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**Asian
Non-Government
Organizations'
Forum on Water
Development**

**Consolidated
Report**



**September
14 to 16, 1983
Sjantikara Campus
Yogyakarta,
Indonesia**



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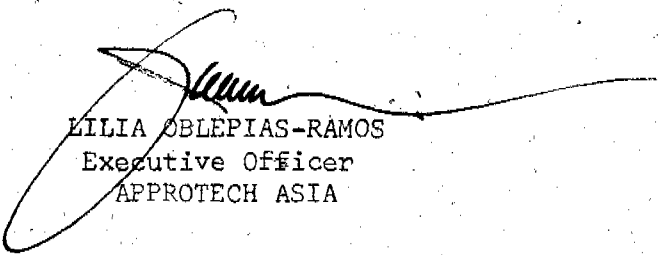
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PREFACE

APPROTECH ASIA is pleased to present this consolidated report of the Asian Non-Government Organizations' Forum on Water Development, held September 1983 in Yogyakarta, Indonesia. The body of the report fully, and we feel accurately presents the salient events of the four-day Forum. It is our hope that the report will be of use to individuals and institutions involved in water and sanitation projects in Asia (and beyond). Collectively, the experiences highlighted during the Forum represent more than a decade's experience in community development. As the introductory essay of this report states, the Forum has been "the occasion for much fruitful sharing" and through this report, we hope that this process of sharing will be continuous and substantial. It remains only for us to thank all the participants and their institutions, our host Yayasan Dian Desa of Indonesia and especially its director, Anton Soedjarwo, recipient of the 1983 Ramon Magsaysay Award for Community Leadership. We also acknowledge the Philippine Business for Social Progress for its valuable assistance both during the Forum and in the preparation of this report. Needless to say, we also thank the collaboration given by the International Development Research Centre and the Iwatani Naoji Foundation.

This report was edited for publication by J. Ibarra Angeles, who also wrote the introductory essay entitled, "The Water Decade and Asia's Imperatives."



LILIA OBLEPIAS-RAMOS
Executive Officer
APPROTECH ASIA

16 December 1983
Manila, Philippines

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THE WATER DECADE AND ASIA'S IMPERATIVES

"All peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs."

- UNITED NATIONS WATER CONFERENCE RESOLUTION ON
COMMUNITY WATER SUPPLY (Mar del Plata, Argentina,
March 1977)

WATER COVERS three-quarters of Spaceship Earth; and yet, fresh water -- vital for sustaining life, health and productive activities -- constitutes only 0.8 per cent of the world's supply. And nobody really knows just how much of this amount is fit for human consumption.

What is known is that half of the world's population does not have access to a safe and adequate drinking water supply. Characteristically, the developing nations share the greater burden of this tragedy, with three-fifths of their peoples suffering the gamut of physical, economic and social devastations directly or indirectly attributed to the lack of safe drinking water and sanitation systems.

In Asia, the situation is one of great concern. A report by the World Health Organization (WHO) mentions that a significant proportion of illness in the Southeast Asian (SEA) region stems from water-borne and water-related diseases. Depressed socio-economic conditions, poor education, lack of sufficient water supplies and adequate sanitation systems contribute to this situation. Exceptionally high mortality rates are common in most of the countries in this region. Diarrhoeal diseases

of children and severe malnutrition are major contributors to the high proportion of deaths during infancy and childhood. Typhoid, dysentery, cholera and amoebic infections are widely prevalent. The WHO report has indicated the existence of a general relationship between infant mortality rates and the percentage of the population having no access to a safe water supply and adequate sanitation. It has been estimated in 1980 that in the entire SEA region, only 39% of the total population have access to safe water, while only 19% enjoy some form of sanitation facility. The problem is clearly a rural one. Seventy per cent of SEA's rural population are using unsafe water. Ninety per cent of them do not use any sanitation facility at all.

Responding to the call of the United Nations' International Drinking Water Supply and Sanitation Decade (1981-1990), Asian governments have begun setting up water and sanitation improvement targets for both their urban and rural sectors. And yet, as one of the papers in the NGO Water Forum decries, implementation has been far from satisfactory, due in large part to an inability of policy-makers to see water and sanitation as critical development issues.

Undeniably, there are serious constraints. Countries of the Asia and Pacific region, majority of which have per capita GNPs of US\$500 or less, find themselves sharply limited in mobilizing enough resources to meet their water/sanitation targets. The chief constraint continues to be the shortage of funds -- in itself an indication of how development priorities are being fostered. In addition, Asian countries have a shortage of trained manpower, lack institutional arrangements, are inadequate in materials and equipment, and have a shortage of water resources.

The constraints are huge. But they are not insurmountable. The key, according to the Decade dossier, is the use of the right technology -- technology that is technically, economically and socially appropriate to individual Asian communities. It is thus not surprising that the conference papers highlighting the water/sanitation experiences of Asian NGOs share several common grounds. One, as has been mentioned, is the emphasis on the development and use of appropriate technologies. Another is the stress given to total involvement of the village people, they who will eventually benefit and maintain the kinds of water/sanitation systems installed in their respective communities. Perhaps even more significant is the final realization that women, in particular, are critical elements in any water supply and sanitation development programme. For this reason, one of the lectures delivered during the Water Forum explored the implications on women, of the scarcity or availability of water. Inevitably, water supply and sanitation improvement schemes must be designed with the participation of women, the traditional water carriers; indeed, design questions need to be formulated from their point of view.

The issue of design redounds back to suitable or appropriate technologies. In these, the Water Forum has been the occasion for much fruitful sharing, not only in terms of "hardware" knowledge, but also in the very vital field of "software" development and dissemination. A common consensus for example was the importance attached to community organization, commitment and skills training. While seen as a health and sanitation necessity, water projects are not viewed as isolated from other community concerns. Rather, as the Decade dossier affirms, they are part of a broadbased development strategy of community development

that, without neglecting growth, promotes structural and institutional changes "to ensure more equitable distribution of benefits and wide popular participation." Thus, the mobilization of communities for water/sanitation activities addresses as basic, physiological human need, with tremendous ramifications for the communities' social and economic upliftment.

The case of India offers a dramatic illustration. In this country, water-borne diseases alone claim 73 million work days every year. The cost in terms of medical treatment and lost production has been estimated at around US\$600 million annually.

In another vein, water supply and sanitation activities can actually lead to a worsening of the relative position of the poor, if badly designed. Equal contributions, for example, exacted from all residents for the construction or operating costs of a water supply system may mean an expense which poor families cannot afford. Or access to a new water supply may be restricted or monopolized. This danger includes cases where the project design ostensibly covers the poor as well, but actual flow is limited or diverted, so that only the dominant group benefits (e.g., by use of water for farming purposes, in such quantities that it no longer reaches the homes of the poor).

Central then to any water project is close collaboration with those which it intends to serve: the majority of the community inhabitants. Such collaboration does not happen automatically for a variety of social or cultural reasons; it is a process. Thus, the equally vital task of building and organizing human communities, to ensure that programmes are (in the words of the Decade dossier), "socially and economically relevant, achieve self-sustaining status, and encourage self-reliance."

It is of course the unique advantage of the institutions which participated in the NGO Water Forum to have had extensive experiences in direct work with communities. Their appreciation and handling of water supply/sanitation problems in their respective countries demonstrate a sensitivity to the psyche of the Asian poor which comes from seeing people as people, and not as mere statistics in a public technocrat's data banks.

In a world of distorted priorities -- where for example US\$511,000 million a year is spent for military purposes -- the quest for a simple water pump must surely be one of the most humane, civilizing tasks remaining.

14 November 1983, JIA

NGO WATER FORUM
Executive Summary

ASIAN NON-GOVERNMENT ORGANIZATIONS' FORUM ON WATER
DEVELOPMENT

THE ASIAN Non-Government Organizations' Forum on Water Development was conducted from September 14-16, 1983 at the Siantikara Campus, Yogyakarta, Indonesia.

Twenty-one (21) representatives from a similar number of development organizations based in the ASEAN region participated in the conference hosted by Yayasan Dian Desa of Indonesia. Dian Desa takes a leading role in introducing and propagating appropriate technologies in Indonesia. The participating organizations are involved in technology sourcing, research, development, training, information dissemination, rural and urban community building and human resource development. Countries represented included: India, Bangladesh, Indonesia, Sri Lanka, Thailand and the Philippines.

Principal guests to the Water Forum included Mr. Michio Ito, Programme Officer of the Asian Community Trust; Mr. Lee Kam Wing, Programme Officer of the International Development Research Centre (IDRC); Ms. Vijita Fernando, Consultant, United Nations Development Programme; and, Mr. Mesbahuddin Akhter, Programme Co-ordinator for Water and Environmental Sanitation, United Nations Children's Fund (UNICEF), who delivered the keynote address.

The Water Forum was coordinated by APPROTECH ASIA, the Asian Alliance of Appropriate Technology Practitioners, in collaboration with the IDRC and the Iwatani Naoji Foundation of Japan. APPROTECH ASIA is a

regional appropriate technology service mechanism composed of institutions, formal and non-formal groups and individuals from eight (8) Asian countries: Bangladesh, India, Indonesia, Malaysia, Philippines, Sri Lanka, Singapore and Thailand. The Philippine Business for Social Progress (PBSP) provided technical and logistical support.

The Water Forum has learning-sharing sessions designed to achieve its objectives. These sessions were in the form of lecture/discussions dealing with the causal relationship between water and certain key welfare concerns; presentations on the experiences of various NGOs in the implementation of water and sanitation projects, field visits to Dian Desa water development projects; dialogues with potential resource support agencies; small group discussions; sessions aimed at formulating possible NGO strategies on water; and, individualized consultations of project proposals with possible funding institutions.

The Water Forum pursued the following objectives:

- (1) To bring together NGOs currently involved in or who may be interested in implementing water and sanitation programmes in the Asian region;
- (2) To provide participating NGOs with the opportunity to see a variety of affordable technologies in the provision of potable water for the rural and urban poor;
- (3) To enable participating NGOs to discuss issues pertaining to the planning and implementation of water and sanitation programmes, especially with regard to women;
- (4) To enable participating NGOs to learn from the experiences of identified organizations in the successful implementation of water and sanitation programmes; and,
- (5) To complete project proposals for implementing water supply and sanitation programmes.

PROCEEDINGS HIGHLIGHTS

(1) Mr. Anton Sudjarwo, Executive Director of Yayasan Dian Desa delivered the welcoming remarks and introduced the keynote speaker,

Mr. Mesbahuddin Akhter, Programme Coordinator for Water and Environmental Sanitation, United Nations Childrens Fund (Jakarta).

(2) Mr. Akhter's keynote address focused on "The Asian Situation: Need for Potable Water and the Utilization of Appropriate Technology." In his address, Mr. Akhter stressed the vital role played by adequate drinking water systems in maintaining a humane quality of life, particularly in the rural areas of Asia. He explained how a majority of the underdeveloped world's peoples had no access to a safe and adequate drinking water supply, and of how the choice of the right technology is the crucial strategy in overcoming the major problems facing the water development goals in the Asian region. He concluded his address by pointing to the use and expansion of innovative and appropriate technologies as one of the most important contributions of NGOs in helping to solve the developing world's water and sanitation problems.¹

(3) Lectures/discussions during the Water Forum's first working day dealt with the causal relationships between water and certain important welfare issues. These provided crucial springboards for a deeper appreciation of the water problem, and of possible strategies for alleviating it. Specifically, the lectures/discussions were those of Dr. Bimo,

¹An edited version of this address may be found in the body of this report. See page 18.

Yayasan Indonesia Sejahtera, on the "Implications of the Absence/Availability of Water on Health and Sanitation", Ms. Jae Hee Kim, Programme Officer, UNICEF, on the "Implications of the Absence/Availability of Water on Women." (Paper was read by Mr. M. Akhter). The latter in particular brought to the surface of growing consensus that women, especially rural women, are crucial factors in the successful implementation of water projects, and that women should not only participate in the design of water projects, but should be given the distinction of having the design questions formulated from their point of view.

(4) The first working day of the conference was largely devoted to the presentation of working papers, dealing with the experiences of several NGOs in implementing drinking water and sanitation projects. Each presentation was followed by an open forum. The working papers were as follows.

(4.1) "Rainwater Collection for Safe Drinking in Rural Thai Villages." The paper was presented by Mr. Tanothai Sookdhis, Manager, Asian Center for Population and Community Development, PCDA.

(4.2) "Clean Drinking Water -- A Basic Need", by the Rural Technical Service Unit, Sarvodaya Shramadana Movement, Sri Lanka. The paper was presented by Mr. Dharmadasa Pathirana, Coordinator, Engineering Division, Sarvodaya.

(4.3) "ACHAN's Concerns with Water and Sanitation Projects", by Susan B. Rifkin, Coordinator, Asian Community Action Network (ACHAN), Hongkong. The paper was presented by the author.

(4.4) "Urban Community Development Programme -- An Environmental Improvement, Sanitation Maintenance and Community Health-care Programme in the Slums of Ahmedabad", by the VIKAS Centre for Development, India. The paper was presented by Mr. Rajesh Shah, Executive Secretary, VIKAS.

(4.5) "Participation in the Drinking Water and Sanitary Decade Programme", by the Kerala Gandhi Smarak Nidhi (KGSN), Kerala, India. The paper was presented by Mr. K. Janardanan Pillai, Chairman, KGSN.

(5) On the third day of the conference, Ms. Vijita Fernando, Consultant to the UNDP Water Forum, presented to the participants the Final Action Plan (Consensus and Strategies) resulting from the Sri Lanka National NGO Consultations for the International Drinking Water Supply and Sanitation Decade, held in Colombo, Sri Lanka, 8 December 1982.

(6) Representatives of participating organizations were given an opportunity to confer with two possible institutional sources of technical and/or financial support. Mr. Lee Kam Wing, Programme Officer, gave a presentation for the IDRC, while Mr. Michio Ito, Programme Officer for the Asian Community Trust, gave a similar presentation.

(7) During the final working day, participants were asked to engage in small group discussions. This was for the purpose of formulating specific project proposals for implementing water and sanitation programmes. These project proposals became the basis for individual discussions with representatives of potential funding agencies. Together with the documentation of NGO experiences, the project proposals constituted one of three major conference outputs.

(8) The final output of the Water Forum were recommendations submitted as inputs to the APPROTECH IV Conference, held in Indonesia from September 17-19, 1983. These recommendations are as follows:

- (8.1) Collect and disseminate information from members and other sources (e.g., funding sources, the international community), and to publish a newsletter for this purpose;
- (8.2) Assist members in identifying financial, technical and manpower resources or expertise that could be tapped in the planning and implementation of water system projects;
- (8.3) Assist members perform their advocacy roles;
- (8.4) Adopt a program that will facilitate transfer of technology and expertise (e.g., training, personnel exchange);
- (8.5) Encourage increased dissemination of small-scale technologies utilizing social marketing schemes and setting up of small businesses;
- (8.6) Coordinate operations research in member countries to evolve policy options and strategies for disseminating water system technologies; and
- (8.7) Assist members prepare proposals, with a possible activity being the provision of training in research methods and techniques.

ABSTRACTS OF WORKING PAPERS

Title: "Rainwater Collection for Safe Drinking in Rural Thai Villages",
by Tanothai Sookdhis, Population and Community Development
Association (PCDA), Bangkok, Thailand. The paper was presented
by the author.

THE PAPER discussed the positive results of CBATDS' pilot studies in
rainwater collection and storage in the Ban Pai District, Khon Kaen
Province. Slated for expansion in other areas, the project emphasized the
use of locally-available materials, suitable technologies and intensive
participation of the village inhabitants.

In particular, the pilot study project tested the technical feasibility
and rural village suitability of three types of rainwater tank constructions:
ferrocement, bamboo-reinforced concrete, and pre-cast sewer pipes.
Related to this was an effort to determine the storage volume needs of
villagers. The pilot study also tested technology software: organization
and involvement of the project's beneficiaries. Village participants
provided free labour and availed of loans for construction materials,
payable according to a pre-agreed repayment scheme.

A total of 51 rainwater tanks were constructed in the two pilot
villages. Each tank had a storage volume of from 3.4 to 11.3 cubic meters.
The bamboo-reinforced concrete tank with a storage capacity of 11.3
cubic meters proved to be the most acceptable design for villagers.

As a result of this pilot study, CBATDS will implement the project
on a wider scale in the three provinces of Buriram, Khon Kaen and Mahasarakam,
in the northeastern region of Thailand. Nearly 9,000 water tanks of the
bamboo-reinforced concrete variety will be constructed over a period of
four (4) years.

Title: "Clean Drinking Water -- A Basic Need", by the Rural Technical Service Unit, Sarvodaya Shramadana Movement, Sri Lanka.

Presenter: Mr. Dharmadasa Pathirana, Co-ordinator, Engineering Division, Sarvodaya.

THE PAPER discussed the activities and strategies used by Sarvodaya in its water projects. All water-related activities are not carried out in isolation but are integrated into the framework of Sarvodaya's strategy for overall community development. The paper briefly describes the water projects in terms of: technical options and technology level ("kept deliberately low"); methodology of project implementation ("active participation of the village population"); training of human resources ("basic skills...leadership...village work"); the drinking water well programme, involving village organizational schemes and the technical evaluation of several village water supply technologies.

Sarvodaya sees the need for clean drinking water in Sri Lanka as acute: 1980 figures show that only 12% of the total population had access to safe drinking water.

In all its water projects, technology options are kept purposely low, and the systems simple but of high quality -- to keep maintenance requirements minimal; to maintain the system at village levels; to keep costs minimal; and, to ensure longevity for the installations.

The drinking water program conforms to the general Sarvodaya strategy of village development in that, great emphasis is placed on the participation and initiative of the villagers, at all stages of implementation. Villagers are consulted, taught skills, and given education on the concepts of health and sanitation. Sarvodaya believes that a village water system will endure only if the villagers have a clearly expressed commitment to the maintenance of a communal water installation and a strong sense of collective ownership and responsibility.

Title: "ACHAN's Concerns with Water and Sanitation Projects",
by Susan B. Rifkin, Co-ordinator, Asian Community Health
Action Network (ACHAN), Hongkong. The paper was presented
by the author.

MS. RIFKIN's paper briefly described the work of ACHAN, with emphasis on the water technology system being pursued by the organization. The paper emphasized the softwares that are necessary for introducing and eventually institutionalizing the systems in the villages.

The paper identified the three component parts of a good water technology system: (a) the systems operation, reflecting the physical facilities available for securing safe water or implementing sanitation projects; (b) the systems performance, focusing on the behaviour and belief of the community people regarding the use of physical facilities; (c) the systems impact, describing the outcome of the technical interventions in terms of health, economic, social and environmental impacts.

Pinpointed were the vital roles played by appropriate technology, community participation, and development of software -- described as the "research, training and evaluation necessary to ensure successful implementation, utilization and projected benefits of the water/sanitation facilities").

ACHAN summarizes its contributions to water and sanitation projects with the statement that, it helps "to strengthen the links between the systems operation and the systems performance" through various awareness-building, research and training activities.

Title: "Urban Community Development Programme -- An Environmental Improvement, Sanitation Maintenance and Community Health-Care Programme in the Slums of Ahmedabad", by the VIKAS Centre for Development, India.

Presenter: Mr. Rajesh Shah, Executive Secretary, VIKAS.

THE PAPER is essentially a master plan for a health and welfare package for the slum communities of Ahmedabad, the sixth largest city of India. Designed as a 5-year effort, the project hopes to inject "various inputs of environmental and sanitation maintenance, housing improvement and primary health care", introduced at the appropriate time and with active involvement of the community inhabitants. Target beneficiaries are some 5,000 slum families.

VIKAS considers its programme as an alternative approach which will demonstrate that minimum sanitation, hygienic living conditions and primary health services can be provided to slum families at relatively modest cost.

Central to the programme is the organization and participation of the community people, who are expected to "share the burden in implementing the programme, both by taking over the responsibility of management and by providing financial contributions."

This programme covers the following key areas, to be implemented in several phases: environmental sanitation, shelter, community health care, and primary health care. Throughout all the stages of the programme, the active involvement of the community people, their organization, their training for skills, and their continuing education on health principles is seen as paramount.

Title: "Participation in the Drinking Water and Sanitation Decade Programme",
by Kerala Gandhi Smarak Nidhi (KGSN), Kerala, India.

Presenter: Mr. K. Janardanan Pillai, Chairman, KGSN.

THE PAPER briefly describes the work of KGSN, now on its third decade, among the rural poor of Kerala State. KGSN implements an integrated rural development programme, with a potential beneficiary audience of about 600,000 people. The agency's water and sanitation activities include the construction of protected water supply sources, latrines, dissemination of community health information, provision of training to community members, installation of smokeless ovens and community organization and mobilization.

KGSN covers thirteen (13) districts of the State through a network of sixty (60) centres. Each centre works among two thousand families, covering roughly a population of ten thousand.

Initially, water coverage targets (100% by 1985) were highly optimistic, as set by the State Government. "Looking to the actual performance so far", according to the paper, "this seems to be unrealistic." The State has had the misfortune of undergoing a nine-month drought period. During this time, the severity of the problem became prominent, leading to intensive efforts. Significantly, it is estimated that during this period, 12% of the population was covered, as against a cumulative total of 23% in the last 27 years (an average of less than 1% per year since the beginning of the programme).

The magnitude of the need continues however. States the paper: "Even in the villages where water supply schemes, either pipe lines, tube wells or open wells have been undertaken, the points of supply are

NGO WATER FORUM
Keynote Address

THE ASIAN SITUATION: NEED FOR POTABLE
WATER AND THE UTILIZATION OF APPROPRIATE
TECHNOLOGY

By: Mesbahuddin Akhter, Programme Co-ordinator
for Water and Environmental Sanitation,
UNICEF, Jakarta

14 September 1983

WATER IS ESSENTIAL for life. It makes up nine-tenths of the human body and two-thirds of its weight. Without water, no one can survive for more than a few days. Men have used water since the dawn of history; but the realization of its importance and in some instances, of its danger to health is a relatively recent development.

For half the world's people and three-fifths of those living in developing countries, reasonable access to a safe and adequate drinking water supply is still more a wish than a reality. And it is the poor who suffer the most from the absence of safe water and sanitation. Not only do they lack the means to provide for such facilities; they do not have the information on how to minimize the ill effects of their unsanitary living conditions. The consequences can be staggering.

UNICEF estimates that about 15 million children below the age of 5 die in developing countries every year. The absence of safe water and sanitation plays a major role in this tragedy. If everyone had access to safe water and sanitation, infant mortality could be cut by as much as 50% world-wide. The World Health Organization (WHO) estimates that approximately 80% of all sickness and disease can be attributed to inadequate

water and sanitation. Diarrhoea alone directly kills six million children in developing countries every year and contributes to the death of up to 18 million people.

The economic and social costs of the lack of safe drinking water and sanitation are also very high. Surveys show that in certain arid and semi-arid parts of the world, it is not uncommon to find a household where someone has to spend more than six hours each day collecting water from far away sources. In such circumstances, it is usually women and children who suffer the most. Instead of a journey to school, the day can begin for a young child with a long difficult walk to fetch water. Ironically, the water that is obtained even after this painstaking labour may not promise life. If it is polluted, such water may bring disease and even death.

Rural areas have been the most severely affected. Approximately 75% of those living in urban areas of developing countries receive some form of safe drinking water. In contrast, only 29% of those in rural communities have clean water readily available. With regard to sanitation, 53% of the urban population of developing countries receive adequate services, while only 13% of the rural people are served.

The situation in Asia and the Pacific region is even more distressing than those of other areas. In this region, based on 1980 estimates, only 39% of the total population have access to safe water while only 19% is covered with some form of sanitation facility. The difference between the urban and rural areas are quite significant. While 70% of the urban population is covered with safe water supplies, only 30% of the rural population have access to safe water. In sanitation, the coverage disparity is even more immense, with only 10% of the rural population enjoying some form of sanitation system.

To give you a clearer picture of the situation, I will quote some figures compiled by the UN General Assembly, WHO and UNICEF. Afghanistan with a population of about 22 million and a high infant mortality rate of 184 per 1,000 live births, has adequate water supply for 22% of its urban population, but only 8% for its rural population. Bangladesh, an overcrowded nation of 90 million people and with a very low per capita GNP of US\$110 has safe water for about 50% of its population. In Burma, the population coverage with safe water is about 38% for the urban areas and about 15% for the rural areas. Of the 700 million people in India, only 41% is served with water. In Indonesia, about 36% of the urban population and about 15% of the rural population are reported to be served by safe water. Only 6% of the rural population, and about 80% of the urban population of Nepal enjoys clean water. Figures for the other countries in this region are also available in the same documentations. Coverage levels for urban areas generally vary from 20% to 90%, whereas those for rural areas are considerably lower; usually, between 6% to about 70%.

These distressing conditions have moved the world community through the United Nations, to initiate actions for improving the situation within a minimum possible time.

After a series of earlier conferences, the United Nations launched on 10 November 1980 the International Drinking Water Supply and Sanitation Decade. The World Bank estimates that the total cost for meeting the Decade's goal of drinking water and sanitation for all could be as high as US\$600,000 million. By choosing suitable technologies for both urban and rural sub-sectors and by providing a wider mix of service levels, this

cost has been brought down to US\$300,000 million or less. Thus, investment requirement may vary considerably with the choice of technology and the mix of services provided to the people.

There exists, for instance, a range of technologies with different costs, levels of convenience and sophistications in urban sanitation. Substantial reduction in costs are also possible in water supply by using a mix of services involving individual house connections, community stand-posts and handpumps.

Developing countries, including those in Asia, have already set their own coverage targets and objectives. While some countries stress the importance of upgrading existing systems, others are planning to increase accessibility to unserved populations of at least minimum levels of service. The targets and objectives being contemplated by the international community for the Decade are, thus, becoming more country specific and therefore, more realistic.

In the Decade commencement report of WHO Southeast Asia region, the major constraints towards achieving Decade targets have been identified to be the shortage of funds; the other constraints being shortage of trained manpower, lack of institutional arrangements, inadequacy in materials and equipment, and shortage of water resources.

The extent of resource requirements is, again, largely dependent on the choice of technology. Thus, one of the key strategies in the success of the Decade would be the choice of the right technology.

Selecting technologies which are technically, economically and socially relevant will be crucial in the installation and maintenance of water supply and sanitation facilities, especially in Asia where

shortage of resources, including finance and technical personnel, is a major obstacle. Water systems may depend upon complex machines as mobile drilling rigs or simple tools like the bamboo water pump. But technical considerations alone cannot determine what technology to select. Both the drilling rig and the pump have been developed under specific social, economic, environmental and cultural settings. Both require certain materials, skills and knowledge to build, operate and maintain. Many countries have sought to develop by using advanced technologies. Most of these are imported from the industrialized countries where high labour cost and plentiful supply of capital favor technologies that minimize the former and maximize the latter. In those situations, in the design of water supplies, the choice of components, materials, and dimensions are often governed by codes of practice or by professional conventions which engineers trained in the West too readily take for granted. And not only do these conventions limit the adaptation of designs to local needs, they are often suited to the needs of an urban water supply in say Europe, rather than to a village water supply in an Asian country. Dependence on imported technologies has also caused a drainage of hard currencies, increased dependence on imported spare parts and fuel, displaced local labour and caused environmental damage. At the other end of the spectrum, there are simple technologies which have helped people meet their needs adequately for thousands of years. Many of these, such as bamboo water pipes and clay water storage may still be effective today. However, these technologies may be hard to use, of limited productivity and not very durable. They often require adaptation and upgrading to meet changing requirements.

In between these two extremes is a whole range of choices among intermediate and appropriate technologies. These may provide the best solutions in

situations where simple technologies are inadequate, and where labour is plentiful and capital scarce. These technologies normally:

- are produced locally, using available resources and expertise;
- fit in with local cultural and geographical environments;
- are low-cost and thus affordable;
- are people-oriented, and thus meeting needs effectively;

It is extremely encouraging to note that there is a significant increase in the use of appropriate technologies, specific to water supply and sanitation projects in Asia. Examples may be made of manual techniques of drilling handpump wells, which have helped install a very large number of handpumps in India, Bangladesh, Nepa and other countries at very reasonable costs. Similarly, introduction of ferro-cement and bamboo-cement technologies have helped in the construction of household rain collection tanks in Thailand, Indonesia and other Southeast Asian nations. There are other successful examples which also involve use of low-cost local materials and local expertise.

There is every reason to believe that the use and expansion of innovative and appropriate technologies will continue and I believe the non-government organizations have very important roles to play in this field.

Appendix A

LIST OF PARTICIPANTS AND GUESTS

1. MR. MOHAMMAD AFSARUDDIN, Project Manager, Savar Gonoshasthaya Kendra.
2. MR. SHAIKH ABDUL HALIM, Executive Director, Village Education Resource Center.
3. DR. B.V. PARAMESWARA RAO, Secretary, The Bhagavatula Charitable Trust.
4. MR. ANTON SUDJARWO, Director, Yayasan Dian Desa.
5. DR. BIMO, Yayasan Indonesia Sejahtera.
6. MR. SUTRISNO KUSUMOHADI, Vice-Director, Planning and Development, Yayasan Indonesia Sejahtera.
7. DR. IGNACIO PABLO, Vice-President, Science & Technology Division, Barangay Technology Center, Philippine Women's University.
8. MRS. LILIA OBLEPIAS-RAMOS, Executive Director, Manila Community Services, Inc.
9. MR. ERNESTO D. GARILAO, Executive Director, Philippine Business for Social Progress.
10. MR. BENJAMIN GERTES, Managing Director, Philippine Center for Appropriate Technology and Training.
11. MR. A.W.M. TILLAKARATNA, Deputy Director, Community Development Services.
12. MR. TANOTHAI SOOKDHIS, Director, Asian Centre for Population and Development.
13. MR. DHARMADASA PATHIRANA, Coordinator, Engineering Division, Lanka Jathika Sarvodaya Shramadana Sangamaya, Inc.
14. MR. DAVID RICHARDS, Manager, Asia/Middle East, AT International.
15. MR. MAHINDA THENABADU, Officer-in-Charge, Technonet Asia.
16. MR. K. JANARDANAN PILLAI, Chairman, Kerala Gandhi Smarak Nidhi.
17. MR. RAJESH SHAH, Executive Secretary, VIKAS-Center for Development.
18. MS. SUSAN RIFKIN, Coordinator, Asian Community Health Action Network (ACHAN).
19. MR. CRESENTE PAEZ, Executive Director, Visayas Cooperative Training Center.

(G u e s t s)

- 20. MR. MICHIO ITO, Programme Officer, Asian Community Trust.
- 21. MR. LEE KAM WING, Program Officer, International Development Research Centre (IDRC).
- 22. MS. RUTH LECHTE, Consultant for Appropriate Technology, World Young Women's Christian Association.
- 23. MR. MESBAHUDDIN AKHTER, Programme Coordinator for Water and Environmental Sanitation, United Nations Children's Fund, Jakarta.

(S e c r e t a r i a t)

- 24. RUTH S. CALLANTA
- 25. ZENAIDA A. ABAD
- 26. EDERLINDA P. GAMBOA
- 27. CRISTINA ARISTANTI SUDJARWO
- 28. RAUL GARCIA

Appendix B

CONFERENCE PROGRAM

- September 13 Arrival and Registration
- September 14 Opening ceremonies
- Keynote address by Mr. Mesbahuddin Akhter, UNICEF.
- Lecture/discussion on the "Implications of the Absence/
Availability of Water on Health and Sanitation", by
Dr. Bimo, Yayasan Indonesia Sejahtera.
- Lecture/discussion on the "Impact of the Absence/
Availability of Water on Women", by Ms. Jae Hee Kim,
Programme Officer, UNICEF.
- Presentation of Working Papers: Organizational
Experiences in Implementing Water and Sanitation
Projects.
- September 15 Project visitations
- September 16 Recapitulation of Previous Activities
- Presentation by Ms. Vijita Fernando, Consultant,
UNDP Water Forum on Possible NGO Strategies on Water.
- Small group discussions and presentation of group
outputs.
- Talks by Mr. Lee Kam Wing, IDRC, and Mr. Michio Ito,
Asian Community Trust, on "Opportunities Available
for Water and Sanitation Projects."
- Finalization of Project Proposals/Individual
consultations.
- Closing activities.

Appendix CWORKING PAPER

Title : "Clean Drinking Water -- A Basic Need", by the Rural Technical Service Unit, Lanka Jathika Sarvodaya Shramadana Sangamaya, Inc., Sri Lanka.

Presentor : Mr. Dharmadasa Pathirana, Coordinator, Engineering Division, Sarvodaya.

I. INTRODUCTION

The world's people suffer from a lack of clean and sufficient drinking water. According to the World Health Organization (WHO), 1,320 M people in the 3rd World were without clean water in 1980. The human sufferings behind this naked figure are beyond imagination.

The immense task of supplying water to all these people has spurred individuals, groups, organizations and governments all over the world toward special efforts. Of these, one of the most noticeable is the Water Decade of the UN with its overly optimistic targets.

This paper deals with the efforts in this field by the Lanka Jathika Sarvodaya Shramadana Sangamaya, Inc. (Sarvodaya). Sarvodaya is a private grassroots organization for which the satisfaction of basic human needs is not the end but only the beginning of development -- development not so much of infrastructures but of people.

II. THE SARVODAYA APPROACH IN BRIEF

The Sarvodaya ideal is the creation of a just economic and political order. The very name of the movement is significant. "Sarvodaya" means "awakening of all" while "shramadana" means "sharing of labor." Hence, Sarvodaya's strategy is the awakening of all through the sharing of thought, time and energy. "Awakening" means reminding the people of their moral, cultural, and religious values, thereby bringing to bear the full potential of individuals, families, villages and the nation to work for society's change and betterment.

The Sarvodaya Movement recognizes that a human being can only be engaged in a socially beneficial and personally satisfying livelihood if he can live in an environment where he is psychologically secure, physically cared for, socially and politically free.

This is where "traditional" technically-oriented development work comes in. The work proceeds through a wide range of activities geared to an aim higher than the mere satisfaction of basic needs. The "technical" work is in the provision of these needs, ten of which the villagers of Sri Lanka themselves have identified, as necessary for building a good life. These basic needs are:

1. A clean and beautiful environment
2. An adequate supply of safe water
3. Minimum clothing requirements
4. A balanced diet
5. Simple housing
6. Basic health care
7. Communication facilities
8. Energy
9. Total education related to life and living
10. Spiritual and cultural needs.

III. SARVODAYA'S RURAL TECHNICAL SERVICES

Over the past 25 years, the Sarvodaya Movement has developed an organizational structure having a wide range of service sections to carry out the increasing scope of development work.

One of the specialized sections in the Rural Technical Services Section (SRTS). Through SRTS, rural infrastructural work is initiated, planned and implemented in any area of Sri Lanka where Sarvodaya assistance is either active or requested. SRTS is an integrated part of the Movement at district level. The District Coordinators are directly responsible for the implementation of all SRTS assisted projects.

Regional technical offices of SRTS are located in Moratuwa (for West and Southcoast), Anuradhapura (North), and Palletalawinna (Hill country and Eastcoast). Activities include:

- Agricultural training and extension work with emphasis on home gardening and improved methods for rainfed farming in the Dry Zone
- Construction of simple village water supplies in the Hill country
- Construction of drinking water wells and development of a locally-manufactured handpump
- Sanitation programmes
- Masonry training
- Technical training
- Afforestation and soil conservation programmes

- Rural settlements; low-cost housing
- Design and construction of appropriate tools and implements, such as windmills, handpumps, agricultural equipment, tools and materials for building construction, etc.; in the Sarvodaya workshops in Moratuwa, Palletallewinna (Kandy) and Anuradhapura.
- Planning and supervision of buildings and service facilities for Sarvodaya centres.

SRTS is not a funding body. However, sponsorship by Helvetas (the Swiss Association for Technical Assistance) enables it to have an independent budget. It is thus able to support, in a limited number of cases, its technical interventions with financial inputs.

IV. THE NEED: CLEAN WATER

In 1980, only about 12% of the total Sri Lankan population had access to safe drinking water. In the rural sector, 99% obtain their daily water requirements from shallow wells or surface sources. These wells and sources are not protected. Hence, the quality of water is highly questionable. In addition, these sources dry up during the summer months, especially in the country's so-called Dry Zone. It is not surprising therefore that 40% of hospital beds are occupied by patients suffering from water-related illness. Outbreaks of diarrhoea and cholera are common, and a great number of people unknowingly are weakened by intestinal parasites (e.g., amoebiasis, worms, etc.).

V. SRTS WATER PROJECTS

1. Technical Options and Technology Level

The objective of any drinking water supply scheme is to provide a safe and adequate amount of drinking water that is within a reasonable distance from the consumer. Construction should be simple, durable and reasonably costed.

SRTS water projects avail of two different options:

- In the low country and coastal areas, groundwater is tapped with shallow dug wells and the water is extracted through a simple, Sarvodaya-made handpump. The well-head is thoroughly sealed, so that the groundwater remains uncontaminated.
- In the hill country, springs situated above the village are caught sufficiently inside the ground and the water is piped by gravity to a storage tank and from there to public standposts. Every measure is taken to protect the water from contamination, e.g., the catchment area is established as a protection zone, the storage tank is well-sealed and the pipes are laid three feet underground.

The choice of the water supply system (well or gravity) is dictated by local conditions. Where possible, gravity systems are preferred despite the higher per capita cost because --

- Handpumps on wells are mechanical devices which require maintenance and prone to breakdowns. A gravity system requires marginal maintenance;
- Shallow groundwater is exposed to contamination by pit-latrines, unprotected old wells, surface run-off, etc.;
- Basic requirements for general health improvement, like accessibility and quantity of drinking water, are normally best met with piped systems.

The level of technology has been deliberately kept low and the systems simple yet of high quality.

- To keep maintenance requirements minimal and within the village level;
- to keep costs low, and;
- to ensure longevity for the installations.

Wells are generally lined with pre-fabricated concrete rings and the well-heads sealed with concrete slabs.

For gravity schemes, all buildings (i.e., tanks, tub stands) are usually done in stonemasonry, according to the locally available material. Chambers and tanks are covered with stonemasonry arches, a labor-intensive construction method which economizes on expensive cement and reinforcements, while yielding high quality construction results.

2. Methodology of Project Implementation:

In view of the Sarvodaya village development strategy, the implementation of a water supply project is not considered an isolated activity. It is preceded, accompanied and followed-up by various other activities. The active participation of the village population is sought and required at all stages of project implementation.

- The request for the improvement of the drinking water situation has to be expressed by the village.
- In a preliminary survey, feasibility and need for improvement are investigated (present status with regard to health, water, sanitation, potential new water sources, etc.). The minimal yield of sources is gauged over one year and compared with the demand.
- Through health education, the villagers are made aware of the relations between good health and clean water. The importance of adequate sanitation is also underlined. Simple charts and a video-tape presentation are used in this phase.

- A project committee is formed by the villagers. This project committee becomes the main organizing and decision-making body of the project in coordination with Sarvodaya.
- SRTS works out the project design and a cost estimate. (There is a standard design for wells).
- The project design is discussed, modified if necessary, and approved by the villagers and Sarvodaya. Work and financing of the project is planned.
- All unskilled work is done by the villagers in Shramadana work, e.g., excavation of trenches, pits or wells, transportation of material, provision of locally available material like stones, sand, etc. According to the progress of work, an experienced group of Sarvodaya workers joins the villagers for the skilled portion of the construction work.
- Parallel to the work on the water project or as a follow-up activity, urgent sanitary improvements are also carried out.
- During construction, attention is already paid to the maintenance of the new water scheme. In particular, caretakers are selected by the village and trained on-the-job, as well as through theoretical courses.
- After completion, the installations are turned over to the village, which will then be solely responsible for future maintenance. For major handpump repairs, assistance from an experienced district pump mechanic and the central workshops is available.

As a rule, government institutions have to be involved to periodically check the hygienic quality of the water.

3. Training:

Through on-the-job training, basic skills in well construction, stonemasonry, handpump installation, simple pipe-laying and plumbing techniques are continuously disseminated to Sarvodaya youth as well as village masons. Theoretical classes for mason trainees are also conducted regularly.

Caretakers for piped systems or handpumps are trained during project implementation and in theoretical courses at the district centres.

SRTS supervisors and technicians give short courses and weekend seminars to concerned village volunteers to enable them to brush up on existing knowledge, introduce new techniques, and also to give more general training in leadership, village work, ways to improve other basic human needs and others.

4. Drinking Water Well Programme:

State of the Work. Well programmes continue to be implemented in ten districts. Emphasis is placed on the completion of wells, since many still remain to be finished. As of June 30, 1983, 141 wells have been completed (including well-head and apron), 68 handpumps installed (with five in fieldtest stage), and 145 wells currently under construction.

Brief Programme Evaluation. During the past year, a number of technical and organizational problems remain unsolved. Aspects of some of these problems are discussed below:

Technical Design and Quality of Construction. The basic design of the SRTS wells remain unchanged (lined with concrete rings; sealed with concrete slabs). The well-head design was modified. A rectangular slab shape was chosen and the design unified in all districts. Until a reliable handpump can be delivered and its subsequent maintenance reasonably assured, the people can get water using buckets lowered through a manhole. Installation of a windlass instead of a handpump is possible.

The quality of construction is still faulty in many places. Basic techniques like sealing the filter package, the proper sealing of ring joints with mortar, etc. are not always done properly.

In the manufacture of concrete rings, the curing of fresh rings is generally neglected.

The above shortcomings continue to be difficult to eradicate, despite frequent attention called to them by the local SRTS staff.

In general however, significant and excellent work is being done by the many dedicated workers in the districts.

Organizational Aspects. The various well programmes are carried out entirely by the district organizations and district SRTS-units. An SRTS-engineer assigned to the districts visits these projects on a sporadic basis.

The delegation of responsibility to the districts is strengthened whenever possible. Delegation entails some disadvantages of course -- like more difficult financial control and higher expense for salaries (SRTS-units cannot be shifted from one district to another).

The selection of well sites is usually done by the villagers in collaboration with Gramodaya and SRTS workers. Although SRTS workers know the basic technical requirements for selection of suitable well sites (i.e., distance from latrines, security from floods, etc.) very poor well locations still occur.

¹Fifty (50) well projects in "excavation only" stage have not been included in the counting.

The villagers are generally well-organized and motivated for the actual construction phase. Often however, maintenance of the installations is not adequate, especially in the case of handpumps, where simple repairs and preventive maintenance are not often done.

More efforts are required in the future on the part of Sarvodaya to motivate the people not only for the construction, but for the much longer phase of operation and maintenance. A clearly expressed commitment to the maintenance of a communal well is necessary, and a strong sense of collective ownership and responsibility has to be created.

Increasing attention has to be paid to the numerous tubewell programmes which are carried out by government and foreign aid organizations and which nor proliferate in some districts, particularly in the Dry Zone. Sarvodaya must address its efforts to areas which are neglected for technical or other reasons by these programmes. The SRTS shallow wells are not suited for all hydro-geological conditions however; hard rock ground or deep watertables can only be overcome by drilling machinery -- a technology that is not within the operating scope of Sarvodaya.

Handpumps. SRTS advocates the sealing of wells with a permanent cover and the installation of a handpump. This is the most effective way to protect the water and to realize the expected improvements in health.

At the time of this report, development work on a simple, reliable Sarvodaya-made handpump continues. For various reasons, mass production remains suspended however.

A general monitoring and repair programme for the Sihilase handpump already installed in the field began last March. To date, all handpumps have been monitored and lists of the needed parts for repairs have been prepared districtwise. Repairs have been carried out in at least three districts. Manufacturing of spare parts for the other districts is in progress. It has been noted that about 30 to 40 per cent of the pumps installed are not operational.

Frequently, the pumps still working had unacceptably high rates of leakage through the footvalve. Especially in areas close to the sea, corrosion of above-ground parts poses a serious problem that cannot be entirely solved as yet even by galvanizing of these parts due to poor galvanizing methods available.

Many pumps could be in much better condition if the village caretakers had done minimal amounts of preventive maintenance or repaired minor faults. Clear instructions to the caretakers and the distribution of a small kit with basic tools will be effected when the installation of handpumps is resumed. Educational and motivational work has to be strengthened. A simple caretaker manual will have to be prepared.

The present period is considered a "testing period" for the handpumps. At the end of this period, a thorough technical assessment on how to further improve the pumps is expected. The prototype pumps of the L4-type made in the Moratuwa workshop have performed efficiently so far.

Comprehensive testing of both the Sihilase and L4 type handpumps has been done or will be done with the cooperation of such agencies as the Consumers Association Testing and Research, Harpenden, England; the German Agency for Technical Cooperation, and the United Nations Children's Fund. Available testing results indicate the need for stricter quality control.

Although both handpumps still need further improvement, Sarvodaya is convinced that both pumps meet the criteria for a "village level operation and maintenance" (VLOM) waterpump.

Some Considerations. A well-designed and functioning handpump does not offer a complete solution however. The crucial role of proper handpump maintenance has surfaced worldwide, and not only SRTS is doing some serious thinking about it. Various theoretical models of maintenance systems have been developed, with some even working well in practice. However, reported costs are almost prohibitive. While World Water magazine reported yearly maintenance costs, in Africa, in the range of \$50 to \$200 per pump, an Earthscan publication ("Water, Sanitation, Health -- For All?"), reports that maintenance costs in the case of India's Mark II pumps in Tamil Nadu, India are in the neighborhood of \$40 per handpump per year.

Sarvodaya (or even Helvetas) clearly cannot make a long-term commitment to the funding of handpump maintenance costs; even if costs can be brought down to Rs 500 (\$25) per pump. The community must bear a substantial part of the maintenance cost, by say, paying for spareparts. The mandatory setting up of a village handpump maintenance fund might help to make people realize that handpumps are not free. SRTS should also offer several technology options (e.g., open traditional well, improved one-bucket well with windlass, covered well with handpump, etc.) so that people can make a conscious decision about their preferred technology with full knowledge of the costs and benefits ratio (financial and healthwise) of each solution. What we clearly should not do is to force a certain solution upon people.

Such an approach however will require more educational inputs on the part of Sarvodaya.

Whoever will pay the handpump maintenance cost, there must be a corresponding organizational set-up that ensures the availability of spareparts and of a pump mechanic for major repairs. To suit the decentralized structure of Sarvodaya, a form of "three-tier system" is proposed: Manufacture of pumps and spareparts in central workshops; pump mechanics with stocks of spareparts in District Centres; and, village caretakers for maintenance and minor repairs.

5. Village Water Supplies (Gravity Scheme):

Besides the traditional project area in Kandy district, new projects were started in three other districts in the past six months. A rather untypical water supply project in one village sought to solve the problem of saltwater intrusion. Here, a water distribution scheme with bowsers was started. SRTS assisted in the purchase of a 1200-gallon bowser-trailer. Budget allocations have likewise been made for the digging of a central supply well and the construction of a number of small water tanks in the village.

Generally, it can be said that gravity water schemes are the most expensive, yet otherwise the least problematic of SRTS water projects. Village participation can usually be won, despite the hard labor involved in digging of trenches, breaking of stones, etc., since immediate benefit in the form of safe drinking water is evident. Through the Shramadana experience, a sense of collective ownership and achievement usually evolves. This is necessary for the maintenance of new installations. And with gravity schemes, maintenance requirements are small due to the simple, yet high quality of construction.

Appendix D

WORKING PAPER

Title : "ACHAN's Concerns with Water and Sanitation Projects", by Susan B. Rifkin? Coordinator, Asian Community Health Action Network (ACHAN), Hongkong.

Presentor : (By the author)

I. ACHAN: A BRIEF HISTORY

The Asian Community Health Action Network (ACHAN) was created in 1980 to make more systematic the exchange of materials, information and personnel among non-government organizations (NGOs) in the Asian region. The objectives of the network are:

- (a) To provide documentation of Asian experiences in community health done by Asian themselves;
- (b) To establish communication and exchange of information among members through newsletters, exchange of materials and visitors;
- (c) To assist members when requested to develop **training techniques** and programmes;
- (d) To assist the development of other national community health networks where they do not exist;
- (e) To facilitate the exchange of programme personnel;
- (f) In the long term, to develop a data bank of people, programmes and technologies as a catalogue of resources.

In the first three years of its existence, ACHAN has pursued these objectives by undertaking a number of activities. It has published a newsletter, LINK, which presents discussions about important community health problems (i.e., NGOs relationship with governments; have new pharmaceutical laws in Bangladesh, etc.) as well as programme reviews. It has sponsored consultancy on training for managers of community health programmes. With the Asian Health Institute, it has sponsored two training programmes and one curriculum development seminar. It has held two workshops to explore in-depth critical community health issues -- one on the subject of financial self-sufficiency for community health programmes; the other on participatory training methodologies for community health and development workers.

A major undertaking for the future is a research study of NGO experiences in Primary Health Care over the past 10 years. This research project will critically examine a number of programmes in selected Asian countries with the purpose of both documenting Asian experiences in this area and communicating the lessons learned from these experiences to others in the region and in the world.

II. CHALLENGES OF THE WATER DECADE

The 1980's have been designated the Water Decade by the UN and have brought into focus the sad lack of water and sanitation facilities for the majority of the world's people. Over 40% of many people living in urban areas and over 80% of those living in rural areas lack basic clean water sources and adequate environmental sanitation. The World Health Organization (WHO) deems this situation hazardous to good health and exhorts the world's governments to pursue activities to radically and rapidly improve this situation.

Like the area of health care, the area of water and sanitation the last 100 years has witnessed discoveries which have led to the possibility of rapid improvements. However, also like the area of health care, the existence of knowledge and the accompanying technologies has not lived up to the expectations of many familiar with these potentials. The reasons for this failure are many. They include: (1) lack of recognition of the importance of water and sanitation to health and socio-economic development; (2) inability to implement a successful water technology system.

A. Recognizing the Priority

A major problem with meeting the challenges of the water decade is the fact that many people and Governments do not accept the idea that allocated resources will produce the widely expected benefits. While they accept the fact that in the industrialized areas of the world, water and sanitation have dramatically reduced water borne diseases and given rise to generally more healthy environments, they remain unconvinced such improvement is possible in the rural areas or in the mushrooming urban slums, mainly in the third world. One reason for their skepticism is that no reliable impact study has been done. It so far has not been possible to prove the direct correlation between improved water and sanitation and improved health. Information does exist however to correlate poor water supplies and sanitation with disease prevalence. For the water decade policies to be pursued with vigour, information must be made available to Governments and programme planners to pry loose the necessary resources and interest.

B. Implementing a Good Water Technology System

Equally important in seeking the goal of "health for all in the year 2000" is developing a good water technology system. A water technology system may be said to have three component parts. The first is the systems operation which reflects physical facilities available for securing safe water or implementing sanitation projects. The second is the systems performance which focuses on the behaviour and belief of the community people regarding the use of the physical facilities. The third is the systems impact which describes the outcome of the technical interventions in terms of health, economic, social and environmental impacts. A visual presentation of this system and its linkages is found in figure 1.¹ (WASH TECHNICAL REPORT 10 p. 49)

¹I have simplified the interaction of these three components in order to keep my presentation brief and highlight points of relevance to this FORUM.

1. appropriate technology

In the past a major problem with the water technology system has been in the systems operation. In many places, the technology used was inappropriate to the existing conditions. Often, large, expensive and sophisticated pumps or latrines were installed in areas where geographical features, transportation and communication facilities and replacement equipment made these facilities difficult or impossible to use or maintain. Recently, planners have become very aware of the problems of supplying technologies unsuitable for existing conditions. Many groups have been established to devise technologies appropriate to use in rural, poverty stricken conditions in which the majority of the world's people live.

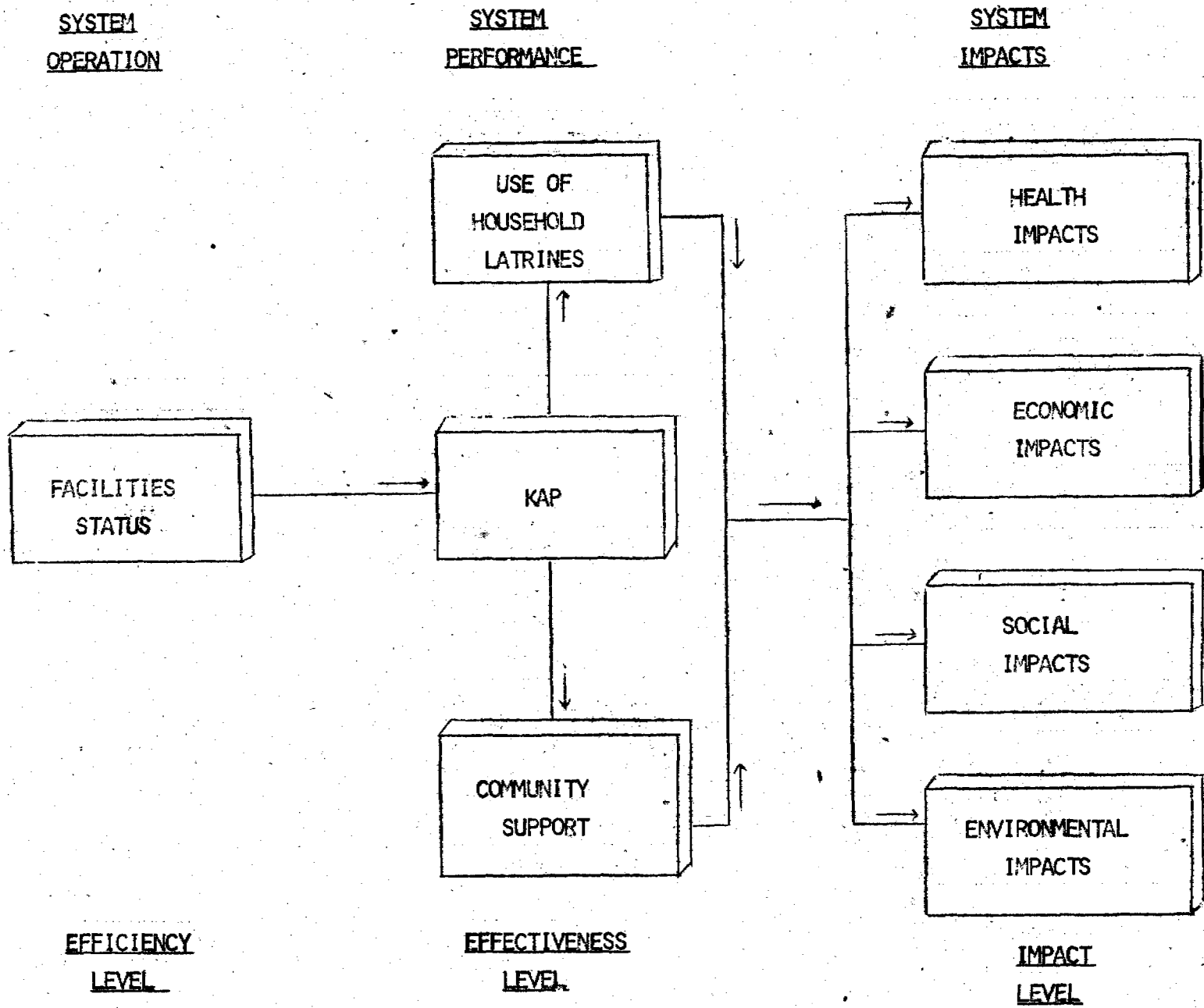


Figure 1

2. community involvement

Today the problems are recognized more to lay in the area of systems performance than in systems operation. The problems focus mainly on the linkages between these two components. The provision of appropriate technology has not concomitantly led to the use and maintainance of the system. The reason for this rests mainly on the fact that programme planners have not responded adequately to community views and involvement in the design, creation, location and maintainance of the technology. Research has shown that the impact of the system depends on community involvement in its planning and implementation.

Community involvement in the deployment of water system technology is critical for several reasons. Firstly, is the fact that overall community benefits result only when the majority of the community utilizes the system. Because water borne disease control depends on the protection of all water supplies, it needs the community members to agree to keep the water safe and clean and use facilities for improving environmental sanitation. People are motivated to use facilities in which they have shared in the designing and planning. Reflecting community (instead of planners' needs) and placing responsibility for construction, utilization and maintainance in the hands of those which the system will affect the most, develops the basis for constant community concern. Although research cannot prove community participation insures successful use of the system, it has proved that lack of participation in many cases does insure its failure.

Secondly, community involvement is likely to help in demonstrating that the technology used is the most appropriate to the situation. It will enable planners to provide technologies which can be repaired and maintained by using locally available equipment and manpower. It will also enable the technology to be the type most appropriate to the community's tradition and customs and to be located in places most convenient and appropriate to the users.

Community involvement also provides additional resources to build and maintain the water technology. Estimates suggest that a community should contribute at least 10% of the cost of constructing and maintaining the system. This contribution, either in money, materials or labour tends to engender respect and appreciation for the project. It also supports the capital costs of construction and maintainance of the project. These projects need not be expensive. Figure 2 gives a cost breakdown of various sanitation technologies available for use in community sanitation projects. What is important is to gain community support and contribution to a technology which they can understand and wish to use. Community resources provide both cost and commitment to improve community environments.

Community involvement insures that those who are most in contact with the technology participate in its design to reflect their concerns. In the case of water supplies, this group is women. Women in most rural households are the ones who collect water, use water for washing, cooking and cleaning and teach children behaviors which influence the use of water and sanitation habits. Introduction of any water technology which ignores the role of women as crucial in the linkage between the systems operation and the systems performance is almost surely doomed to fail.

Figure 2

Capital and Recurrent Costs per Household for Sanitation Technologies (Kalbermatten et al. 1980).

Facility	Total investment cost	Monthly recurrent cost	Hypothetical total monthly cost a/	Per cent of income of average low-income household b/
<u>Low cost</u>				
PF toilet	70.7	0.5	2.0	2
Pit latrine	123.0	-	2.6	3
Communal facility a/	355.2	0.9	8.3	9
Vacuum truck cartage	107.3	1.6	3.8	4
Low-cost septic tanks	204.5	0.9	5.2	6
Composting latrine	397.7	0.4	8.7	10
Bucket cartage b/	192.2	2.3	6.3	7
<u>Medium cost</u>				
Sewered aquaprivy	570.4	2.9	10.0	11
Aquaprivy	1,100.4	0.5	14.2	16
Japanese cartage	709.9	5.0	13.8	15
<u>High cost</u>				
Septic tanks	1,645.0	11.8	25.8	29
Séwérage (design population)	1,478.6	10.8	23.4	26

a. Assuming investment cost is financed by loans at 8 per cent over five years for the low-cost systems, ten years for the medium-cost systems, and twenty years for the high-cost systems.

b. Assuming average annual income per capita of \$180 and six persons per household.

3. development of software

If the key to the use of the appropriate technology for water supplies and sanitation is community involvement, then the focus of planners' interests must be on the development of the software to allow the community to use this technology. Software in this context is the research, training and evaluation necessary to insure successful utilization and projected benefits of the water and sanitation facilities.

Research. The planners involved in developing and implementing water systems technology have had a tendency to focus on the technology and not on the use. There exists a legion of stories of how water pipes located within easy reach of individual households remain unused as women flock to the murky river waters in order to exchange gossip. Or latrines harboring the latest maize crop because they are believed to smell, or flaunt local beliefs about having a covering over the head. These experiences have pointed to the need to understand the communities' belief structure in order to define acceptable water and sanitation schemes. Planners need to analyze what works and what doesn't.

This research needs to include a social analysis of the community. Understanding who might benefit and why suggest whether the technology will serve the majority of the people or only the wealthy few. In addition social analysis allows planners to look at project needs, social impact, project acceptance and utilization. It can help in determining basic policy formulations, comparisons of basic welfare, planning guidelines and overall programme design. More importantly, it contributes to the understanding of the uniqueness of the community. Combined with the examination of custom, beliefs and habits, it assists planners to strengthen the linkages in the water technology system.

Training. Training field workers, be they outsiders or community people, for the development and maintainance of the water technology system is critical to insuring the projected benefits. Like the provision of the physical facilities, it is not merely a matter of knowing how to maintain the technology. The less defined aspects such community motivation and health education are key to the functioning of the system. Guy Steuart and Carla Rull (WASH No. 3, 1981) have suggested five areas of competency which field workers must have in order to insure that the community will profit from improved water supplies and sanitation. These include: social diagnostic skills, to identify groups who are most likely to contribute and support the system and who are critical to its success; social and behavioral change facilitation, to assist groups in modifying their behavior and develop necessary organizations to support the new technology; technical water-related health and sanitation content, to provide the worker with knowledge of the disease problems associated with water and sanitation and the skills to build and maintain the facilities; support system and resource linkage, to insure that organizations involved in taking responsibility for the project have the support, supervision, resources and technical assistance they require; evaluation (see next section).

Equally important as the content is the training process. Research has shown that a strictly didactic approach can not provide the incentive to motivate community people or keep field workers. Much preferable is the

In summary, ACHAN's contribution to water and sanitation projects centers on helping to strengthen the links between the systems operation and the systems performance. The critical influence on impact is the use of the appropriate technology by the people who it will most benefit. As we have noted, this use depends on knowing the community in terms of socio-economic status, in terms of behavior and customs, in terms of beliefs and traditions. It also depends on a dialogue between planners and different community groups, particularly women, to work out the design, use and maintenance of the system. Then, it depends on training people to implement the policies which have been discussed with concomitant evaluation of both process and outcomes. ACHAN focuses on the human element of health care and addresses those issues critical not only to use of water and sanitation but necessary to total human health improvements. We hope through the growth of our network that interest, concern and action about these issues will spread. ACHAN is basically in the communication business. It is our hope that these communications can support progress in all the areas which promote health improvements.

Appendix E

WORKING PAPER

Title : "Urban Community Programme - An Environmental Improvement, Sanitation Maintenance and Community Health-care Programme in the Slums of Ahmedabad", by the VIKAS Centre for Development, India.

Presenter : Mr. Rajesh Shah, Executive Secretary, VIKAS.

I. THE CITY

Ahmedabad, the sixth largest city in India, faces the problem of a rapidly growing squatter population. Census statistics gathered in May 1976 by the Ahmedabad Municipal Corporation revealed that 81,255 families representing 415,103 members resided in about 700 slum settlements in the City. Attempts by the government to solve this housing shortage have proven to be inadequate. The 5th Perspective Plan of Gujarat State, for example, plans to build only 3,000 houses for slum dwellers in the whole state of Gujarat. During the last 13 years, the Ahmedabad Municipal Corporation managed to construct only 7,000 dwelling units. Considering the magnitude of the need, this is a very poor performance. By and large, attempts by both private and public agencies to solve the housing problem have been short-sighted. For the most part, solutions were seen in the relocation of slum dwellers to new sites -- generally along the periphery of the city, or in multi-storeyed buildings. Such moves dislocated the people socially and economically and changed their lifestyle substantially. Experience has shown that such relocation or housing projects tended to create even worse slum conditions.

It is felt that mere rehabilitation will not solve the housing problem. There is a need to introduce other socio-economic inputs to bring about a healthier change in their lifestyles. Hence, the approach should be one of identifying the felt needs of the people.

In most cases, government and civic bodies have by necessity become major dispensers of social services. The low-income urban population however often under-utilize the services available to them. This is largely due to the absence of adequate channels for conveying needs, lack of knowledge or poor coordination between services offered and needs perceived. Developing these adequate channels. Increasing the knowledge of the poor, and creating better correspondence between needs and services are the key steps to improving the access of the urban poor to vital social services.

II. CAN WE PROVIDE HOUSING TO ALL THE URBAN POOR?

Considering the magnitude and complexity of the problem, it seems economically and administratively impossible to provide houses to each slum family. On the basis of studies done in slum areas, it has been observed that slum dwellers can be classified into three categories: HOUSE SEEKERS

(10-15%); PEOPLE WHO HAVE BEEN CONSOLIDATING THEIR STAY (60-70%); and, FRESH MIGRANTS (20-30%). These categories are made on the basis of the way people prioritize their expenditures. In view of this, the latter two categories are people who consider expenditures for housing as a least priority and any organized housing programmes for these groups will tend to be ineffective. Evidently, the first group of HOUSE SEEKERS seem to be the ideal target audience. They are more economically well off and if left to their own resources, would in due time wish to construct their own houses.

The implications for any government or non-government housing programme are obviously, can such programmes address the housing needs of the 80% slum dwelling population whose first priority is employment, followed by job security? Slum dwellers have an average income of Rs. 200 to 400. Can they afford a shelter costing Rs. 1000? Can our present housing delivery system provide a solution that is within reach of these 80% of the economically deprived sectors of the city?

III. SLUMS AS TRANSITIONAL HABITATS

Slum settlements act as transitional habitats for rural migrants. Rural migrants begin their adaptation to urban living by living in slum communities. This process of transition is slow and unavoidable. Hence, it should be recognized and understood. At present, slum rehabilitation programmes do not seem to take this process into account.

Ahmedabad has about 22,000 families (30% of the total slum population), living in about 200 rural/urban pockets spread over the western region of the city. Such rural pockets are either small villages engulfed by expanding city boundaries or are built by rural migrants coming from various villages in Gujarat, as well as neighboring states. These settlements have very strong overtones of a rural village environment, as reflected in their total physical, social, economic and cultural set-up.

These pockets are subject to the constant interaction between rural lifestyle and strong urban influences. Within this context, slums may be seen as part of the present urban system. Government, civic, technical and voluntary agencies should participate in the process of change undergone by the urban poor, and should create conditions which can make the process smoother and faster. Thus, it is imperative that slums be accepted. Attempts should be directed towards improving and restructuring the total environment by positive interventions within this process of change.

In short, we need better slums. Along with the provision of new houses, slum improvement programmes should be recognized as important strategies in resolving the habitation problems of the urban poor.

It is therefore the intention of our agency to actively participate with the urban poor living in rural pockets who are in the process of adapting to an urban environment.

The provision of housing is a dream that is not likely to be realized in the near future. Hence, we feel that the problems of the slum communities in the city must be addressed to in very realistic terms. With a view to

providing a minimum quality of life, the following Urban Community Development Programme has been developed. It has three major components: Environmental Improvement and Sanitation Maintenance; Housing Improvement; and Primary Health-care.

IV. ENVIRONMENTAL IMPROVEMENT AND SANITATION MAINTENANCE

The basic services in this component include:

- cleaning of streets and paths
- garbage collection and disposal
- disposal of household waste water by providing appropriate service drains, soak pits, etc.
- disposal of human waste
- maintaining cleanliness and sanitation around water sources
- cleaning and maintaining community latrines, if available in the community
- paving pathways and providing roads in the community
- measures to provide drainage for rainwater
- measures and steps to assure that minimum sanitation and hygienic conditions are maintained in the community.

Since all of the above services are presently being provided by the Ahmedabad Municipal Corporation, every attempt would be made to ensure that these services are provided regularly by the municipal staff. Where such services are not being provided (as in the case of slums located in private plots of land), communities would be organized to ask for these services. In addition to the above services, the Municipal Corporation also provides:

- street lighting
- community standpipes for drinking water
- community latrines
- preventive health measures, e.g., malaria control, immunization and vaccination.

Steps will be initiated to ensure the community's access to these other services.

Organization. The programme will begin with selected slum communities where people are ready to cooperate. The community must be ready to share the burden in implementing the programme, both by taking over the responsibility of management and by providing financial contributions.

A series of meetings will be held to explain the objectives/details of the programme. Potential volunteers, mainly the youth, will be identified. A local Resident's Committee will be formed to plan, implement and supervise the programme at the community level. This Committee will be composed of community residents, a sanitation supervisor, an elected representative of the Ahmedabad Municipal Corporation, and a representative of VIKAS. The municipal corporation representative will link the committee with the city municipal corporation, will seek active participation of civic bodies in the programme, and will smoothen the process of transferring responsibilities for providing required services to the poor at a later stage. A community worker for every 100 families will be appointed. The community worker will be tasked with maintenance of available community services, cleanliness of open spaces/streets, garbage collection/disposal and all other measures necessary to maintain minimum sanitation and hygienic conditions in the area.

A sanitation supervisor will be appointed for every 100 families. He will supervise the work of 10 community workers and guide them for effective implementation of the programme. The supervisor will be trained by Safai Vidyalaya, Gandhi Ashram. The supervisor will also organize sanitation camps and educational projects in the community.

To coordinate all activities, a project coordinator will also be appointed. In addition to general programme management, he will administer the financial aspects and will provide managerial guidance to the various Resident Committees.

The programme will be implemented over a 5-year period and targets 3,000 families.

Mechanics. Initially, the programme will give financial assistance of as much as Rs. 1,800 per year per 100 families. The assistance will be used for employing the personnel to perform the above-mentioned duties and for the purchase of necessary equipment and tools. This assistance will be provided on the condition that the community will generate counterpart contributions. Eventually, the work should be wholly financed by the community.

Each household is expected to pay Rs. 1 per month for environmental services. One hundred families can therefore contribute Rs. 100 per month towards the salary of one community worker. A worker within a Rs. 200 monthly salary range can perform some of the basic services needed by 100 families. Such services would require about four hours a day. VIKAS will provide a matching grant of Rs. 100 per month per community worker (Rs. 1200/year). The remaining sum of Rs. 600 will be used for purchasing necessary tools. In the case of a compact community, the number of community workers will be reduced.

V. HOUSING IMPROVEMENT

In slums, most dwellings are built by using different kinds of materials like jute/gunny sacks, mud bricks, timber, polythene sheets, galvanised iron sheets, packing materials, recycled waste, etc. Such shelters are temporary arrangements on either private or public land. According to the census of slums conducted in 1976, 78% of slum settlements are located on private land, while the rest are found on government-owned land.

In many cases, slum dwellers pay a monthly rent of Rs.5 to Rs. 35 either to the landlord or the slum lord. Most of the dwellers have made some investments on their shelters from their own meagre resources and are unable to make further improvements because:

- they do not have secured tenure of land
- they do not have access to adequate resources necessary for shelter improvement.

It is thus necessary to provide technical, financial and construction material assistance for slumdwellers wishing to improve their housing conditions.

Legally, this seems feasible today and administratively manageable. Concerned civic and public agencies are making policy changes in favor of slum improvement programmes rather than slum clearance programmes. Attempts are being made to give security of land tenure to slum dwellers through legal action. Such policy changes make slum housing improvement easier to accomplish.

Materials Bank and Labor Cooperative. Under the proposed programme, assistance will be in the form of interest-free loans to be repaid by slum dwellers in installments. Initially, 1,000 to 1,500 families will be covered by loans amounting to as much as Rs. 500 per household. Whenever possible, use will be made of existing private or public housing subsidies, to increase the target coverage of the financial assistance. Such a loan scheme requires a revolving capital fund.

Alternative forms of assistance can be in the provision of construction materials. This can lead to the establishment of a materials bank and the setting up of a construction cooperative. Any member of a slum family can participate in these activities. The production of materials can be taken up by the material bank where members of the slum family can work and for which they can get a coupon. This coupon can be cashed when need arises to buy housing material. Materials assistance can also be given for the construction of community centers, pathways or other community facilities. The material bank will add to the housing material stock in the city and also provide assistance in the form of modestly priced materials to the people. This will also save people from fluctuating high prices of construction materials in the open market.

During the study period (Phase 1), the idea of a health care programme will be put forward before the different communities. Communities interested and willing to participate actively will be chosen to initiate the programme. It will be made clear to the people that nothing will be provided free from the health centre that will be recommended for setting up in the community.

A Residents' Health Committee will be set up. This will be composed of representatives from the community, a consulting doctor and two representatives of VIKAS. The committee will help identify volunteer health workers within the community, will motivate the people for their active participation in the programme and will above all monitor and supervise the programme at their level.

After a period of five years, the health centre will be phased out or will be transferred to a new settlement. Hence, it is important to make the community self-sufficient in terms of running the health programme using their own resources.

Primary Health Care and Its Components. Primary health care includes education concerning prevailing health problems and methods of preventing and controlling them, promotion of proper nutrition, an adequate supply of pure drinking water and basic sanitation, maternal and child health, including family planning, immunization against the major infectious diseases, prevention and control of locally endemic diseases, appropriate treatment of communicable diseases, injuries and provision of essential drugs.

The major diseases that afflict the urban poor in India are gastro-enteritis, pneumonia, malnutrition, conjunctivities and parasite infestations, e.g., malaria which continues to take a heavy toll among slum children.

The major components of a primary health care package are:

- simple curative services and treatment of common ailments
- maternal and child health services
- communicable disease control
- first aid
- health screenings and referrals
- follow-up and convalescent care at home
- support services, e.g., training, drug supply, specialist care, etc.

Key Personnel and Their Function. The community health centre will be staffed by a nurse, a part-time doctor who will act as consultant, and village volunteers called Community Health Promoters (CHPs), who will be trained by the nurse.

The doctor will advise health centre staff and help set directions for the programme. He will guide the nurse in the training of CHPs. His role will be that of an adviser to the health centre, rather than a manager of the centre.

The nurse will be a full-time worker, qualified and preferably with public health experience. Her main functions include running the health centre, treating patients, identifying CHPs, supervising the work of CHPs, training them, etc.

The CHPs are comprehensive grassroots health agents within the community. As the programme progresses, the skill of CHPs will be strengthened and more importantly, they will gradually develop confidence in their work.

The fundamental advantage of CHPs is that they will be 'insiders.' They know the community better and the community understands and accepts them more readily. Their contact with the community is also more permanent, compared to that of the other health centre staff.

Their training will be specifically geared to local situations, with emphasis on problem-solving skills. The CHPs will put their knowledge and skills to work through problem-solving activities. Their training does not become a standard health education programme.

Qualifications for CHP work may differ. A CHP can be a midwife or just anybody willing to serve the people.

The major tasks of the CHPs include treatment of minor illness, giving first aid in case of emergencies, simple dressing of wounds, initiating dialogue with the people to keep the surroundings health and sanitary, and the like.

Training. CHP training will focus on understanding basic health measures, nutrition education, under-five care, maternal care and environmental sanitation.

The objective of this training is to instruct CHPs on their job functions and activities, to promote a team approach to health care and to feedback information from the field on the function of the health service, the deficiencies, inconsistencies, etc.

During this training, the CHPs will be given various practical assignments to equip them with necessary skills for identifying and solving health problems. They will be given information on those diseases prevalent in the community. Priority will be given to enable CHPs to identify serious cases needing expert medical attention, such as malnutrition, dehydration, obstructed labor, etc. In addition to these cognitive skills, CHPs will also be trained in the treatment of minor ailments, emergency first aid, minor diagnostic procedures, etc. Necessary teaching aids and visual material will have to be prepared for the training since most of the CHPs will be illiterate.

After the training, CHPs will immediately be made to conduct a house-to-house health survey. Family records will be made to keep track of illness in the family. This will help both nurses and CHPs in following up cases, and understanding the deeper causes and remedies of a family's health problems.

Related Activities. Throughout the programme, health education will be an important component. Slide shows, short films, and other media materials will be used to teach the people lessons on cleanliness, health care and the value of helping one another and using self-reliant ways to promote better health care.

Once the health care programme becomes reasonably established in a community, the idea of a Health Insurance Scheme will be introduced. The scheme will gradually enable a community to gain self-sufficiency in matters relating to health needs. In this scheme, families will pay a regular fee, which may be a certain percentage of their total family income and in accordance with the size of the family. Members will be entitled to health services, including the curative services given by the CHPs or the health centre, total family care such as regular baby weighing, and others. Successful implementation of such an insurance scheme may pave the way for gradual withdrawal of external health agents, leaving the community independent and reliant on its resources.

VII. CONCLUSION

This package of programmes intends to create awareness among the urban poor of their rights and responsibilities. This will be done through active involvement of the people at every stage of the programme, establishment of linkages with government and civic authorities, and organizing communities to demand the basic services that they need for a decent life.

The package of programmes is an alternative approach to providing basic services. In the absence of full-fledged housing programmes, it creates alternative structures. Successful implementation of these programmes will demonstrate both to the people and the civic body that minimum sanitation, hygienic living conditions and primary health care services can be provided to slum dwellers at a relatively modest cost.

It is hoped that this programme will provide new directions for other agencies working for the urban poor.

Appendix F

WORKING PAPER

Title : "Rainwater Collection for Safe Drinking in Rural Thai Villages",
by Tanothai Sookdhis, Population and Community Development
Association, Bangkok, Thailand. This was presented by the
author.

I. OVERVIEW

About 20% of Thailand's population of 47 million live in urban areas (defined by the government as communities with populations of more than 5,000 people) and 80% in rural communities. About 50% of the urban dwellers (5 million) are concentrated in Metropolitan Bangkok and another 4.7 million reside in 330 other population centres classified as municipalities and towns. The estimated 38 million rural populace is scattered in some 51,000 villages.

Only 1/4 of the population is served by public water supply systems. The remainder, numbering some 35 million people, depend on water drawn from sources of doubtful safety. Although Thailand's overall health situation is relatively good, water and sanitation-related diseases remain high on the list of common diseases. The diarrheal group is the third most common cause of death for children under six.

About 70% of Bangkok's population have access to safe water. Also, two-thirds of the municipalities and towns have piped water supply systems and these serve about 60% of the potential consumers. For the small villages, the percentage of the population presently benefitting from an improved water supply is not known to within a reasonable degree of accuracy. The National Economic and Social Development Board's statistics show that about 44% of the rural population has, at some time or another, been provided with water from shallow and deep wells, metal and concrete storage tanks, and ponds and piped systems. Unfortunately, many of these improvements have not been adequately maintained. A 1978 World Health Organization assessment reported that only 10% of Thailand's rural population have access to safe water.

Thailand has, in general terms, embraced the UN Drinking Water Decade's target to provide all communities with potable water by 1990 but it has still to develop a strategy and to commit investments necessary for achieving this. Consistent with Bangkok's pre-eminent position in virtually all aspects of Thailand's government and economy, the institutional arrangement for water supply consists essentially of two major divisions, Bangkok and other-than-Bangkok. Bangkok's water supply is the responsibility of the Metropolitan Water Works Authority, a state enterprise under the Ministry of Interior.

The latter division is comprised both of urban and rural systems which are administered by several agencies. Responsibilities were ill-defined and fragmented; operation and maintenance performance were generally poor. In 1979, the Provincial Water Works Authority was created as a state enterprise,

under the Ministry of Interior, by merging two major water supply agencies: one the Provincial Water Supply Division of the Ministry of Interior, and the other, the Rural Water Supply Division of the Ministry of Public Health. It is responsible for all piped water supplies outside of Bangkok. The remaining agencies mostly handle nonpiped rural water systems. They are the Sanitation Division of the Ministry of Public Health; the Groundwater Division of the Ministry of Industry, and the following four agencies of the Ministry of Interior: (i) Well Drilling Section of the Public Works Department, (ii) Accelerated Rural Development Office; (iii) Department of Local Administration; and (iv) Department of Community Development.

In the current National Five Year Plan covering 1982-1986, the only project aimed directly at providing potable water to rural people, to be carried out by the Sanitation Division of the Ministry of Public Health, falls under the infrastructural services of the Rural Poverty Eradication Programme.

Table 1
Potable Water Project

	<u>1981-2</u>	<u>1982-3</u>	<u>1983-4</u>	<u>1984-5</u>	<u>1985-6</u>	<u>Total</u>
<u>Target Villages</u>	3,000	3,000	3,000	3,000	1,683	13,683
Small Water Works	500	500	500	500	500	2,500
Rainwater Tanks 3 cu.m.	3,000	3,000	3,000	3,000	1,683	13,683
Water Jars 1 cu.m.	3,000	3,000	3,000	3,000	1,683	13,683
Other components such as water purifications, latrines, economic stoves, training etc.						
<u>Annual Budget (M. Baht)</u>	31.72	31.72	47.73	54.73	42.47	208.37
Small Water Works	17.50	17.50	17.50	20.00	22.50	95.00
Rainwater Tanks	10.50	10.50	10.50	12.00	7.57	51.07
Water Jar	0.75	0.75	2.40	3.00	1.68	8.58
Other Components	2.97	2.97	17.33	16.73	10.72	53.72
Total 5 years budget for the Rural Poverty Eradication Programme is 8,593.38 M.baht.						

II. THE NORTHEASTERN REGION

Thailand's economic growth during the last 20 years is quite impressive. Gross national product has increased 14 times from 60,000 million baht in 1961 to 817,000 million baht in 1981 which raised the per capital income of the country 8 times from 2,200 baht per person in 1961 to 17,200 baht per person in 1981. Thailand began its first Five Year plan in 1961. However, the distribution of wealth from the development efforts was not fairly accomplished. The following table indicates trends of income distribution and gaps between urban and rural areas of the country:

Table 2
GNP Distribution and Per Capita Income by Regions

	<u>North</u>	<u>Northeast</u>	<u>South</u>	<u>Central</u>	<u>Bangkok</u>	<u>Thailand</u>
GNP Distrubiton						
1960	15.8	17.0	14.1	29.3	23.8	100.0
1970	15.2	16.0	12.8	27.5	28.5	100.0
1979	14.9	14.7	11.8	31.2	27.4	100.0
Per Capita (at current price)						
1960	1,496	1,082	2,700	2,565	5,630	2,106
1970	2,699	1,822	3,858	4,662	10,234	3,849
1979	8,781	4,991	12,683	17,655	30,161	12,067

Population in the Northeastern region is the poorest of the country with per capita income of only 4,991 baht-one-sixth of Bangkok. On the other hand, the Northeastern region's population of approximately 13 million represents one-third of the country's population. This led the Thai government to declare new strategy on rural development to be based on the area of poverty in order to allow the rural poor to benefit more from the country's development efforts.

Added to pressing poverty, the region is the driest part of Thailand. Over 90% of the average annual rainfall of 1.25 metres falls between May and October. Water needed for domestic use by the population are drawn from one or a combination of the following sources:

- Small diameter tube wells
- Shallow wide diameter wells
- Village ponds
- Small reservoirs
- Large reservoirs
- Rivers
- Rainwater

Based on surveys conducted by the government, average domestic water requirement for one day is estimated at 55 litres per person. It includes all water used for drinking, cooking, bathing and washing. However requirement for drinking water alone is only 4 litres per day. Although it is desirable to have clean potable water for entire domestic use, people should have access to a crucial minimum of 4 litres of safe drinking water. Yet, this water is not available to majority of the people.

III. THE POPULATION AND COMMUNITY DEVELOPMENT ASSOCIATION (PDA)

The Population and Community Development Association (PDA) is a private non-profit organization engaged in the development and management of population and rural development activities in Thailand. Established in 1974, it initially engaged in the delivery of family planning information and services to rural Thai villages and selected urban communities. Through its Community Based Family Planning Services Bureau, it trained volunteers from the villages to work in 16,236 villages of 157 districts, representing approximately one-third of all villages in the country. It distributed more than 2 million cycles of oral contraceptives, nearly 5 million pieces in 1982.

After the success in family planning, PDA is increasingly addressing itself to other aspects that directly impinge on the daily life of rural people. Several small projects were developed from the initiative and innovation of its field staff and volunteers. In 1978, it set up the Community Based Appropriate Technology and Development Services Bureau (CBATDS) to consolidate and expand the organization efforts.

CBATDS aims to promote low-cost, ecologically sound technologies that are compatible with rural Thai social, cultural and economic conditions. It seeks the maximization of the common man's participation in the process through a self-help orientation as its strategic objective, and the enhancement of the quality of life of the people as its end product. Several projects are being implemented.

In 1980, the reconnaissance mission of the Asian Development Bank studied and reported on the Village Water Supply and Sanitation Sector of Thailand. CBATDS's small experimental project of Village Rainwater Collection and Storage (known in CBATDS as Tung Nam) was thoroughly investigated during the mission assignment.

Based on the assumption that all Thai citizens are to have access to safe drinking water facilities in 1990, it estimated the population of the country at 60 million people, of which 8 million will be served by piped water systems of Metropolitan and Provincial Water Works and concessions while the other 52 million are to be served by various sources of water supply for safe drinking. It also proposed a tentative program and investment requirement to meet the Thai Government's objective of providing access for all to safe drinking water as follows:

Table 3

POPULATION DISTRIBUTION IN 1976 AND IN 1990								
	1976				1990 (mission estimate)			
	Population		Households		Population		Households	
	No.	%	No.	%	No.	%	No.	%
1. Whole Kingdom	38,260,600	100%	6,863,260	100%	60,310,000	100%	10,828,800	100%
2. Bangkok	2,934,820	7.7%	520,100	7.6%	4,644,000	7.7%	822,900	7.6%
2.1. municipalities								
2.2. san. districts	324,480	0.8%	51,320	0.7%	482,000	0.8%	83,400	0.7%
2.3. villages	446,040	1.2%	71,560	1.0%	724,000	1.2%	108,300	1.0%
Bangkok Total	3,705,340	9.7%	642,980	9.3%	5,850,000	9.7%	1,014,600	9.3%
3. Municipalities excl. Bangkok	2,537,860	6.6%	491,320	7.2%	3,980,000	6.6%	775,300	7.2%
4. Sanitary Districts excluding Bangkok	3,884,630	10.2%	735,930	10.7%	6,152,000	10.2%	1,160,700	10.7%
5. Villages excl. Bangkok	28,132,770	73.5%	4,993,030	72.8%	44,328,000	73.5%	7,878,200	72.8%
Total 2 to 5	38,260,600	100%	6,863,260	100%	60,310,000	100%	10,828,800	100%

Note: - 1. Size of the aver. household (Whole Kingdom) in 1976 was 5.57 persons

2. Estimated 1990 population 60,310,000 is based on the medium fertility assumption and was taken from the NESDB "Population Projections and Their Uses for National Development Planning in Thailand" 1980.

3. In preparing the estimate of the 1990 population distribution for the simplicity sake a uniform rate of growth was assumed. It is expected that Bangkok and municipalities will actually grow faster than villages in the rural areas, thus, the village population given above is overestimated and urban population underestimated.

Table 4
Safe Drinking Water

<u>Type of Facilities</u>	<u>No. of Unit</u>	<u>Target</u> (M)	<u>Population</u>	<u>Cost Over 10 Yrs.</u> (Million Baht)
Protected Wells	873,800	39.3	75.1	961
Small Diameter Tube Wells	10,000	2.0	3.8	600
Rainwater Storage Tanks	474,900	2.7	5.2	1,661
Simple Pipewater Supplies	n.a.	8.3	15.9	5,766
Total		52.3	100.0	8,988

Table 5
Estimate of Rain Water Storage Requirements of 1990 Target Population

	<u>Whole</u> <u>Kingdom</u>	<u>Villages</u> <u>Excl. BKK</u>	<u>San. Districts</u> <u>Exc. BKK</u>	<u>Municipal</u> <u>Exc. BKK</u>	<u>Bangkok</u> <u>(BKK)</u>
Households/ Tanks	No. 474,900	144,700	28,600	97,700	203,900
People	No. 2,714,000	802,200	150,200	501,200	1,260,500

Assumptions used in connection with the Rain Water storage solution.

1. It is assumed that rain water storage tanks will be used in areas where other simpler and less expensive solutions are not possible, i.e., protected dug-wells, or small diameter tube-wells.
2. It is assumed that the tank will be constructed by the family on a self-help basis with technical collaboration of the Department of Health, or other outside organization.
3. It is assumed that a loan from the revolving fund will be required by the family to purchase materials.

IV. THE VILLAGE RAINWATER COLLECTION AND STORAGE PROJECT (TUNG NAM)

The Pilot Study

With clear evidences of the need for safe drinking water by the rural population in Thailand, particularly the Northeastern region, and after examination of possible viable programme. CBATDS determined the Village Rainwater Collection and Storage as a viable programme to be carried out. A pilot study programme was designed and carried out in order to:

- a) Test the hardware technology of three different types of rainwater tank construction: ferro-cement, bamboo-reinforced concrete and pre-cast sewer pipes. Also to determine storage volume desired by the villagers.
- b) Test the software technology of organizing and involving the beneficiary of the programme (they provide free labour for the construction and borrow money to pay for construction materials, repaying the loan in installments over a period of time).

Two villages in Ban Pai District of Khon Kaen Province in the Northeast were selected as the study site. A total of 51 rainwater tanks were constructed, 45 at private homes and 6 at public buildings (school, health centre and temple). The storage volume per tank varied from 3.4 - 11.3 m³.

The bamboo-reinforced concrete tank of 11.3 m³ proved to be the most acceptable design. A device known as a sediment trap was added to each tank to improve the quality of rainwater collected and stored. (A sediment trap is a pipe attached to the outside of tank and used to discharge the first run-off of every rainfall, which normally contains dirt and other impurities).

The villagers who participated in the programme agreed to provide labour for the construction. The material costs for this type of tank averaged at ₪ 3,500. CBATDS provided the initial fund and assisted in procurement of all construction materials. Before construction began, contracts were drawn. Each prospective owner had to pay ₪ 500 after the completion of tank construction and ₪ 150 a month for 20 months afterward. A 15% discount was awarded to any tank owner who is able to pay all costs in the first payment, 10% and 5% if total cost is paid in 6 months and one year respectively.

The programme was a successful one. All tanks were constructed properly. The villagers enthusiastically help each other on the construction. Repayment of the material costs by villagers were as scheduled. At the beginning of the programme, it took some time to explain the programme mechanism to the villagers in order for them to understand and participate. However, after all tanks were completed, CBATDS was flooded with requests for further expansion of the programme to other villagers without any motivation.

Tung Nam 1-2-3-4

Rationale: Based on the pilot study, the following were found

1. Rainwater collection and storage tank is a feasible programme to provide villagers with safe drinking water.
2. The bamboo-reinforced concrete tank is the most acceptable type due to simplicity of construction, availability of materials and cost per cubic meter of water stored. Addition of sediment trap to the tank helps improve the quality of water collected and stored.

3. Involvement of programme's beneficiary to provide labour for construction eliminates labour cost and encourages community's cooperation.
4. The revolving loan system is acceptable to villagers. The understanding of the system creates peer-pressure among villagers that result in the repayment of loans as scheduled. Other villagers were made aware that they will have to wait until repayments were made; then it will be available to them. Approximately 60% of original loans can be recovered and made available for the second year.
5. In the pilot study, villagers were asked to pay only the cost of materials. However, CBATDS will need to recover its administrative and operating costs in order to continue providing technical assistance. Three options are available:
 - 5.1. Income derived from discounts in bulk-procurement of materials.
 - 5.2. Build into the cost of materials, the necessary overhead cost.
 - 5.3. Institute interest rate on revolving loan fund provided to villagers.

Objective: To increase the rural villagers accessibility to safe drinking water through collection and storage of rainwater by bamboo-reinforced concrete tank.

Strategy : Through this project, CBATDS will train and assist rural villagers to construct rainwater collection and storage tanks on a self-perpetuating scheme. Specific strategies are:

- a. Bamboo-reinforced concrete tank with storage volume of 11.3 cu.m. is the standard feature of the programme.
- b. Tanks are attached to individual houses, however it is estimated that 20% of these tanks will be shared by two families.
- c. Cost of construction to villagers is 4,200 baht with labour being provided by villagers who participate in the programme.
- d. Financial assistance in the form of loans will be available to villagers to cover the cost of construction. Repayment of 600 baht is to be made upon completion of the tank and 200 baht monthly during the next 18 months. The loan is provided in terms of materials needed for construction of rainwater-tank, not cash.
- e. Village committee is formed to review and select applications of villagers and to manage the repayment of loan.

Target : Site of programme is three provinces: Burirum, Khon Khaen and Mahasarakam, in the Northeastern region of Thailand. Total of 8,900 tanks are targeted during the first four years and 3,000 tanks henceforth, utilizing only revolving loan fund.

Table 6
Workplan of Tung Nam 1-2-3-4

	<u>Year I</u>	<u>Year II</u>	<u>Year III</u>	<u>Year IV</u>	<u>Year V</u>	<u>Year VI-X</u>	<u>Total</u>
	1981-2	1982-3	1983-4	1984-5	1985-6	1986-1991	
TUNG NAM 1	1,000	600	600	600	600	3,000	6,400
TUNG NAM 2		1,000	600	600	600	3,000	5,800
TUNG NAM 3			1,500	900	900	4,500	7,800
TUNG NAM 4				1,500	900	4,500	6,900
	1,000	1,600	2,700	3,600	3,000	15,000	26,900

This target and workplan will help to nearly double the number of tanks to be constructed by the Government as targeted in the five year plan of the Potable Water Project. However, the volume of safe-drinking water available from these tanks will more than triple the volume of Government tanks due to the bigger size of tanks. When these targeted number of tanks are combined, they will represent nearly 18% of the number of tanks as proposed by ADB's mission for villages including Bangkok.

Table 7
Cost Analysis

<u>Cost-Outlays</u>	<u>Y-I</u>	<u>Y-II</u>	<u>Y-III</u>	<u>Y-IV</u>	<u>TOTAL</u>	<u>%</u>
Material Costs	3,500,000	5,600,000	9,450,000	12,600,000	19,810,000	80
Adm. & Ops. Costs	700,000	1,120,000	1,890,000	2,520,000	6,230,000	20
TOTAL	4,200,000	6,720,000	11,240,000	15,120,000	26,040,000	100
Revolving Fund Required	3,500,000	3,500,000	5,250,000	5,250,000	17,500,000	67

- Note 1. Assuming that administrative and operating costs are directly related to the number of tanks to be built. However, experience showed that it could be lower.
2. Revolving fund only required for new tanks to be constructed each year at 3,500 baht/tank.
3. Total revolving fund available at the end of Year IV equivalent to the material costs of 5,000 tanks but only 60% is expected to be recovered and made available for the construction of 3,000 tanks.

IMPLEMENTATION STEPS

- A. Selection of Target Villages: The selection of a target village is based on the following factors:
- a. There is a real shortage of drinking water.
 - b. The village comes under the government development programme.
 - c. The residents of the village have given co-operation in village development.
 - d. There are family planning service acceptors in the village.
- B. Social Preparation
- Before entering the villages, the Water Resource Development Unit (WRU) staff will consult government officials at provincial, district and local levels. WRU staff will also co-operate with government officials in the selection of target villages and of villagers who will be taking part in this project. With the Revolving Fund allocated by PDA Headquarters, WRU staff will purchase equipment, materials and tools. The staff will also train voluntary village technicians to assist in tank construction. The staff explains to the villagers the mechanics of loan repayment.
- C. Selection of Participants: Selection of appropriate and qualified villagers to benefit from this project is based on the following factors:
- a. The villager is willing to have his/her own water catchment tank.
 - b. The villager is used to taking part in development programmes.
 - c. The villager has the intention of developing his/her village.
 - d. The villager has the capability to repay for the cost of construction materials in installments.
 - e. The villager should be a family planning acceptor.
- D. Contractual agreement and construction: Activities to be carried out are as follows:
- * Contractual agreements are arranged
 - Selection and training of village volunteer technicians to assist in construction
 - Inform the villagers of the tank construction technique
 - Establish a Village Development Committee responsible for revolving loan fund
 - Prepare construction schedule
 - Purchase of construction materials, usually in bulk and deliver to villages
 - Carry out construction

E. Follow-up: After tanks have been constructed, WRU staff will visit the participants of this project regularly in order to:

- inspect the conditions of the tanks
- make repairs as necessary at no charge
- see how participants maintain the tanks
- check the repayments of loan
- see the operation of the Village Development Committee
- follow-up the relevant activities of the participants and other villagers

F. Evaluation: The WRU staff and FDA Headquarters staff will evaluate the impact of this project on the participants and on the target villages. At the same time the staff will try to trace any discrepancy with the view of rectifying them.

Actual Progress: Tung Nam-1 and -2 was carried out by CBATDS as planned. Total number of tanks built in Tung Nam-1 are 1,004. Repayment was made according to schedule which enabled the proper implementation of Tung Nam-2. Total number of tanks built in Tung Nam-2 are 1,610. Repayment was also on schedule. At present, CBATDS is launching Tung Nam-3 which has a target of 2,700 -- nearly double Tung Nam-2's target of 1,600.

Appendix G

DISCUSSION PAPER

- Title : "The Implications of Scarcity/Availability of Water on Women",
by Z. Karim, Project Officer, UNICEF, Jakarta.
- Presenter : Mr. Mesbahuddin Akhter, Programme Coordinator for Water
and Environmental Sanitation, United Nations Children's Fund,
Jakarta.

In many societies, women are the main drawers of water. It is women, therefore, who have to bear the brunt of water scarcity. They with their children, are the most affected when water is scarce or polluted. For the women, the toil of carrying water over long distances is increased, while for the children, each drink they take is potentially lethal.

The heavy jars or cans that women expertly balance on their head may eventually lead to pelvic disorders with accompanying complications during childbirth. Not once but several times a day must they make the trip to the water source. Should they wish to engage in other activities more extensively -- for example, child care or income-raising -- the hours spent just fetching water present a significant hindrance. Nonetheless, many poor women attempt to accomplish all these tasks and others, which frequently add up to an 18-hour day.

Keeping the children and herself clean is a never ending struggle. While she may bathe right at the water source, she still has to take her place in the queue or appear at odd, usually inconvenient hours during the day or night. For some women, this exposure to the public eye becomes a source of embarrassment even though provisions for modesty are taken by bathing with a sarong or other clothing on. In many Middle Eastern societies however, public bathing outside the family courtyard is not an acceptable alternative for women. This increases their burden of water hauling.

It is women who must tolerate the flies and insects that surround their domain, landing on soiled dishes stacked in a corner awaiting water for washing and hovering over the household refuse still to be disposed of. Should she seek to raise some income by preparing some cooked food or drinks for sale, or by raising goats, pigs or chicken, her initiatives suffer from the lack of water.

In years of insufficient rain, women must undergo extreme hardship in order to fetch water from remote places. Since much time and energy are spent in collecting water, little time is left for other family activities, including health care.

According to studies carried out by the United Nations Economic Commission for Africa, the carrying of water is the most strenuous physical burden of all the tasks performed by women. It is estimated that rural women who must climb steep or hilly terrain use from 15 to 27 per cent of their calorie intake in water drawing.

Assuming that an average woman carries 20 litres of water per trip, she would definitely not be able to fetch enough water for domestic consumption and other household requirements. It is, therefore, not surprising that women have spearheaded much of the efforts to bring water closer to the home. In rural water development in Kenya, women have been a major instrument in creating an awareness and in translating this awareness into programmes. They have assisted in mobilizing support for the projects, raising the initial capital and in most cases contributing most of the labour.

Many women had to lose valuable time in school during their childhood in order to carry water. Very often, ten or eleven-year old girls are taken out of school because their families need them as water bearers. This has long-term social implications on the future life of these children.

The effect of scarcity or pollution of water on health is highest among children. It is, however, almost always the mother who has to take care of the sick child. In addition to the mental agony and distress she goes through, it also increases her workload.

Water is one of the basic needs for living. Water is physiologically necessary for human survival and individual water intake varies widely. However, the average daily water intake for women and children are less than for the adult male.

Women and children of the developing world are the chief beneficiaries of improvements in water supply. Women benefit because they are responsible for collecting, transporting and storing water in a vast majority of cases, all at the cost of a considerable expenditure of energy. If the burden of water collection can be reduced, women will have more time and energy for other household works, child bearing/rearing or for herself.

In a study in East Africa, rural women were asked what they would do with time saved through having water piped into their houses. They agreed almost unanimously that they would prefer to spend more time on other household tasks like sewing and cooking and expressed almost no regret at the potential loss of social contact at the river, well or spring.

There is a need to focus our attention on the most neglected sector of development; the heavily burdened women of the villages. It is necessary not only because of the prevalent neglect of their rights and needs, but also because of the conviction that the advancement of women is the single most important ingredient in a successful struggle for a better life - indeed for a more adequate development strategy.

Availability of water is not the solution to all the problems of women. Nor is it possible to substantially reduce the incidence of mortality and morbidity from water borne diseases without making potable water available. But by improving the accessibility to "safe" water, there is a better chance that overall development efforts will succeed.

Appendix H

PRESENTATION PAPER

Title : "Project Criteria and Procedure", Health Sciences Division, International Development Research Centre, Tanglin, Republic of Singapore.

Preseptor : Mr. Lee Kam Wing, Programme Officer, International Development Research Centre.

I. INTRODUCTION

The International Development Research Centre (the Centre) is unique among international institutions in that it was established by the Parliament of Canada in 1970 as an autonomous public corporation to initiate, encourage and support research into the problems of the developing regions of the world, and into the means for applying and adapting scientific, technical and other knowledge for the economic and social advancement of those regions. Strong emphasis is given to strengthen local research capabilities.

This is accomplished by providing support to developing country researchers and institutions to carry out research on areas which are important within their national context. IDRC staff provide guidance in identifying and developing research projects and assistance where necessary in the execution of the research.

Although funded by appropriation voted by the Parliament of Canada, the Centre's operations are guided by an international and autonomous Board of Governors. Members of the Board represent 10 countries other than Canada; several are from developing countries. The Board and its Executive Committee meet twice a year. The Governors set the Centre's policy directions and approve all major projects.

The Centre has four program divisions: Agriculture, Food and Nutrition Sciences; Social Sciences; Information Sciences; and, Health Sciences.

II. PROGRAM DIRECTIONS OF THE HEALTH SCIENCES DIVISION

The Division currently focuses its research support in four broadly defined and flexible program sectors:

(a) Water Supply and Sanitation

Support in this sector is given to research activities which integrate socio-economic, community education, training and maintenance aspects. Other activities include the development and testing of appropriate technologies and the transfer of these to the village level.

(b) Maternal and Child Health

Support is given to studies on the health of mothers and children who are up to the age of 5 years. Research areas include pre- and post-natal studies, causality of maternal and infant morbidity and mortality, nutrition, child development, diarrhoeal diseases, evaluation of family planning methods, and as well as research on health care delivery.

(c) Tropical and Infectious Diseases

This sector encompasses research activities on a broad spectrum of tropical and infectious diseases which have major public health implications. Activities include epidemiological and clinical aspects of these diseases; field research on the development and testing of new vaccines; evaluation of national immunization campaigns; and health operations research.

(d) Occupational and Environmental Health

Support is given to studies which are to determine the extent of specific occupational health problems and to test corrective measures in reducing the problem. Support is also given to studies on health hazards due to industrial effluent discharged into the environment.

III. CRITERIA FOR SUPPORTING PROJECTS

The IDRC Board of Governors considers project proposals not only in relation to their scientific merit but also such factors as:

National priority: The research should relate directly or indirectly to national policy issues as identified by local policy makers.

Local researchers and resources: The research should utilize developing country researchers and institutions. Expatriate researchers may be supported but only on a consultancy basis as required by the local researchers. Such assistance must be shown to be beneficial to the local researchers.

Research applicability: The results of the research should have reasonably immediate implications for the country where it is conducted. The methodology and approaches to be used should reflect the availability and capacity of the personnel and facilities allocated for the conduct of the research.

IV. PROJECT DEVELOPMENT PROCEDURES

A preliminary proposal is usually submitted initially. This should outline the objectives, methodology, institutional affiliation of the researchers, and estimated budget. It is then reviewed by IDRC staff to determine whether it meets the criteria for project support. A written response is normally sent within 6 to 8 weeks of receipt of the preliminary proposal.

The researcher may then be invited to submit a detailed proposal, which can vary in length, complexity or sophistication as according to the particular standard of the researcher. There are no fixed dates for submission of proposals.

Below is a suggested format but it should be emphasized that this is by no means the only way of presenting a detailed proposal. Certain of these sections may not be relevant and this should only be used as a guideline.

(i) Title of Study

State in a detailed phrase reflecting the subject of the research.

(ii) Institution proposing the research

State the name and address of the institution undertaking the research. Describe the institution briefly, including its objectives, and indicate previous experience with research, if any. Indicate the project leader.

(iii) Collaborating Agencies

State the names and addresses of all other institutions which are involved in the planning of the research or which will be involved in carrying out the project.

(iv) Introduction

Significance of the problem and justification for the research

Describe briefly the historical development of the current problem under investigation and indicate your particular interest in the problem. Provide justification as to why the research should be carried out.

Formulation of the specific research problem and working definitions to induce the study objectives.

Before considering the research objective setting, formulate the specific problem that can be investigated by scientific procedures. Decide then what aspects of it should be given extensive analysis or treatment.

Review of current knowledge

This should summarize the highlights of important findings that have a direct bearing upon the problem to be studied.

Regional, national and local policy implications related to the study's results

(v) Research Objectives

General Objective

The overall aim of the project should be given and should take the form of a brief but concise statement on the general goals to be achieved.

Specific Objectives

These are elaborations of the general objective in a measurable term and should provide details of the specific areas of investigation to be made. The researcher should assess subjectively the objectives of the research to determine whether he/she has the capability to deal with the chosen problem effectively, based on time limitations and manpower restrictions under which the researcher must work.

Hypotheses (if any)

These are to be deduced logically from a theoretical framework. Usually the number of hypotheses, as well as their nature, coincides closely with the objectives of the project stated earlier.

(vi) Research Methodology

Study population and sampling

Where will the study take place? Who will be studied? Provide detailed information on the study population. If a sample is to be taken, outline the proposed sampling design giving information on the sampling frame, the sampling procedure, and the sample size to be used.

Methods

How will the subjects be studied and what will be studied? Give details as to how the data will be collected, i.e., whether through the use of one or more of the following procedures: questionnaires, interviews, observations, clinical examinations, laboratory tests, analysis of secondary sources of information, etc. Provide a list of the study variables for which data are to be collected and indicate their relevance to the study. Include details of the educational background, training and duties of the personnel who will be involved with the data collection. If biological samples are to be collected, indicate the number and type of samples, method of collection and how the samples will be transported (if taken in the field), stored and analyzed.

Data processing and analysis

Describe the procedures for processing the raw data, i.e., whether by manual methods (tallying, handsorting, peripheral punched cards and sorter) or electronic methods (computers). Outline the type of statistical analyses to be carried out with the processed data.

(vii) Project Implementation Schedule

When will the study take place and how long will it be expected to run? Estimate how long it will require to complete each phase of the research and the total period required to complete the entire project. These estimates should consider start-up time, staff recruitment, equipment purchase and field preparation.

(viii) Training Component

Identify those aspects of the project that would contribute to the training of researchers and indicate whether it would be necessary for certain personnel to undergo specific training prior to or during the project:

(ix) Research Personnel

List the personnel to be involved in carrying out the research project and indicate their time commitment. The curriculum vitae of the principal staff should be included.

(x) Ethical Review

Describe any ethical review procedures which are to be followed locally.

(xi) Budget

Estimate the total costs of the project, indicating the yearly contributions to be made by each institution or agency involved. All budget items must be quoted in local currencies. The budget should be divided into 2 categories: IDRC Contribution and Local Contribution. The local contribution can be an estimation of resources "in kind", such as salaries, equipment, etc. The budget estimates should be computed on a year by year basis. The following categories are offered as examples:

- (a) Personnel. List all project personnel, including consultants if necessary, and the approximate time in person-months which they will spend on the project.
- (b) Equipment and Supplies. List all equipment requirements. Provide make, model, specifications, quantity, and name and address of supplier, particularly if IDRC is requested to purchase these items.

- (c) Travel and Per Diem
- (d) Data Processing and Analysis
- (e) Training
- (f) Dissemination of Results (seminars, publications)

(xii) Fund-receiving Authority

Indicate who will administer the funds, and state the department and address where the funds should be directed.

(xiii) Local Clearance

In those countries where there are country agreements between the Government and IDRC, approval of the proposal by appropriate government officials must be sought by the researchers themselves.

Please address all correspondence to the regional office:

Dr. Dae Woo Han
Representative

or

Mr. Lee Kam Wing
Program Officer

Health Sciences Division
International Development Research Centre
Tanglin P.O. Box 101
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Republic of Singapore



Group picture of Water Forum participants.



Participating in session with the Water Forum IDRC...



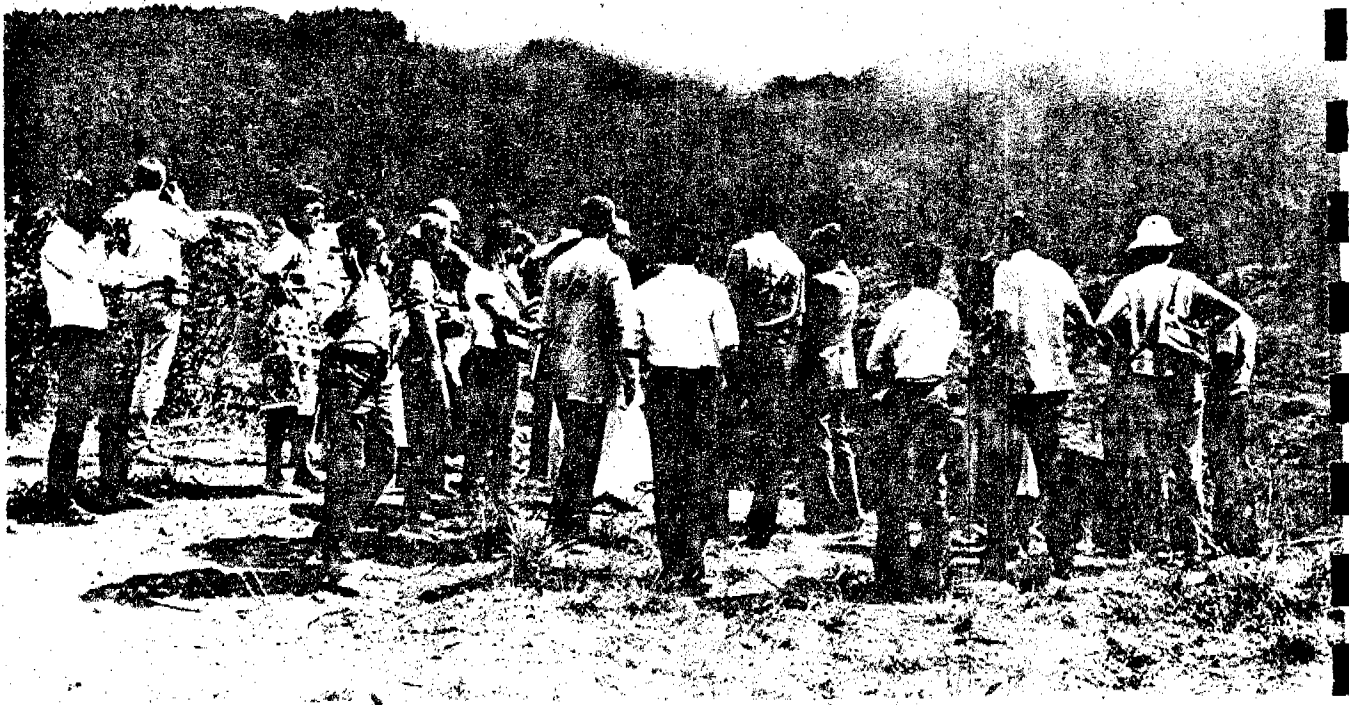
Water Forum participants in session.



Susan Rifkin
presenting
her paper
on "ACHAN's
Concerns with
Water and
Sanitation
Projects."



Rajesh Shah
of VIKAS.



Field visit to Dian Desa's village projects.

