keep plugging away.

MODERATOR: Two more questions.

SPEAKER: Okay. Well, what I would like to do is just make a few laconic observations here because I see that there are a lot of questions which are focused on the World Bank. I would like to point



out a caveat here. When I was in Geneva, with the International Council of Voluntary Agencies, we organized a group in liaison with the World Bank and the NGO groups to pursue mechanisms for collaboration with the World Bank. We have been meeting this week. We have met over the past year with various sections of the World Bank to discuss this collaboration for the future and to exchange information.

We find that there is a great lack of information concerning both the NGO community and the World Bank's activities. I suggest that PVOs or NGOs who are interested contact one of the members of that group to find out where we are in pursuing this kind of mechanism for collaboration. I think we have to be very, very careful here. The World Bank does have a lot of money. The World Bank works with governments, does not work with the private sector, does not work with NGOs.

We cannot submit projects or proposals directly to the World Bank. We have to work with the host governments either in the formulation of the program or project, or somehow catalyze the kind of activity between the government and maybe an intermediary so that the project could be submitted to the World Bank. There are mechanisms that we are pursuing, I do want to say that. The money is not available, is what I am saying, and I think you said this adequately at the beginning of your statement.

Concerning UN organizations, we should be clear about who can submit projects to the UNDP, UNICEF, etcetera. Do these organizations need some official recognition with the UN? If they do not have official recognition, such as category 1 or 2 status, what can be done so that we can facilitate a linkage with the NGO involved?

Now to the last point, to be very brief about this. I think there is a serious gap in information and relationships between American NGOs on one hand and European and LDC NGOs on the other. I would like to see forums, not only of this kind but a greater movement on both sides of the Atlantic, to come together and discuss common concerns and, perhaps, to seek ways of cooperation with the UN community, World Bank, and with governments.

Thank you.

MODERATOR: A series of excellent points. I think Ms. Paqui did give us some information about part of the question that you have raised in regard to submission of projects.

MS. PAQUI: We do have the project referral system which is exclusively a Decade mechanism for matching projects in need of funding or assistance with donors. It could be technical, not necessarily financial. But there are other mechanisms.

UNESCO has what they call a co-action program, and this is a listing of projects which need assistance. An organization and its project are twinned with communities or organizations that are interested in funding specific projects in specific countries.

These are limited mechanisms, but that is what we are working with at the moment.

MODERATOR: One last question of the panel. Yes, center.

SPEAKER: I am not sure to whom this is addressed, perhaps to all of you. This may be a question, or a request, or a challenge.

I think there is a consensus among the people who have participated in this workshop, at least those whom I have spoken to. While these three days have been extremely valuable, we just really scratched the surface of three very broad topics called planning, implementation and evaluation, which represent collectively just one of the million ways in which you could cut the pie of rural water supply and sanitation.

There are a number of other ways we could have defined the topics, a number of other areas that could have been addressed in this conference that were not because of the shortage of time. And there are other issues that came up, as well.

There is a lot of interest in these other issues and other ways of looking at these problems. There are a lot of people in these organizations that are doing useful things in water supply and sanitation, and they are interested in doing more useful things. But, in many cases, they lack a lot of information, a lot of experience, and access to the sorts of assistance that they require to do more successful projects.

My question is whether any of your organizations--including the two institutions which sponsored this and perhaps some of the PVOs which are participating--have plans in the coming year or two to have more conferences involving PVOs to address such things as the selection of technologies, training of personnel, project, and finance. Specific-

ly, do you lend money or do you give it away to a project? Other areas to explore include health education and grant writing, both of which have come up a number of times this afternoon. These are very specific issues, very much more closely focused issues, that I think we would all find very useful and that we really only touched on very briefly in these three days.

And one last question, or recommendation. In thinking about this sort of workshop, consider the wisdom and the value of including, in addition to the PVOs which are based in the U.S., those PVOs based in developing countries which are run and staffed by nationals. They are much more familiar with the problems and are doing some very valuable work, but they desperately need this sort of technical assistance and this sort of orientation. This workshop has been extremely valuable. I want to thank the people who put this together. I think that in many ways it is just the beginning for something that could be even more valuable during the Decade.

MODERATOR: Is there anyone who wishes to respond to the points that have been raised?

MR. MORGAN: Yes, I would like to, from the National Council perspective. We realize this is, in fact, just scratching the surface. One of the concepts that's come as a result of meetings like this has been that PVOs have asked us to do several things. One request has been for us to capsule the essence of a conference like this and do it overseas, maybe on a regional basis. As has been suggested by our CRS representative, such a conference would have representatives of PVOs, not only U.S. but local and European that are working in those countries, along with host nationals.

We would hope to bring some technical expertise from the United States and in cooperation with regional and local expertise try to stimulate the process of project development.

And one other thing that we will be doing as a follow-up to this conference, is put together--everybody loves it--a questionnaire for the various PVOs, basically to develop a supplement to our directory which identifies which organizations are involved in water and sanitation in countries around the world. The directory begins to give you, as a staff person, an opportunity to understand the breadth of relationships between the different organizations.

Those are the two types of follow-up that we are looking at at this point.

MODERATOR: Thank you, Mr. Morgan. And Mr. Kalbermatten, you had another comment.

MR. KALBERMATTEN: Just to answer quickly, yes. We have project specific meetings with PVOs. We had a recent one in Europe which dealt with development, testing, and evaluation of rural water supply hand-pumps, a very important topic given the fact that energy prices keep going up.

I find, at least from my selfish point of view, that meetings which are topic oriented are the ones that my colleagues and I are most interested in. We like to sit down with PVOs, not to talk about the general philosophy of aiding developing countries, but to talk about specific projects. What can we do to improve handpump performance? Where are you working, where could you test the handpump, where can we participate?

We plan to have more meetings of that sort, not just restricted to that topic. Perhaps a questionnaire could identify some of the interests that exist amongst the PVOs, where they would like to have meetings, and how we might participate.

MODERATOR: I think Mr. Bourne has a comment.

DR. BOURNE: Yes. In UNICEF it is normal that, during the Executive Board, NGOs and private groups have a chance to talk not only about water and sanitation but on all aspects that are covered by the program.

So, the door is open for you. Thank you.

MODERATOR: And now, we have one other comment from the UN.

MS. PAQUI: We have already held such dialogues with PVOs in the USA, Canada, and in Western Europe, and we plan to hold more. We are prepared to take part in any workshops organized by PVOs or other groups to continue this dialogue.

MODERATOR: I want to express the appreciation of the Chairman and the appreciation of the group for the participation of the panelists this afternoon.

## CLOSING

Morton S. Hilbert

I want to express my appreciation and that of the entire group for the participation of the panelists this afternoon. Because of the shortage of time, I will limit my closing remarks to a few items that I would like to bring to your attention.

I am uneasy with the idea that we should, perhaps, set "easy" goals. I feel that if we cannot get people to run with us, we should not go ahead with water and sanitation projects. We know that community involvement is important and this may mean that we need to enlarge our objectives in water and sanitation projects and emphasize the health component first, so that people will see the connection between health and water and sanitation.

Although this is a conference on water and sanitation, we have not paid very much attention to the sanitation side of the Decade. Unless we do, many communities may have water at the end of the Decade but have as much disease and as many deaths as they had before. We may have to re-order our goals so that the objectives of both sanitation and improved health are achieved through our work in water projects.

A major purpose of this conference was to strengthen cooperation among PVOs and to help increase their contributions to the Decade. I hope the conference has given you the chance to come to know representatives of other PVOs, of official agencies of this country, and of international organizations.

I have enjoyed being your Chairman, even though I was not able to deliver my seven pages of prepared remarks. I hope that next time I will be given enough time to be a professor and also be the first one on the program.

Thanks for coming. We look forward to seeing you at another conference.

## REFERENCES FROM FACULTY PRESENTATIONS

- AID, Bureau for Science and Technology, Project Impact Evaluation Reports. Tunisia, Peru, Thailand, Kenya, Korea. Other titles to follow.
- APHA, Environmental Sanitation in Integrated Health Delivery Systems, American Public Health Association (International Health Programs Monograph Series No. 4), Washington, D.C., 1981.
- Development Alternatives, Inc., The Development Impact of Private and Voluntary Organizations: Kenya and Niger, Washington, D.C., 1979, under AID No. 39 contract Otr C-1383.
- Dworkin, Daniel, Assessing Evaluation of Water and Sanitation projects. Report of Conference, January 1982. Through AID's Evaluation Office.
- International Drinking Water Supply and Sanitation Decade Directory, World Water, 1-7 Great George St., London SW1 P3AA, 1982.
- PAHO, Environmental Health Activities of the Pan American Health Organization: Water and Sanitation Decade, Environmental Impact Assessment, Control of Environmental Hazards, Cooperative Programs, Special Caribbean Activities, Environmental Series No. 1, Pan American Health Organization, Washington, D.C., 1981 (also available in Spanish).
- Tillman, Gus, Environmentally Sound Small-Scale Water Projects. Guidelines for Planning. Codel & Vita, 1981.
- Vanderschmidt, H. & Lent, Systematic Project Design, A Handbook for Volunteers, Center for Educational Development in Health, Boston University, 1981.
- WHO, Project and Programme Information System (for International Drinking Water Supply and Sanitation Decade). Geneva, 1980.
- Film "Journey for Survival". Produced by United Nations Development Program, 1981. In Developing Countries available for purchase or loan from UN Information Centers or UNDP Resident Representatives. In the U.S. distributed by Barr Films, 3490 E. Foothill Blvd., Pasadena, California 91101. Write for rental price. Purchase in U.S. approximately \$400.00.

## CASE STUDY RESOURCE MATERIALS AVAILABLE TO PARTICIPANTS

Boston University, Center for Educational Development in Health. Systematic Project Design: A Handbook for Volunteers, Boston, August 1981.

This document covers the planning, implementation, and evaluation process for delivering human service programs. It is written primarily for volunteers but can be used by any organization attempting to effectively organize and carry out workable programs.

Brush, Richard E., Wells Construction, ACTION Peace Corps, Washington, D.C., 1979.

This how-to manual was designed as a working and teaching tool for development workers in field activities with information presented in a form easily adapted to on-the-job needs. It brings together in one volume the principles of well construction and outlines practical techniques currently being used and tested around the world.

Cairncross, Sandy, Carruthers, Ian, et al., Evaluation for Village Water Supply Planning, John Wiley and Sons, New York, 1980.

Practical advice and information on the various components of village water supply projects is presented in this publication which should be of particular use as a reference for those working in the field. Importance of in-the-field designs and implementation of evaluation is stressed.

DHV Consulting Engineers, Shallow Wells, P.O. Box 85, Amersfoort, The Netherlands, 1979.

This beautifully illustrated publication is based on the experience gained with the construction of some 750 shallow wells in Tanzania. Though specific to the sparsely populated area of East Africa, information contained should be helpful for anyone planning construction of shallow or medium-depth wells in developing countries.

Pacey, Arnold. Rural Sanitation: Planning and Appraisal. London: Intermediate Technology Publications Ltd., 1980.

This booklet, which was written for hospital staff and community development workers in Third World countries planning programmes to improve sanitation and hygiene in rural areas, examines two important concepts: the appraisal of the particular communities' skills, resources, and needs, and the planning of village-level technical assistance in support of health education.

If you are a W&S person, marooned on a desert island, be sure you have with you the following two Ross Institute booklets:

Cairncross, Sandy and Feachem, Richard, Small Water Supplies, The Ross Institute of Tropical Medicine, London, 1978.

A simple but succinct description of methods for building water supplies to serve small communities. Simple illustrations and line drawings are excellent.

Feachem, Richard, and Cairncross, Sandy, Small Excreta Disposal Systems, The Ross Institute of Tropical Medicine, London, 1978.

This is a new edition of the first version issued 25 years ago. The immense cost of conventional sewerage has focused attention on alternative methods. The booklet lucidly describes and illustrates the range of technologies available for small communities. Design formulae are included.

Winblad, Uno, and Kilama, Wen, Sanitation Without Water, Swedish International Development Authority, Stockholm, 1980.

For the large majority of the world's population that still has no access to piped water, a flush toilet is not an alternative to consider. This booklet discusses various methods of excreta disposal without use of water.

World Bank Studies in Water Supply and Sanitation--Appropriate Technology for Water Supply and Sanitation Series:

#1 Technical and Economic Options, by John M. Kalbermatten, DeAnne S. Julius and Charles G. Gunnerson, December 1980.

This report discusses the program planning necessary to implement technologies available to provide socially and environmentally acceptable low-cost water supply and waste disposal.



- #1a A Summary of Technical and Economic Options, by John M. Kalbermatten, DeAnne S. Julius and Charles G. Gunnerson, December 1980.

This paper summarizes the broad technical, economic, health, and social findings of the research and discusses the aspects of program planning necessary to implement the findings.

- #2 A Planner's Guide, by John M. Kalbermatten, DeAnne S. Julius, and Charles G. Gunnerson, December 1980.

This report provides information and instruction on how to design and implement appropriate technology projects based on the findings reported in Technical and Economic Options. It provides guidelines and design tools for the engineers and sanitarians responsible for planning and implementing sanitation projects.

- #3 Health Aspects of Excreta and Sullage Management--A State-of-the-Art Review, by Richard G. Feachem, David J. Bradley, et al. December 1980.

This report sets out to provide information about the interaction between excreta and health so engineers and planners may make more informed and rational decisions regarding the effects on disease of improvements in excreta disposal and the ways in which particular excreta disposal and reuse technologies affect the survival and dissemination of particular pathogens. It has been written with an emphasis on presenting the complex, and sometimes contradictory, evidence as clearly and concisely as possible.

- #5 Sociocultural Aspects of Water Supply and Excreta Disposal, by Mary Elmendorf and Patricia Buckles, December 1980.

This report examines the social and cultural factors influencing people's responses to water supply and excreta disposal technologies. It describes the methodology and questionnaire used to investigate how sanitation and water supply problems are perceived and to what extent people would be willing to participate in projects to improve their existing situation. It suggests an approach that can be used by planners to integrate social and cultural considerations into project design to ensure the introduction of water supply and excreta disposal technologies that will be accepted, properly used, and maintained.

#11 A Field Manual, by John M. Kalbermatten, DeAnne S. Julius, and Charles G. Gunnerson, December 1980.

This report provides information about the selection and construction of on-site sanitation systems reviewed in the Bank's research project. It was written for the community worker, sanitarian, extension worker, and others without background in sanitary engineering but who are responsible for the implementation of sanitation programs.

World Bank -- Poverty and Basic Needs Series

Poverty and Basic Needs. September 1980.

A series of appraisals setting forth the basic needs of the world's poorest.

Meeting Basic Needs: An Overview. 1980.

Policies and programming for basic needs.

Water Supply and Waste Disposal. 1980.

An outline of what constitutes basic needs in water supply and waste disposal in Third World countries.

## FUNCTIONAL INDEX

The Functional Index was developed to help PVOs find information in terms of concerns they expressed at the Conference. The Index is not complete, but the most obvious and relevant items have been selected.

### Help With Money Resources

1. AID, Economic Support Fund, Bloom, pp. 13, 15, 16  
Health Office Bigelow  
PVO Office, Bigelow, pp. 97, 98
2. Approaches to host government and donors.  
Lucas, p. 9  
Results of Workshop on Implementation, p. 62
3. United Nations Project Data Sheets, See Appendix I  
for WHO Project and Information System.
4. UNESCO
5. UNDP, WHO, Paqui, pp. 103, 102, 118 and Appendix I
6. UNICEF, emergency and regular, Ferrari-Bono, pp. 92, 93
7. World Bank, Kalbermatten, indirect Bank funding, pp. 108-113

### Technical Help

1. Choice of water technologies, Briscoe, esp. pp. 80-82
2. Considerations in technology selection, see McJunkin for
  - 1) choosing a source, pp. 30, 31
  - 2) digging or drilling, pp. 37-39
  - 3) handpumps, pp. 34-37
  - 4) disinfection, pp. 39-40
3. Explanation of WASH services, Preface, pp. 1-2, Beverly and Coghlan, p. 43

4. Explanation of NCIH services, p. 1
5. Information resources,  
Beverly and Coghlan, p. 43  
Rieff, pp. 89-91

#### Help with Work in the Field, as well as Headquarters

1. Peace Corps reference, Eng, p. 71, Discussion, p. 118
2. UNICEF reference, Ferrari-Bono, p. 92
3. UNDP, Paqui, p. 105
4. Implementation, Cox, esp. p. 57 and Appendix F
5. Evaluation,  
Vanderschmidt, pp.46-48 and Appendix D  
Clark, pp. 49-50 and Appendix D
6. Planning,  
Eng, pp. 68, 71-73  
Briscoe, p. 78

#### Help with Related Issues

1. Health education,  
Cox, p. 58  
Eng, pp. 69-71
2. Training,  
Cox, p. 61 and Appendix G  
Eng, pp. 70-71  
Ferrari-Bono, p. 95

#### Major Issues Cited for the Coming Decade

Among others see  
Bloom, pp. 14-17  
Bourne, pp. 23-27

Problems and Possibilities Seen by PVOs

1. Results of evaluation workshops, pp. 53-54
2. Field staff, Cox and Clemens, p. 59
3. Implementation, Cox and Clemens, pp. 56-65
4. Own Organizations, Results of Workshops on Implementation, p. 63

## APPENDIX A

### INFORMATION RESOURCES FOR PVO HEADQUARTERS OPERATIONS

1. DIRECTORIES: manufacturers, special libraries, information centers, clearinghouses, research organizations, consultants, universities, government and international agencies.
2. COUNTRY FILES: country specific materials for orientation, training, briefing.
3. TECHNICAL FILES: descriptions, specifications, etc., of relevant technologies.
4. PERIODICAL FILES: your own, if any, and those relevant to your activities.
5. NEWSLETTER FILES: your own and other relevant newsletters.
6. ACCESSION LISTS: your own and those of relevant organizations.
7. PROGRAM/PROJECT FILES:
8. YOUR PUBLICATION LIST:
9. YOUR MAILING LIST:
10. YOUR LIBRARY: which would include most of the above plus other relevant information materials, texts, manuals, reports, slides, tapes, cassettes, maps, posters, etc.

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## APPENDIX B

### LIST OF WASH PUBLICATIONS: TECHNICAL AND FIELD REPORTS

#### TECHNICAL REPORTS

1. WASH Technical Report 1. Triocide Questions and Answers. November, 1980.
2. WASH Technical Report 2. Possible Disinfection of Oral Rehydration Solutions. Notes from November 13, 1980 meeting with Richard Cash and Lincoln Chen.
3. WASH Technical Report 3. Training of Rural Community Development Workers in Health Education, with Special Reference to Water Supply Protection and Use Maintenance of Sanitation Facilities. March, 1981. Prepared for Mandara Mountains Water Resource Project, USAID Mission, Yaounde Cameroon by Guy Steuart and Carla Rull.
4. WASH Technical Report 4. Evaluation Methods for Community Rural Water Supply and Sanitation Projects in Developing Countries: A Synthesis of Available Information. March 31, 1981. Prepared for the USAID Mission, Malawi, by Robert Struba.
5. WASH Technical Report 5. The Choice of Health Status Indicators to Evaluate Water and Sanitation Projects in North Cameroon: A Synthesis of Available Information. April 9, 1981. Prepared for Mandara Mountains Water Resource Project, USAID Mission to the United Republic of Cameroon. CIC Task #49.\*
6. WASH Technical Report 6. Women, Water and the Decade. Presented at the International Affairs Session of the American Water Works Association, St. Louis, Missouri, June 9, 1981 by Mary Elmendorf. OTD #35.\*\*
7. WASH Technical Report 7. Facilitation of Community Organization: An Approach to Water and Sanitation Programs in Developing Countries. June 17, 1981. Prepared by Raymond B. Isely. CIC Task #94.

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\* CIC Task refers to work done by or for the WASH Coordination and Information Center (CIC).

\*\* OTD refers to work done under Orders of Technical Direction (OTD) received from the Office of Health of USAID. OTDs are briefly summarized in periodic WASH Progress Reports.

8. WASH Technical Report 8. Integration de L'Approvisionnement en Eau et de L'Assainissement du Milieu dans les Programmes de Soins Primaires. Presented in Sousse, Tunisia, August 31, 1981 by Raymond B. Isely. OTD #52.
9. WASH Technical Report 9. Toward an Asia Bureau Water and Sanitation Policy Statement. September, 1981. Prepared for the Office of Health, Population and Nutrition of the Asia Bureau, USAID by James Thomson. CIC Task #98.
10. WASH Technical Report 10. Social and Economic Preconditions for Water Supply and Sanitation Programs. Prepared for AID/PPC by Dennis B. Warner, September, 1981.
11. WASH Technical Report 11. The Role of Women as Participants and Beneficiaries in Water Supply and Sanitation Programs. December, 1981. Prepared for the Office of Health by Mary L. Elmendorf and Raymond B. Isely. CIC Task #51.
12. WASH Technical Report 12. Measuring and Evaluating Diarrhea and Malabsorption in Association with Village Water Supply and Sanitation. A Review of the Food Wastage/ Sanitation Cost Benefit Methodology Project (Guatemala), Contract AID/csd-2959, by an External Panel of Experts. Prepared for the Office of Health by Branko Cvjetanovic, Lincoln Chen, Richard Kronmal, Charles Rohde and Robert Suskind. December, 1981. OTD #19.
13. WASH Technical Report 13. Participants Manual for Sessions on Water Supply and Sanitation: USAID Workshop on Primary Health Care in Africa, November 15-20, 1981. Lome, Togo. February, 1982. Prepared for the Africa Bureau, USAID by Raymond B. Isely, Craig R. Hafner, Daniel A. Okun, Morris A. Shiffman, Thomas Talbert and Marjorie L. Tupper. OTD #53.

#### FIELD REPORTS

1. WASH Field Report 1. Socio-Cultural and Economic Characteristics of Conditions in Ancash and La Libertad, Peru with Special Emphasis on the Callejones de Huaylas and Conchucos: Questions to be Considered in an Evaluation of CARE-Sponsored Water, Sewage and Health Projects. Prepared by Charlotte D. Miller. OTD #6.
2. WASH Field Report 2. Review of AID Rural Potable Water Programs - Haiti. November 16-29, 1980. OTD #9.
3. WASH Field Report 3. Feasibility of Local Manufacture of the AID Hand-Operated Water Pump, and other Technology Appropriate for Rural Water Supply Programs in the Philippines. Prepared for USAID by Phillip W. Potts, Robert Knight and Yaron M. Sternberg. April, 1979. OTD #11.



4. WASH Field Report 4. Tunisia, Aspects of Well Drilling Rural Potable Water Project - Report on a Field Trip, December 20-27, 1980. Prepared for USAID by Michael Glaze. OTD #15.
5. WASH Field Report 5. Dominican Republic Consultations on the Health Sector Loan II. Report of a Field Trip, January 26-30, 1980. OTD #21.
6. WASH Field Report 6. Report on the Peru Rural Water Systems and Environmental Sanitation Project. January 31, 1981. Prepared for USAID by Harold Shipman. OTD #18.
7. WASH Field Report 7. Tanzania - A National Environmental Sanitation Education Master Plan, A Preliminary Review. February 22-March 13, 1981. Prepared for USAID by Dennis B. Warner and Kenneth Woolf. OTD #26.
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TR: 4; FR: 26;

Community Education and Participation (CEP)

TR: 7; 11; FR: 2; 6; 13; 37; 39; 42;

Evaluation

TR: 4; 5; 12; FR: 1; 2; 5; 22; 24; 27; 35;

Human Resource Development (HRD) (including training)

TR: 3; 13; FR: 7; 8; 16; 21; 28; 31; 34; 38;  
39; 42;

Information

FR: 18; 26; 28;

Institutional Development

TR: 3; 4; 5; 7; 8; FR: 6; 8; 12; 13; 19; 21; 22; 23;  
24; 27; 33; 34; 35; 38; 39;

Planning

TR: 9; 10; FR: 5; 7; 8; 9; 11; 14; 18; 27; 33;  
34; 35; 36; 40;

Public Health

TR: 1; 2; 5; 8; 12; FR: 1; 7; 8; 11; 23; 29; 31; 37; 39;  
42;

Sanitation

TR: 11; FR: 1; 9; 10; 17; 19; 25; 26; 28;  
30; 33; 37; 38; 42;

Technology Transfer (including local manufacturing and R&D)

FR: 3; 5; 6; 16; 20; 26;

WASH Contributions to Conference, Seminars, etc.

TR: 8; 13;

FR: 15;

Water Supply (including hydrology)

TR: 1; 2;

FR: 1; 2; 4; 6; 9; 11; 19; 22; 24;  
25; 26; 30; 32; 36; 37; 38; 40;  
41; 42;

Women in Development

TR: 6; 11;

Workshops

TR: 8; 13;

FR: 29; 30; 31; 36;

WASH TECHNICAL REPORTS AND FIELD REPORTS  
BY COUNTRY AND REGIONAL BUREAUS

Brazil

FR: 40;

Burundi

FR: 24;

Cameroon

TR: 3; 5;

Dominican Republic

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El Salvador

FR: 26;

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TR: 12;

Haiti

FR: 2;

Indonesia

FR: 16; 28; 39; 42;

Jordan

FR: 17; 34; 36;

Lebanon		FR: 10;
Mali		FR: 32;
Malawi	TR: 4;	
Mauritania		FR: 11;
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Peru		FR: 1; 6; 38;
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Tanzania		FR: 7; 8;
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Tunisia	TR: 8;	FR: 4;
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APPENDIX D

FORM #1

SITUATIONAL ANALYSIS

ISSUES

POPULATION

1. A. TOTAL ESTIMATED POPULATION: 675

B. AGE STRUCTURE:

• INFANTS LESS THAN ONE YEAR OLD 20

• CHILDREN 1 - 4 120

• OTHER AGE GROUPS:

5 - 14 230

15 - 59 305

60 AND OVER                     

• CLASSIFY AGE GROUPS BY SEX

	MALE	FEMALE
5 - 14		
15 - 59		
60 AND OVER		

C. TOTAL HOUSEHOLDS 100

D. AVERAGE NUMBER OF INDIVIDUALS PER HOUSEHOLD 6

FORM #1-SITUATION ANALYSIS-CONT'D

ISSUES

4. HEALTH: SUMMARIZE DATA FROM HEALTH SURVEYS IF AVAILABLE OR ASK LOCAL HEALTH CENTER STAFF TO HELP YOU ANSWER THESE QUESTIONS.

A. DISTANCE TO NEAREST HEALTH FACILITY ? at least 10 Km.

B. ARE THERE PERIODIC IMMUNIZATION CAMPAIGNS FOR COMMON ILLNESSES (DYPHTHERIA, WHOOPING COUGH, TETANUS, TB, MEASLES)? No

C. WHICH ILLNESSES, CONDITIONS ARE MOST COMMON (NUMBER FROM MOST COMMON TO LEAST COMMON: 1 = MOST COMMON, 5 = LEAST COMMON)

• EXCESSIVE COUGHING/SORE THROATS, COLDS 5

• MALNUTRITION/POOR NUTRITION \_\_\_\_\_

• VOMITING/DIARRHEA 4

• WORMS, INTESTINAL PROBLEMS 1

• MALARIA 3

• OTHER accidents 2

D. MORTALITY:

• AVERAGE LIFE EXPECTANCY AT BIRTH \_\_\_\_\_

• INFANT MORTALITY (BIRTH TO ONE YEAR) LAST CALENDAR YEAR  
6/26 or 20%

• UNDER FIVE MORTALITY LAST CALENDAR YEAR 10-20%

FORM #1-SITUATIONAL ANALYSIS-CONT'D

ISSUES

5. SOCIAL SETTING:

A. LOCAL CULTURAL PRACTICES WHICH MIGHT AFFECT A PROJECT

- VILLAGERS THINK WATER IS SAFE  
ALTHOUGH IT ISN'T
- CASTE SYSTEM
- ABSENTEE LANDLORD
- BUDDHIST RELIGION
- PADDY CULTURE

B. FAMILY STRUCTURE ABOUT 6 PEOPLE  
LIVE IN EACH HOUSE

C. MAJOR RELIGIOUS GROUPS BUDDHIST

D. MAJOR CASTE CLASS GROUPS THREE CASTES:

- ① WELL OFF
- ② SMALL FARMERS
- ③ LANDLESS- PEASANTS



FORM #2

NEEDS ASSESSMENT

ISSUES

1. WHAT ARE THE CHIEF PROBLEMS OF THE COMMUNITY? LIST IN ORDER OF IMPORTANCE.

POVERTY / LACK OF WORK

DIRTY WATER / LACK OF WATER

HIGH INFANT / CHILDHOOD MORTALITY

NO MOTORABLE ROAD

2. WHAT HELP WOULD VILLAGERS LIKE?

BETTER SOURCE OF WATER

SPICE COOPERATIVE

LATRINES

KITCHEN GARDENS

3. WHAT ASSISTANCE TO THE PROJECT WILL THE COMMUNITY PROVIDE?

MANPOWER IS PROBABLY

AVAILABLE BECAUSE OF UNDER

EMPLOYMENT

FORM #2-NEEDS ASSESSMENT-CONT'D  
ISSUES

5. PROJECT TITLE: DEVELOP / BUILD SANITARY  
WELLS

6. PROJECT OBJECTIVES AND PURPOSES:

A. WHAT IS THE EXPECTED OUTCOME? TO DIG THESE  
SANITARY WELLS; TEACH  
VILLAGERS HOW TO MAINTAIN  
WELLS

B. WHY IS THIS OUTCOME IMPORTANT? INCREASE  
SUPPLY OF CLEAN WATER IN  
THE VILLAGE

FORM #3

DESCRIPTION OF END AND BEGINNING OF PROJECT AND TASKS

<p>WRITE: DESCRIPTION OF BEGINNING OF PROJECT HERE: <u>FIVE WELLS</u> <u>EXIST, ONE</u> <u>RIVER, A FEW</u> <u>SPRINGS EXCEPT</u> <u>IN THE RAINY</u> <u>SEASON. THE</u> <u>WELLS AND</u> <u>RIVER ARE</u> <u>CONTAMINATED.</u></p>	<p>WRITE: DESCRIPTION OF END OF PROJECT HERE: _____ <u>FIVE</u> <u>NEW WELLS</u> <u>WILL BE</u> <u>DUG. ALL</u> <u>10 WELLS</u> <u>WILL BE CLEAN</u> <u>AND MAINTENANCE</u> <u>PROCEDURES</u> <u>BEGUN.</u></p>
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# WELL PROJECT

Task No.	Brief Task Description	Week Number										Week Number										Individual Responsible	Equipment, Services, Supplies Needed
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
1	CONSULT ENGINEER ABOUT SITES	→																				IDENTIFY ENGINEER WHO HAS WORKED ON WATER PROJECTS	
2	CONSULT PUBLIC HEALTH INSPECTOR	→																				IDENTIFY PUBLIC HEALTH INSPECTOR WHO CAN PURIFY WELLS	
3	MEET WITH VILLAGE LEADERS TO PLAN	→																					
4	ASSEMBLE / ORDER SUPPLIES EQUIPMENT	→																				HOES, PICK AXE, SHOVELS, CEMENT FOR APRON, LIP	
5	CHOOSE SITES		→																				
6	BEGIN DIGGING WELLS			→	→	→	→	→	→	→	→												
7	PURIFY EXISTING WELLS							→	→	→	→											CHLORINE FOR PURIFYING ACCESS TO WATER TESTING LABORATORY	
8	EVALUATE PROGRESS					→		→		→													
9	TRAIN VILLAGERS TO MAINTAIN WELLS																					MANUALS ON WELL MAINTANANCE AND HEALTH EDUCATION	
10	EVALUATE PROJECT										→												
11	FOLLOW-UP TO CHECK ON STATUS OF WELLS											→		→		→		→		→			
12	EVALUATE IMPACT																			→			
13																							

FORM #4

COMPLETING A PROGRESS AND PRODUCT EVALUATION

ISSUES

1. BEGINNING OF PROJECT EVALUATION

ARE SERVICES/FACILITIES LIKE THOSE PLANNED NOW AVAILABLE?  
FOR INSTANCE:

ARE EQUIPMENT, SUPPLIES, MATERIALS AVAILABLE TO BEGIN WORK  
ON THE PROJECT? DESCRIBE ANY SHORTAGES.

TOOLS ARE AVAILABLE, BUT THE PROJECT  
LACKS CEMENT TO LINE THE WELLS, DEVELOP  
A LIP AND APRON. ATTEMPTS ARE BEING  
MADE TO OBTAIN CEMENT.

ARE PEOPLE RESOURCES AVAILABLE? VOLUNTEERS? COMMUNITY MEMBERS?  
DESCRIBE ANY SHORTAGES.

TEN VOLUNTEERS ARE AVAILABLE, 15 VILLAGERS  
HAVE AGREED TO WORK ON THE PROJECT.

IF EITHER MATERIALS OR MANPOWER ARE LACKING, WHAT ALTERNATIVE  
COURSES OF ACTION ARE POSSIBLE?

IT MAY BE POSSIBLE TO "MAKE DO" WITHOUT  
CEMENT USING SMALL STONES FOR LINING THE  
APRON AND LARGER STONES FOR THE LIP.

FORM #4-COMPLETING A PROGRESS AND PRODUCT EVALUATION - CONT'D

ISSUES

HAVE ONE OR MORE OF THE GOALS OF THE PROJECT BEEN PARTIALLY MET?

NO

HAVE ANY OF THE TASKS SPECIFIED BEEN COMPLETED? IF YES, PLEASE DESCRIBE.

THE ENGINEERS AND  
HEALTH INSPECTOR HAVE BEEN  
CONSULTED.

2. PROGRESS CHECKS (THESE SHOULD BE CARRIED OUT AT FREQUENT INTERVALS DURING THE LIFE OF THE PROJECT.)

ARE THE TASKS OR ACTIVITIES WHICH YOU LISTED IN YOUR IMPLEMENTATION SCHEDULE (FORM #3) BEING CARRIED OUT?

YES

DESCRIBE ANY PROBLEMS. WHAT REMEDIAL STEPS WILL YOU TAKE?

FOUR OF THE VOLUNTEERS HAVE  
GONE HOME - WE WILL TRY TO  
RECRUIT NEW VOLUNTEERS.

ARE THE TASKS OR ACTIVITIES YOU LISTED IN YOUR IMPLEMENTATION SCHEDULE (FORM #3) ON SCHEDULE?

THE WELL DIGGING IS PROGRESSING  
SLOWLY BECAUSE FOUR OF THE  
VOLUNTEERS HAVE GONE HOME.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Project: \_\_\_\_\_

Form #5

CHECK LIST OF POSSIBLE PROJECT PROBLEMS

PROJECT PROBLEM AREAS	EXAMPLES	HOW SOLUTIONS WILL BE IDENTIFIED
<p>Equipment, supplies, or services in use are not sufficient or of the correct kind.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<p>1. Well drilling equipment will not drill deep enough.</p> <p>2. Incorrect fertilizer for gardens.</p> <p>3. Books in literacy class inappropriate</p> <p>4. No compactors for a road project.</p>	<p>The project may have to be modified or changed to accommodate the equipment and supplies available or new sources found. Consider these methods:</p> <p>1. Bargaining and Negotiations, page 94</p> <p>2. Technical Assistance, page 102</p> <p>3. Practical Tests, page 112</p>
<p>Volunteers and community members lack sufficient skills.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<p><u>No One Knows:</u></p> <p>1. How to test and chlorinate wells.</p> <p>2. Why vegetables will not grow in a village.</p> <p>3. The correct way to construct water sealed latrines.</p> <p>4. Effective teaching methods for adult illiterates.</p>	<p>The project leaders require training and assistance; consider these methods:</p> <p>1. Library Search, page 75</p> <p>2. Education, page 142</p> <p>3. Technical Assistance, page 102</p>

PROJECT PROBLEM AREAS	EXAMPLES	HOW SOLUTIONS WILL BE IDENTIFIED
<p>The product being produced by the project is not being used properly or the community does not appear to be benefiting from the project.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<ol style="list-style-type: none"> <li>1. Children will not attend an after school remedial reading program.</li> <li>2. Villagers will not use latrines.</li> <li>3. A village poultry cooperative is not enrolling a sufficient number of villagers.</li> </ol>	<p>The project may require a critical assessment to determine whether or not the services are appropriate or whether or not the recipient of the services are willing. Consider these methods:</p> <ol style="list-style-type: none"> <li>1. Group Discussions and Community Meetings, page 89</li> <li>2. Consulting Experts, page 84</li> <li>3. Feedback, page 110</li> </ol>
<p>The project plan underestimated the cost of necessary equipment and supplies, or promised funds are not available.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<ol style="list-style-type: none"> <li>1. The cement required for a bridge will cost far more than estimated in the plan.</li> <li>2. The paddy harvest in the village was poor and the villagers are unable to provide funds.</li> <li>3. It seems impossible to raise in the village sufficient funds for the purchase of vegetable seeds.</li> </ol>	<p>It may be necessary to revise the plan and to scale down the project or seek additional sources of support. Consider these methods:</p> <ol style="list-style-type: none"> <li>1. Bargaining and Negotiations, page 94</li> <li>2. Technical Assistance, page 102</li> <li>3. Practical Tests, page 112</li> </ol>



PROJECT PROBLEM AREAS	EXAMPLES	HOW SOLUTIONS WILL BE IDENTIFIED
<p>Villagers do not appear to be interested in working on the project, using the results or products produced and generally appear to have lost interest.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<ol style="list-style-type: none"> <li>1. Villagers will not use a well constructed by volunteers.</li> <li>2. Villagers will not participate in a malaria control project.</li> <li>3. Villagers will not volunteer their services on a road project.</li> </ol>	<p>Motivation and interest on the part of villagers may be important. Consider these methods:</p> <ol style="list-style-type: none"> <li>1. Group Discussion and Community Meetings, page 89</li> <li>2. Bargaining and Negotiations, page 94</li> <li>3. Providing Model Behavior, page 97</li> </ol>
<p>The project is not being managed or supervised properly.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<ol style="list-style-type: none"> <li>1. Village leaders who promised to manage the project are not doing so.</li> <li>2. Expert assistance promised by the Ministry of Health in Nutrition Education is not available.</li> <li>3. So many volunteers have left the project that it lacks continuity.</li> </ol>	<p>Effective leadership is very important. It may be necessary to replace or train the original leaders. Consider these methods:</p> <ol style="list-style-type: none"> <li>1. Group Discussion and Community Meetings, page 89</li> <li>2. Bargaining and Negotiations, page 94</li> <li>3. Nonformal Education including on-the-job training, page 99</li> </ol>

PROJECT PROBLEM AREAS	EXAMPLES	HOW SOLUTIONS WILL BE IDENTIFIED
<p>Conflicts and disagreements which threaten the project have developed between key groups in the project.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<ol style="list-style-type: none"> <li>1. A project may be developing a village health center, and a serious disagreement has developed over the location of the center.</li> <li>2. A cooperative to market excess produce can not agree on the structure of the group.</li> <li>3. A community organization created to plan and manage a sanitation plan for the village is opposed by some of the village elders.</li> </ol>	<p>Conflict between opposing groups is a frequent occurrence and the real reasons for the conflict are often hidden. Consider these methods:</p> <ol style="list-style-type: none"> <li>1. Group Discussion and Community Meetings, page 89</li> <li>2. Bargaining and Negotiation, page 94</li> <li>3. Technical Assistance, Coaching, Team Building, page 102</li> </ol>
<p>Some of the volunteers appear to be indifferent to the project, unwilling to work, not comfortable in the village and as a result, the project has a high turnover.</p> <p>1. Yes <input type="checkbox"/></p> <p>2. No <input type="checkbox"/></p>	<ol style="list-style-type: none"> <li>1. Over a period of 3 months, 60 volunteers are sent to a remote village. The stay is ten days.</li> <li>2. Female volunteers will not work on a latrine project.</li> <li>3. Male volunteers are reluctant to make house calls on a family planning project.</li> </ol>	<p>Volunteer motivation is an important factor in project success. Consider these methods in dealing with volunteer problems:</p> <ol style="list-style-type: none"> <li>1. Group Discussion and Community Meetings, pages 89</li> <li>2. Team Building, page 102</li> <li>3. Bargaining and Negotiation, page 94</li> </ol>

FORM #6

DESIGNING AND COMPLETING FOLLOW-UP AND IMPACT EVALUATION

ISSUES

A. FOLLOW-UP. REFER TO EACH MAJOR OUTCOME OF YOUR PROJECT

1A. WHAT ARE YOUR PLANS FOR CONTINUATION OF MAINTENANCE BY VOLUNTEERS AND/OR COMMUNITY MEMBERS?

COMMUNITY MEMBERS WILL MAINTAIN  
WELLS IN GOOD REPAIR AND WILL PURIFY  
WELLS IF THEY GET CONTAMINATED.

1B. LIST THE TASKS FOR CONTINUATION OF MAINTENANCE.

PATCH WELLS IF NEEDED  
CLEAN BRANCHES, LEAVES OUT OF WELL  
USE CHLORINE TO PURIFY WELL IF IT  
BECOMES CONTAMINATED

1C. DRAW A TIMETABLE FOR FOLLOW-UP.

FOLLOW-UP MONTHS: 12, 15, 18, 20

FORM #6-DESIGNING AND COMPLETING FOLLOW-UP AND IMPACT EVALUATION - CONT'D  
ISSUES

2A. WHAT PEOPLE RESOURCES ARE NEEDED TO FOLLOW-UP?

FOUR VOLUNTEERS OR FOUR  
TRAINED VILLAGERS  
TOOLS TO CLEAN AND MAINTAIN WELLS  
CHLORINE DISINFECTANT

2B. WHAT MATERIAL RESOURCES ARE NEEDED?

TOOLS TO CLEAN WELLS  
CHLORINE DISINFECTANT

2C. HOW WILL YOU, OTHER VOLUNTEERS AND THE COMMUNITY KEEP RECORDS AND MAKE REPORTS?

THE COMMUNITY LEADER CAN KEEP  
SIMPLE RECORDS ABOUT WHEN WELLS  
HAVE BEEN CLEANED AND  
DISINFECTED

ISSUES

B. IMPACT

1. WHAT EASY TO MEASURE INDICATORS FOR IMPACT EVALUATION WILL YOU CHOOSE?

DO WELLS LOOK CLEAN UPON INSPECTION?  
ARE THEY IN USE? IS THERE A GREATER  
SUPPLY OF WATER NOW? DURING THE WET  
SEASON? DURING THE DRY SEASON?

2A. WHEN WILL YOU EVALUATE THE PROJECT'S IMPACT? BEFORE THE PROJECT?

YES  NO

JUST AFTER THE PROJECT IS COMPLETED?

YES  NO

LATER WHEN YOU FOLLOW-UP ON THE PROJECT?

YES  NO

3A. HOW WILL YOU DETERMINE THAT CHANGE OCCURRED?

DO VILLAGERS REPORT THERE IS NOW  
SUFFICIENT CLEAN WATER

4A. HOW LARGE A SAMPLE DO YOU NEED TO LOOK AT TO BE SURE THAT THE PROJECT HAS HAD THE DESIRED IMPACT?

TALK TO VILLAGERS (50) DURING YOUR  
WALK THROUGH THE VILLAGE. ASK A  
FEW QUESTIONS RELATED TO QUESTIONS  
(SEE B1) ABOVE.

ISSUES

5A. HOW WILL YOU DOCUMENT YOUR RESULTS?

MEMO ON EFFECTIVENESS OF PROJECT  
PREPARED FOR VOLUNTEER  
ORGANIZATION AND VILLAGE ELDERS

5B. WHAT WILL YOU DO WITH YOUR RESULTS?

USE EXPERIENCE TO PLAN NEW  
PROJECTS; CONTINUE FOLLOW-UP  
ON PRESENT PROJECT

SUMMATIVE EVALUATION

BAMBERABEDDE PROJECT

BEGINNING OF PROJECT STATUS: 5 DIRTY WELLS

OBJECTIVE: 5 NEW WELLS WILL BE DUG  
ALL 10 WELLS WILL BE CLEAN  
AND MAINTENANCE PROCEDURES  
BEGUN.

MEASURABLE PRODUCTS AT  
END OF PROJECT: 8 WELLS -  
2 REPAIRED AND CLEANED  
3 NEW WELLS DUG AND WORKING  
2 DIRTY WELLS (WOMEN BOIL  
WATER)  
1 DRY WELL

## APPENDIX E

### PROGRESS EVALUATION

#### INTRODUCTION

The purpose of this evaluation form is to find out what the different groups think about the way the projects are developing. Your assistance will be very valuable in making the program better understood and in helping many other needy people to benefit from it.

We are very grateful for your cooperation and for the sincerity of your answers to our questions.



EVALUATION OF THE CEDEN'S DRINKING WATER SUPPLY  
AND SEWERAGE PROGRAM

Evaluation Form

Form #: \_\_\_\_\_

Date: \_\_\_\_\_

Introduction

A. GENERAL DATA

1 - Village or Community \_\_\_\_\_

2 - Municipality \_\_\_\_\_

3 - Type of Project:

a) ( ) Well (Drinking water)

b) ( ) Distribution System

c) ( ) Sewerage

4 - Number of beneficiaries:

a) ( ) Drinking water \_\_\_\_\_

b) ( ) Sewerage \_\_\_\_\_

5 - Total cost of the project: \_\_\_\_\_

6 - Status of the project:

a) ( ) Completed

b) ( ) Over 50% completed

c) ( ) 50% completed

d) ( ) Less than 50% completed

7 - Type of management:

a) ( ) Sponsorship

b) ( ) Committee for Development

c) ( ) Other \_\_\_\_\_

B. PROJECT PLANNING

8 - Did the community take part in the planning of the project?

- a) ( ) Yes
- b) ( ) No
- c) ( ) I do not know

9 - The time devoted to the planning of the project seemed to you:

- a) ( ) Short
- b) ( ) Appropriate
- c) ( ) Too long

C. PROJECT EXECUTION

10 - Has the project been carried out according to the agreement made by CEDEN and the community?

- a) ( ) Yes
- b) ( ) I do not know because .....

11 - Do you think that the amount of time devoted to project implementation has been?

- a) ( ) Less than was estimated
- b) ( ) As much as was estimated
- c) ( ) More than was estimated

12 - Do you think that the quality of the installations is?

- a) ( ) Good
- b) ( ) Fair
- c) ( ) Bad

13 - Have there been any specific problems due to the type of installation or to the quality of the material used?

- a) ( ) No
- b) ( ) Yes, (please list them) .....

14 - How do you rate the community's participation in the implementation of the project?

a) ( ) Good

b) ( ) Fair

c) ( ) Bad

because .....

D. PROJECT MANAGEMENT (for project already completed)

15 - Do you agree with the operating procedures of the Committee for Development (or other sponsorship)?

a) ( ) Yes

b) ( ) No

because .....

16 - Is the present installment payment system fair in relation to the community's ability to pay?

a) ( ) Yes

b) ( ) No

because .....

17 - Do you think the present charges are fair for the services being provided?

a) ( ) Yes

b) ( ) No

because .....

18 - Are there people in the community who have been trained by CEDEN to handle the water system efficiently?

a) ( ) Yes

b) ( ) No

because .....

- 19 - Do you have any suggestions about changes related to the present type of management operations or the system of payment for the drinking water supply and sewerage services?
- a) ( ) No
  - b) ( ) I do not know
  - c) ( ) Yes, (explain) .....

E. PROGRAM RESULTS

- 20 - What are the main benefits of the program for the community?
- 21 - Has your community initiated any other development program as a direct result of the drinking water supply and sewerage project?
- a) ( ) No
  - b) ( ) Yes, (which?) .....
- 22 - Has the community entered any other CEDEN program after this project was completed?
- a) ( ) No
  - b) ( ) Yes, (which?) .....
- 23 - Which are in your opinion the main problems of the drinking water supply and sewerage program?
- 24 - Do you have any suggestions to improve the program in your community or in any other where it could be initiated?

F. CEDEN/COMMUNITY RELATIONS

25 - Do you agree with CEDEN's working system?

a) ( ) Yes

b) ( ) No, because .....

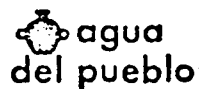
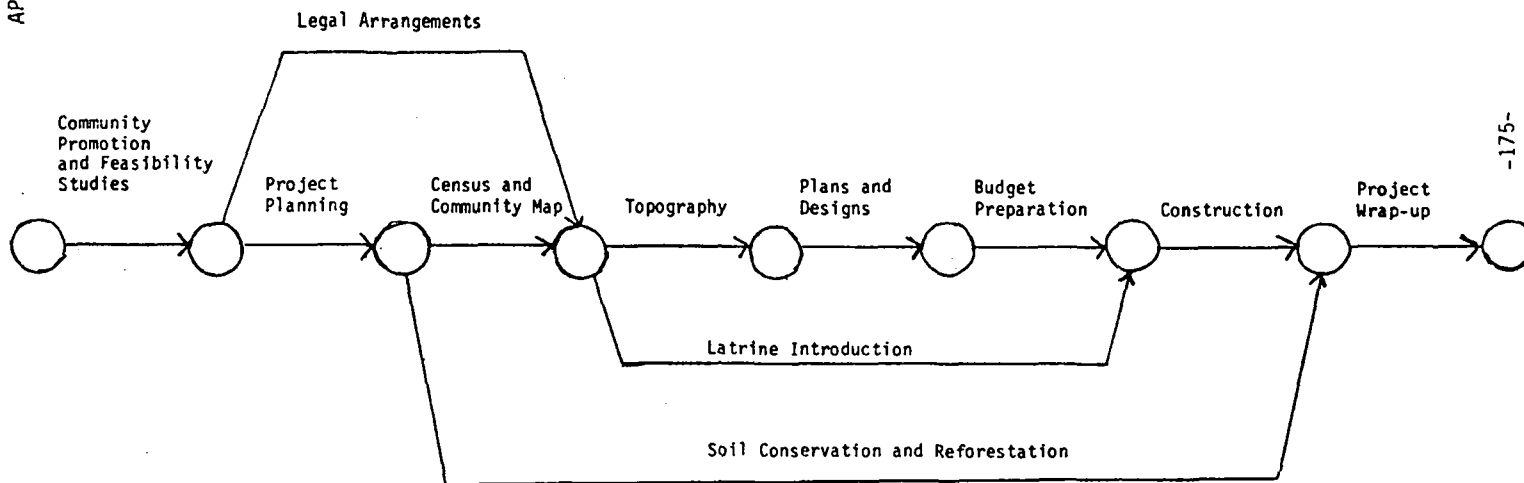
26 - Please assess the relationship between CEDEN's staff members and the community:

Personnel	Very bad	Bad	Fair	Good	Excellent
Supervisor					
Promoter					
Technical drilling workers					

27 - How can CEDEN improve its relationship with the communities?

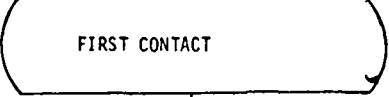

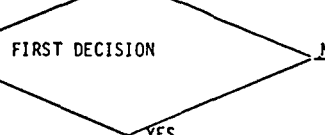
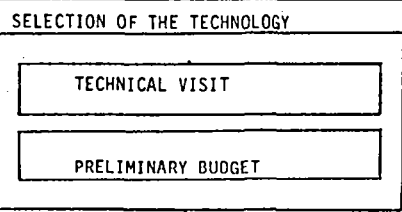
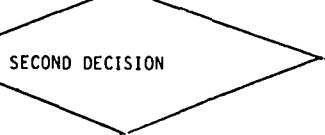

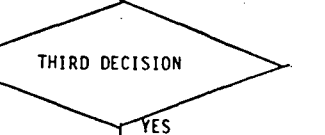
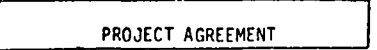
AN INTEGRATED IMPLEMENTATION METHODOLOGY FOR RURAL WATER SUPPLY AND SANITATION PROJECTS

APPENDIX F



AGUA DEL PUEBLO  
41 Calle 5-01, Zona 8  
Guatemala, Guatemala, C.A.  
Telephone: 40913

AGUA DEL PUEBLO  
320 45th Street  
Oakland, California 94609  
Telephone: (415) 653-0346

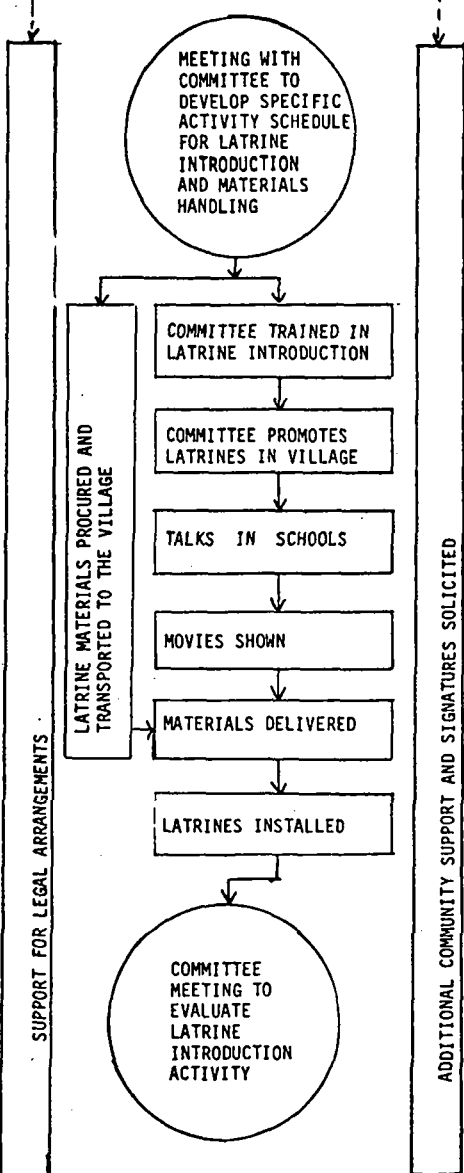
PHASE ONE: COMMUNITY PROMOTION AND FEASIBILITY STUDIES	TASKS	DURATION	DECISION PARAMETERS
	<ul style="list-style-type: none"> <li>-first discussions with the community</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-interview with local committee</li> <li>-inspection/measurement of water source</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-comparison of water needs and supply</li> </ul>	1 hour	<ul style="list-style-type: none"> <li>-sufficient water available for 20 year project design life.</li> <li>-local committee exists</li> </ul>
	<ul style="list-style-type: none"> <li>-water quality testing</li> <li>-initial altimetry readings</li> <li>-rough map sketch</li> <li>-pipe route studied</li> <li>-initial flow plan and design</li> <li>-prepare rough budget</li> </ul>	2 days	
	<ul style="list-style-type: none"> <li>-review technical study</li> <li>-project selection committee meets</li> </ul>	1 day	<ul style="list-style-type: none"> <li>-technical: altimetry, water quality and quantity</li> <li>-legal: committee, tank and pipeline rights of way</li> <li>-social: 80% interest</li> <li>-financial: costs and contributions OK</li> </ul>
	<ul style="list-style-type: none"> <li>-local village committee meets</li> <li>-project reviewed</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-project discussed at village meeting</li> <li>-community accepts project and responsibilities</li> </ul>	1-2 weeks	<ul style="list-style-type: none"> <li>-village accepts methodology</li> <li>-minimum of 80% agree</li> <li>-financial arrangements specified</li> <li>-water use restrictions accepted</li> </ul>
	<ul style="list-style-type: none"> <li>-agreement written</li> <li>-signatures obtained</li> </ul>	-176-	

PHASE TWO: PROJECT PLANNING	TASKS	DURATION	OBSERVATIONS
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">SUPPORT FOR LEGAL ARRANGEMENTS</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">ADDITIONAL COMMUNITY SUPPORT AND SIGNATURES SOLICITED</p>	<p>-meeting with local committee to identify steps in project implementation</p> <p>-meeting with local committee to discuss implementation steps and decide on their proper sequence</p> <p>-meeting with local committee to assign responsibilities and completion dates for activities</p> <p>-drafting of project schedule</p> <p>-exercises with local committee</p> <p>-play presented to the community</p>	<p>1 day (4 hours)</p> <p>1 day (4 hours)</p> <p>1 day (4 hours)</p> <p>1 day</p> <p>4 days</p> <p>2 hours</p>	<p>In this phase, the water promoter tries to clarify for the beneficiaries the reasoning behind each activity and the sequence of activities. Also, more difficult aspects of the project (especially technical aspects) are explained.</p> <p>While these discussions are in progress, the promoter works with the committee in the generation of additional community support and the completion of necessary legal arrangements.</p>

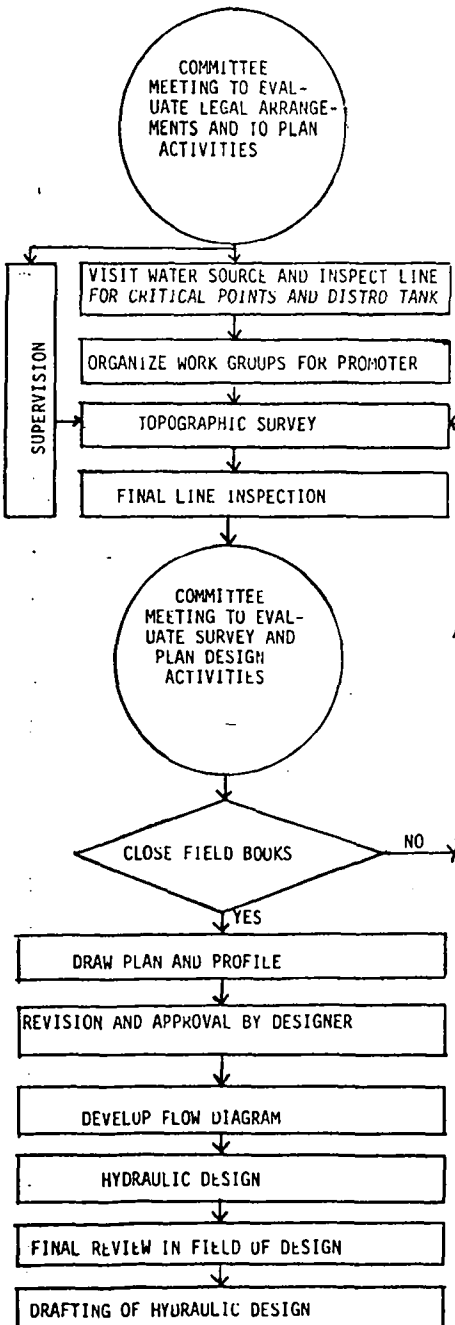


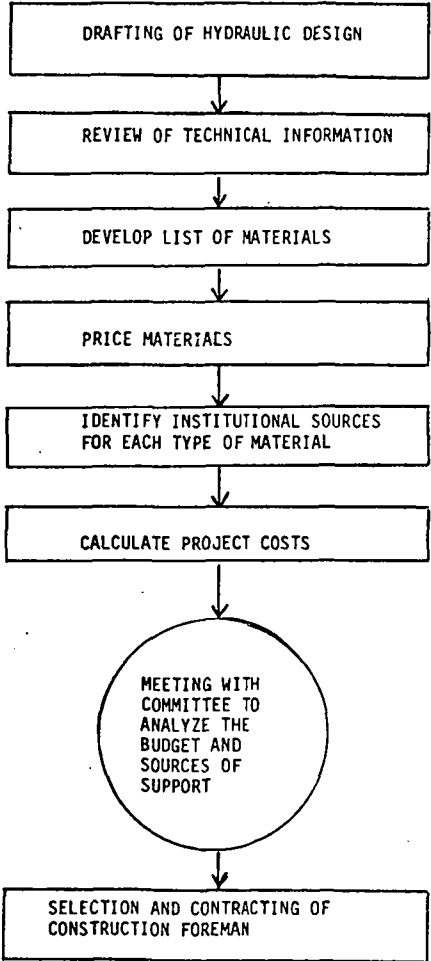
PHASE THREE: CENSUS AND COMMUNITY MAP	TASKS	DURATION	OBSERVATIONS
<pre> graph TD     A((MEETING WITH LOCAL COMMITTEE TO DEVELOP SPECIFIC ACTIVITY SCHEDULE FOR CENSUS AND MAP ACTIVITY)) --&gt; B[LOCAL COMMITTEE TRAINED IN THE PREPARATION OF A COMMUNITY MAP]     B --&gt; C[COMMUNITY MAP PREPARED]     C --&gt; D((MEETING WITH COMMITTEE TO DIVIDE COMMUNITY INTO SECTORS))     D --&gt; E[COMMITTEE TRAINED IN CENSUS METHOD]     E --&gt; F[CENSUS DATA COLLECTED]     F --&gt; G[CENSUS DATA TABULATION]     G --&gt; H((MEETING WITH COMMITTEE TO PLAN AND PRESENT CENSUS PLAY))     D --&gt; I[COMMUNITY MAP DISTRIBUTED]     </pre> <p>SUPPORT FOR LEGAL ARRANGEMENTS</p> <p>ADDITIONAL COMMUNITY SUPPORT AND SIGNATURES SOLICITED</p>	<ul style="list-style-type: none"> <li>-evaluate village response to theater</li> <li>-referring to general schedule, plan a specific schedule for census and map activity</li> <li>-train committee in map planning and symbols</li> <li>-draft community map</li> <li>-divide map into sectors to be assigned to individual members of the committee</li> <li>-provide copies of map to each committee member</li> <li>-train committee in use of census forms</li> <li>-committee collects data</li> <li>-census data tabulated by sector</li> <li>-plan and present census play</li> </ul>	<p>4 hours</p> <p>4 hours</p> <p>2 days</p> <p>2 hours</p> <p>1 day</p> <p>2 days</p> <p>1 day</p> <p>4 hours</p>	<p>In this meeting, the committee reviews the general work plan established earlier and develops a <u>graphic work progress chart</u>, with specific work objectives for this activity, to which they can refer later to monitor their progress.</p> <p>Each house is represented graphically on the map with a symbol which allows for census data collection progress to be registered.</p> <p>Additional community support is solicited and legal arrangements are made.</p>

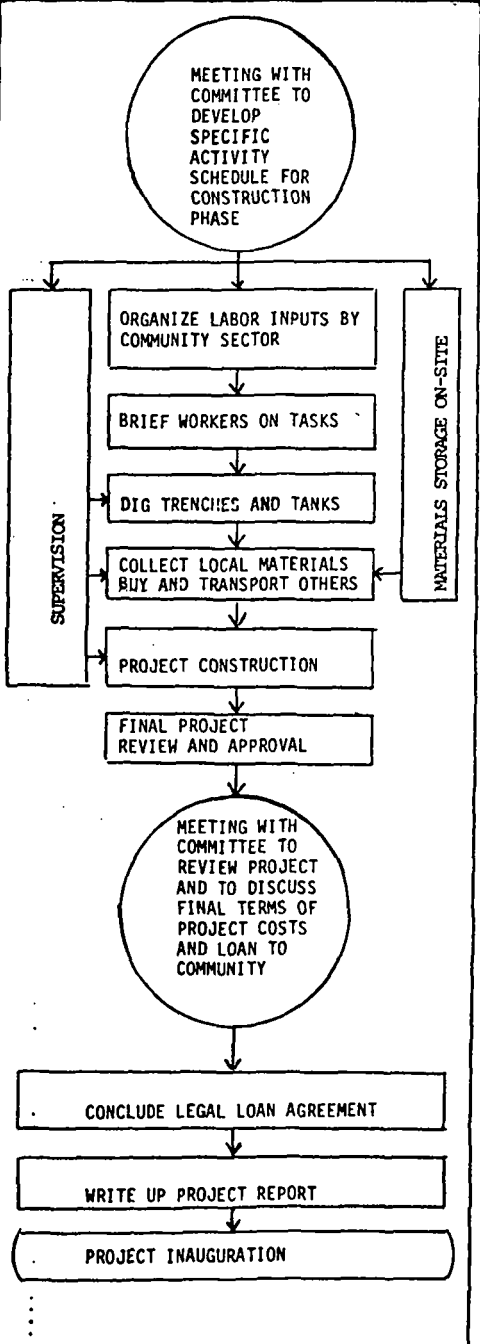
# agua del pueblo

PHASE FOUR: LATRINE INTRODUCTION	TASKS	DURATION	OBSERVATIONS
	<ul style="list-style-type: none"> <li>-census play reviewed</li> <li>-general project progress checked against general plan</li> <li>-specific latrine introduction schedule drafted</li> </ul>	1 day	The local schoolteacher is invited to participate in this meeting to discuss educational games to be played in the classroom.
	<ul style="list-style-type: none"> <li>-talk with committee about latrine benefits, use and maintenance</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-committee promotes latrines to neighbors and advertises movie</li> </ul>	5 days	
	<ul style="list-style-type: none"> <li>-educational games about latrine use</li> </ul>	4 hours	These games may include arithmetic exercises using data from the project (simple spring flow arithmetic, for example).
	<ul style="list-style-type: none"> <li>-sanitary education movies shown</li> </ul>	2 hours	
	<ul style="list-style-type: none"> <li>-committee members deliver latrine materials to families</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-individual families install latrines with committee supervision</li> </ul>	3 weeks	Community map graphics are colored in to show completion of this phase for each house in each committee member's sector.
	<ul style="list-style-type: none"> <li>-committee meets to discuss progress in this phase and record it on their work plans</li> </ul>	1 day	

PHASE FIVE: REFORESTATION	TASKS	DURATION	OBSERVATIONS
<p>(PHASE TWO: PROJECT PLANNING)</p> <p>COMMUNITY THEATER "El Proyecto"</p>			
<pre> graph TD     A((MEETING WITH COMMITTEE AND SCHOOLTEACHER TO DISCUSS REFORESTATION)) --&gt; B{IS IT THE PROPER SEASON FOR REFORESTATION?}     B -- YES --&gt; C[SOLICIT COOPERATION AND/OR SEEDLINGS FROM GOVT. AGENCY]     B -- NO --&gt; D[IDENTIFY THE APPROPRIATE REFORESTATION SEASON]     C --&gt; E[DEMONSTRATE PLANTING METHODS TO COMMITTEE MEMBERS]     E --&gt; F[COMMITTEE TEACHES SCHOOL-CHILDREN PLANTING METHODS]     F --&gt; G[SEEDLINGS PLANTED]     D --&gt; C     </pre>	<p>-explain the relationship between soils, water, and plants as key to watershed management</p> <p>-identify critical erosion areas near spring site and pipeline</p> <p>-determine appropriate tree species</p> <p>-describe other soil and water conservation methods</p> <p>-arrange cooperation and seedling donations from national forestry agency or other source</p> <p>-training in reforestation techniques</p> <p>-cooperate with teacher to involve children in reforestation</p> <p>-plant the trees</p>	<p>1 day</p> <p>1 week</p> <p>1 day</p> <p>1 day</p> <p>1-3 days</p>	<p>This phase is essential for continued stability of the water source.</p>

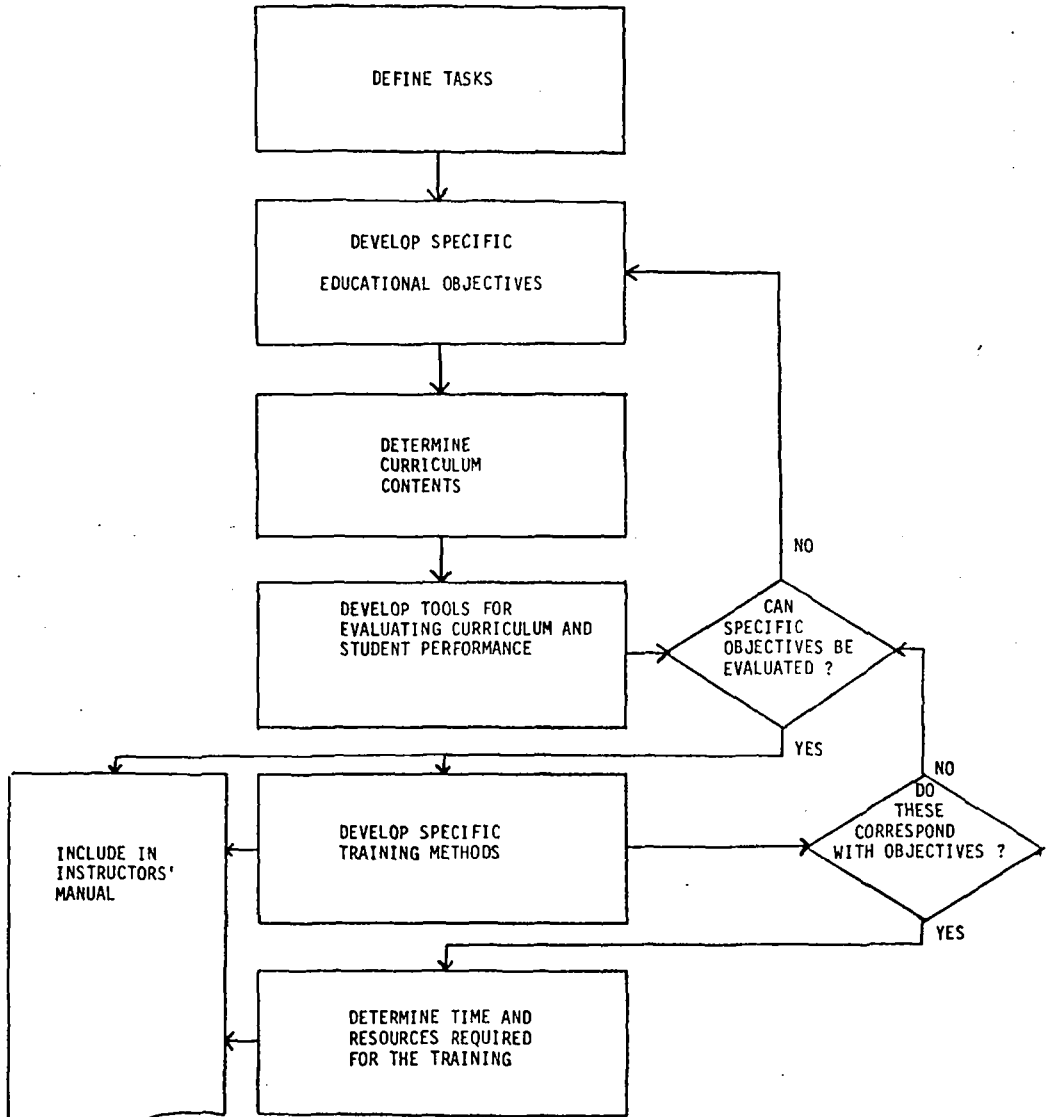
PHASE SIX: TOPOGRAPHY PHASE SEVEN: PLANS and DESIGNS	TASKS	DURATION	OBSERVATIONS
	<ul style="list-style-type: none"> <li>-tabulation of signatures by sector</li> <li>-develop specific activity schedule</li> </ul>	1 day	-willingness of residents to donate land is essential
	<ul style="list-style-type: none"> <li>-preliminary line placement</li> </ul>	1-2 days	-topographic conditions -location of houses
	<ul style="list-style-type: none"> <li>-organize groups</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-land survey and leveling</li> </ul>	10 days	-traditional methodologies using compass and tripod level
	<ul style="list-style-type: none"> <li>-determine need for galvanized steel pipe</li> </ul>	1-2 days	-final review of survey
	<ul style="list-style-type: none"> <li>-evaluate progress and develop specific activity schedule</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-calculate running elevations</li> </ul>	2 days	-if problem encountered, return to field
		3 days	
	<ul style="list-style-type: none"> <li>-check critical points and closures</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-calculate design flows</li> </ul>	4 hours	-on the basis of project design criteria
	<ul style="list-style-type: none"> <li>-size pipe and tank</li> </ul>	2 days	-
	<ul style="list-style-type: none"> <li>-to check critical points</li> </ul>	1 day	
	<ul style="list-style-type: none"> <li>-indicate pipe sizes and types</li> </ul>	1 day	

PHASE EIGHT: BUDGET PREPARATION	TASKS	DURATION	OBSERVATIONS
 <pre> graph TD     A[DRAFTING OF HYDRAULIC DESIGN] --&gt; B[REVIEW OF TECHNICAL INFORMATION]     B --&gt; C[DEVELOP LIST OF MATERIALS]     C --&gt; D[PRICE MATERIALS]     D --&gt; E[IDENTIFY INSTITUTIONAL SOURCES FOR EACH TYPE OF MATERIAL]     E --&gt; F[CALCULATE PROJECT COSTS]     F --&gt; G((MEETING WITH COMMITTEE TO ANALYZE THE BUDGET AND SOURCES OF SUPPORT))     G --&gt; H[SELECTION AND CONTRACTING OF CONSTRUCTION FOREMAN]           </pre>	<ul style="list-style-type: none"> <li>-review of fieldbooks, plans, profiles and list of project subscribers</li> <li>-develop precise list of materials from project design data</li> <li>-identify best price alternatives</li> <li>-match donors and contributors with in-kind commitments</li> <li>-calculate cost per family, cost per capita, total cost and cost per source of support</li> <li>-interview candidates</li> <li>-site visits with candidates</li> <li>-receive bids</li> <li>-contract foreman</li> </ul>	<ul style="list-style-type: none"> <li>4 hours</li> <li>2 days</li> <li>1 day</li> <li>1 hour</li> <li>1 day</li> <li>4 hours</li> <li>1 week</li> </ul>	<p>During this phase, committee members are taught elementary principles of accounting to enable them to monitor maintenance and loan amortization payments.</p>

PHASE NINE: CONSTRUCTION	TASKS	DURATION	OBSERVATIONS
	<ul style="list-style-type: none"> <li>-identify local operation and maintenance personnel</li> <li>-develop specific activity schedule for construction phase</li> <li>-plan community labor inputs and local materials collection</li>   <li>-organize equitable distribution of labor responsibilities</li>   <li>-plan secure on-site storage of materials</li>   <li>-specify quantity and type of local materials</li> <li>-purchase and transport pipe, cement and other materials</li>   <li>-promoter visits site a minimum of five times during construction</li> <li>-supervising engineer approves project</li>   <li>-calculate final project costs</li> <li>-calculate loan repayment schedule</li> <li>-review terms of loan with community</li>   <li>-project subscribers sign loan agreement</li>   <li>-promoter drafts final report</li>   <li>-community celebration</li> </ul>	<ul style="list-style-type: none"> <li>1 day</li>   <li>4 hours</li>   <li>1 day</li>   <li>1-4 mos.</li>   <li>1 month</li>   <li>1 month</li>   <li>2 days</li>   <li>1 day</li>   <li>2 days</li>   <li>1 day</li>   <li>1 day</li> </ul>	<p>During the construction phase, the persons selected for operation and maintenance duties are trained on the job by the promoter and the construction foreman.</p> <p>Both monthly maintenance fees and loan amortization fees are established and the means for their regular collection are determined. Collection is administered by the committee.</p>
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METHODOLOGY USED IN THE DEVELOPMENT OF THE TRAINING CURRICULUM FOR PARAPROFESSIONAL RURAL WATER PROMOTER/TECHNICIANS



TAR TRAINING MODULES

<u>NO.</u>	<u>MODULE NAME</u>	<u>DURATION (HRS.)</u>
01	PROJECT ADMINISTRATION AND METHODS	35
02	INITIAL PROJECT INVESTIGATION (FEASIBILITY STUDIES)	38
03	ORGANIZATION OF THE COMMUNITY	35
04	ORGANIZATION AND TRAINING OF LOCAL COMMITTEES	35
05	PREPARATION OF COMMUNITY MAP	24
06	PREPARATION OF COMMUNITY SURVEYS AND CENSUS	45
07	LATRINE INTRODUCTION AND HEALTH EDUCATION	35
08	TOPOGRAPHY	81
09	DRAFTING	38
10	DESIGN CALCULATIONS	100
11	MATERIALS SELECTION	16
12	PROJECT BUDGET	47
13	PROJECT CONSTRUCTION	156
14	SUPERVISION OF CONSTRUCTION	36
15	OPERATION AND MAINTENANCE	92
16	WELLS AND HANDPUMPS	35
17	SOIL AND WATER CONSERVATION	36
18	PROJECT IMPLEMENTATION METHODOLOGY SEMINAR	<u>24</u>
		TOTAL 908



APPENDIX H

Conference Participants

Mr. Carlos Gomez  
Agua del Pueblo  
41 Calle 5-01, Zona 8  
Guatemala City  
Guatemala

Ms. Helen Vukasin  
CODEL  
79 Madison Avenue  
New York, NY 10157

Mr. Hernan Ruiz  
Agua del Pueblo  
41 Calle 5-01, Zona 8  
Guatemala City  
Guatemala

Mr. Graeme Frelick  
Clearinghouse Coordinator  
NCIH  
2121 Virginia Avenue, #303  
Washington, D.C. 20037

Michele Siegel (FIELD)  
Save the Children Federation  
48 Wilton Road  
Westport, CT 06880

Ms. Claudette Kaba  
Peace Corps  
806 Connecticut Avenue, N.W.  
Washington, D.C. 20523

Mr. Kevin Henry  
CARE  
660 First Avenue  
New York, NY 10016

Mr. Robert Moore  
MAP International, Inc.  
P.O. Box 50  
Wheaton, IL 60187

Ms. Ellen Lieber  
CARE  
660 First Avenue  
New York, NY 10016

Ms. Bonnie Kittle  
In'l Human Assistance Pros, Inc.  
360 Park Avenue So.  
New York, NY 10010

Joseph McNeill  
Field Director - CREO  
P.O. Box 12509  
S. San Antonio, TX 78212

Mr. Bill Senn  
MAP International, Inc.  
P.O. Box 50  
Wheaton, IL 60187

Dr. W.M. Pruzensky (FIELD)  
Asst. Director of Operations  
CRS - 1011 First Avenue  
New York, NY 10022

Ms. Ruthy Deere  
VITA  
3706 Rhode Island Avenue  
Mt. Ranier, MD 20822

Mr. Peter Persell  
AFRICARE  
1601 Connecticut Avenue, N.W.  
Washington, D.C. 20009

Mr. Joe Sprunger  
Lutheran World Relief  
360 Park Avenue So.  
New York, NY 10010

Ms. Mary Schulz  
Lutheran World Relief  
360 Park Avenue So.  
New York, NY 10010

Ms. Virginia Shea  
National Council of Catholic Women  
1312 Massachusetts Avenue, N.W.  
Washington, D.C. 20005

Ms. Helen O'Brien  
Center for Population Activities  
1717 Massachusetts Avenue, N.W., #202  
Washington, D.C. 20036

Mr. Jack Maybee  
Mission Health Foundation  
Box 89  
Independence, MO 64056

Ms. Ann Nally  
World Organization for Scouting Movement  
3796 Dade Drive  
Arlington, VA 22003

Mr. Peter Vanderlippe  
Lutheran World Relief  
360 Park Avenue So.  
New York, NY 10010

APPENDIX I

*Sample Data Sheet*

Copies available at the UNDP RR Office or from the Country WHO Office



INTERNATIONAL DRINKING WATER SUPPLY AND SANITATION DECADE

PROJECT DATA SHEET

1. <u>COUNTRY:</u>		2. <u>NO:</u>
3. <u>TITLE:</u>		
4. <u>SCOPE:</u>		
5. <u>BACKGROUND:</u>		
6. <u>RESPONSIBLE GOVERNMENT AGENCY:</u>		
7. <u>INSTITUTIONAL SUPPORT:</u>		
8. <u>DURATION:</u>		9. <u>STARTING DATE:</u>
10. <u>ESTIMATED COST:</u>		

*Sample Data Sheet (Cont.)*

<p>11. <u>GOVERNMENT INPUTS:</u></p> <p>(i) Personnel:</p> <p>(ii) Equipment and Supplies:</p> <p>(iii) Funds:</p>	<p>12. <u>EXTERNAL INPUTS:</u></p> <p>(i) Personnel:</p> <p>(ii) Equipment and Supplies:</p> <p>(iii) Funds:</p>
<p>13. <u>SECTOR DEVELOPMENT PERFORMANCE:</u></p>	
<p>14. <u>OUTPUTS:</u></p>	
<p>15. <u>GOVERNMENT PRIORITY AND COMMITMENT:</u></p>	
<p>16. <u>EXPECTED BENEFITS:</u></p>	
<p>17. <u>PREPARED BY:</u></p>	<p><u>DATE:</u></p>

### *Guidelines to Complete Project Data Sheet*

1. Country Name of country. State also region where project is implemented.
2. No. Data sheets will be numbered sequentially for each country as projects are identified and data sheets prepared.
3. Title State full title of project.
4. Scope State briefly work and activities involved in the project, e.g. master planning; preliminary engineering institutional studies; manpower development; tariff studies, etc.
5. Background
  - (i) State and describe existing studies (indicating title and year), as well as data, information, etc. available relevant to the project.
  - (ii) Indicate how the project fits into the country's development programme and its linkages to the sector.
  - (iii) Describe relation of project to other externally assisted projects. State year of start or completion and status of these projects. Indicate donors and external agencies assisting the sector.
  - (iv) Indicate if there is community participation and involvement envisaged in project implementation.
6. Responsible Government Agency Indicate exact name and address of Government agency responsible for the implementation of the project and to which correspondence should be directed.
7. Institutional Support
  - (i) Describe existing and expected support for operation and maintenance of systems. Also indicate whether funds have been earmarked for operation and maintenance of systems once they are built.
  - (ii) State if project will operate on cost recovery basis. If not, indicate who will pay for the recurrent costs and to what extent.
  - (iii) Indicate the type of organization and management available for project implementation.
8. Duration Expected duration of project. Duration of each phase if applicable.
9. Starting Date Tentative timing for the start of the project. Also indicate what actions will indicate the start of the project.
10. Estimated Cost Total cost of project in US dollars.

*Guidelines to Complete Project Data Sheet (Cont.)*

11. Government Inputs
  - (i) Personnel: State number and designation of counterpart national staff assigned to project. Indicate, if possible, their background, experience, etc., and the support they can provide to project.
  - (ii) Equipment and supplies: Indicate vehicles, equipment, etc., allotted to project.
  - (iii) Funds: Specify Government contribution to project, in cash and kind in US dollars.
12. External Inputs
  - (i) Personnel: State number, background and field of expertise required of foreign experts, consultants, etc., with man months in each case.
  - (ii) Equipment: Indicate if any equipment and supplies are to be provided from external sources.
  - (iii) Funds: State amount of external funding required in US dollars.
13. Sector Development Performance
  - (i) Indicate and name how many similar or related projects have been implemented,
  - (ii) State what Government support has been given to sector development,
14. Outputs
  - (i) State the nature of studies that will come out of the project, Also improvement in the institutional aspects, etc.
  - (ii) State investment projects with estimated costs that will come out of the project. Also improvement in the institutional aspects, etc.
15. Government Priority and Commitment
  - (i) Indicate if project is included in Government development plan and country programme.
  - (ii) Indicate degree of Government priority and commitment to project.
16. Benefits
  - (i) Indicate total population that will be served as a result of the project; also what groups will be the beneficiaries (type of consumer, hospitals, industry, etc.).
  - (ii) Indicate expected improvement in health and socioeconomic conditions.
  - (iii) Indicate personnel (number, types, etc.) expected to be trained as a result of project and improvement in local sector manpower situation.
17. Prepared by

State name of official who completed the data sheet or provided the relevant data for its completion.