PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION

525 TWENTY-THIRD STREET, N.W., WASHINGTON, D.C. 20037, U.S.A. CABLE ADDRESS: OFSANPAN

IN REPLY REFER TO: TELEPHONE 861-3200

APPRAISAL OF THE FEASIBILITY OF A TRAINING SYSTEM FOR TECHNICAL PERSONNEL OF WATER SUPPLY AND SANITATION INSTITUTIONS IN CENTRAL AMERICA, PANAMA, AND THE DOMINICAN REPUBLIC

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INDEX

		Page
1.	BACKGROUND INFORMATION	1
	1.1 History of the Project	1
	1.2 Countries'Background	2
	1.2.1 Costa Rica	2
	1.2.2 Dominican Republic	5
	1.2.3 El Salvador	5
	1.2.4 Guatemala	8
	1.2.5 Honduras	9
	1.2.6 Nicaragua	11
	1.2.7 Panama	12
2.	MISSION'S BACKGROUND AND OBJECTIVES	13
3.	APPRAISSAL OF THE SITUATION AND ASSESSMENT OF THE DEMAND FOR TRAINING OF TECHNICAL PERSONNEL	15
	3.1 Participating Institutions	15
	3.1.1 Costa Rica	15
	3.1.2 Dominican Republic	21
	3.1.3 El Salvador	21
	3.1.4 Guatemala	24
	3.1.5 Honduras	28
	3.1.6 Nicaragua	32
	3.1.7 Panama	34

Page

3.2 Assessment of the Demand for Training of Technical Personnel..... 39

3.3 Existing Training Resources in the Area of Central América, Panama, and the Dominican Republic..... 41

3.4 Legal Aspects..... 42

3.5 Summary Conclusions of the Mission..... 43

4. RECOMMENDATIONS 44

ANNEXES I, II, III, and IV.

TRAINING SYSTEM FOR TECHNICAL PERSONNEL OF WATER SUPPLY AND SANITATION INSTITUTIONS IN CENTRAL AMERICA, PANAMA, AND THE DOMINICAN REPUBLIC

1. BACKGROUND INFORMATION

1.1 History of the Project

As one examines the nature and extent of the human resources available to build, operate and maintain the existing water supply and sanitation systems in Central America, Panama, and the Dominican Republic, they are often struck by: the lack of trained subprofessional staff at the local level; a shortage of appropriate training materials; and a dearth of manpower development institutions that adequately and realistically respond to the sector's needs. The situation becomes even more critical when one examines future programs vs. expected resources.

If the investments in the water sector are to be effective, then there is a critical need to redirect existing training resources from the development of relatively limited number of professionals and high-level technicians (i.e. post graduate education) to that of mass-approach manpower development programs. The need for this change has been highlighted by the background report that was developed by the Manager of the National Water and Sewerage Institution of Honduras for the 1979 meeting of Directors and Managers of the Drinking Water and Basic Sanitation (DWBS) Institutions of Central America and Panama. In his report, Eng. R. Flores points out that current staffing patterns and techniques are not resulting in the agencies being able to adequately operate and/or maintain the existing systems, much less be able to face the growing problems which will result from the new systems that are being designed, built and delivered at an ever-increasing rate. The proof of this is that currently between 30% to 50% of the existing village water systems fail within two to three years of their construction. In urban areas system failure is reflected in unaccounted for water losses that run as high as 40 to 60% of the water produced.

The I Meeting of Managers and Directors of Water Supply and Sewerage Institutions of Central America and Panama was held in Costa Rica from 10 to 11 May, 1979. Its purpose was to discuss the necessary policies and strategies for improving the quality of water supply and sanitation services, to establish intercountry cooperation mechanisms, and to strengthen regional working relationships.

Concurrently with this meeting, the Central American Seminar on the Operation and Maintenance of Water Supply Services was held in the Plumbing Training Center of the Costa Rican Water Supply and Sewerage Institute (AyA), located in La Uruca, in San Jose, Costa Rica.

The meeting of Managers and Directors reviewed the recommendations of the technical group attending the Seminar and discussed the policies and strategies required for implementing them and thus achieving the proposed objective. As a result of their discussions, they adopted various resolutions, one of which, Resolution V, deals with manpower training (See Annex I), and deemed it necessary, inter alia, to entrust the delegation of Nicaragua to draw up a training plan for nonprofessional technical personnel and to request PAHO/WHO to provide cooperation in preparing this plan.

The II Meeting of Managers and Directors of Water Supply and Sewerage Institutions of Central America and Panama took place from 27 to 29 October 1980 in Tegucigalpa, Honduras. At this meeting, the Plan for Training of Nonprofessional Technicians for the Water Supply and Sewerage Institutions of Central America and Panama prepared by the delegation of Nicaragua was accepted. The relevant Resolution V is presented in Annex II.

At the Extraordinary Meeting of Managers and Directors of Water Supply and Sewerage Institutions of Central America and Panama which was held from 4 to 5 May 1981 in Panama City, it was decided, inter alia, to establish the Executive Secretariat of the organization for the years 1981 to 1983 in San Jose, Costa Rica and to reinforce the mandate contained in the Resolution V of the II Meeting in October 1980 in Honduras, to continue negotiations with GTZ/Federal Republic of Germany, IDB and other possible donors for the financing of the above-mentioned project. It was also proposed at this Meeting to consider the participation of the Dominican Republic in this Project at a later stage.

1.2 Countries' Background

1.2.1 Costa Rica

This country has a population of 2.1 million (45% in 33 urban communities over 5000 inhabitants). The country ranks high in most social indications. It has a relatively large middle class with 44% of total national income shared by the middle 60% of the population, GNP per capita reached U.S.$1,240 in 1977, adult literacy rate was 90% in 1973 and as a result of improved sanitation infant mortality was reduced to 27.9 per 1000 live births by 1977.

Sector responsibilities are primarily entrusted to two government agencies as well as to individual municipalities. The Costa Rican Institute for Water Supply and Sewerage (AyA) is the most important government agency in the sector. It is autonomous and decentralized with authority to plan, design, construct, operate and maintain water supply systems in communities of over 200 inhabitants and to carry out similar functions related to public water-borne sanitary sewerage. It also acts as a financing agent and provides technical support to municipalities for the construction of their water supply and sewerage systems. Individual municipalities operate 236 urban and rural water supply systems servicing about 52% of the population benefitted and AyA the remaining 48% with 196 systems. The Ministry of Health (MH) is responsible for environmental health including latrinization programs for the rural and water supply for the dispersed rural population (less than 200 inhabitants).

It is estimated that in 1978 about 75% of the total population was served by public water supply. The urban sector had a reported coveraqe of close to 100% (including 94% by house connection). The concentrated rural population 89% (almost exclusively by house connection) and the dispersed rural population 39% (mostly by house connection). These fiqures indicate a high degree of coverage although it is believed that due to limitations in relevant statistical information, these figures may be somewhat lower. Moreover, they do not reflect population served with intermittent or otherwise inadequate supplies. Information regarding municipally-administered systems is particularly inadequate and there is no systematic data collection, analysis and retrieval.

Public waterborne sanitary sewer systems are reported to cover approximately 43% of the urban population while 54% have septic tanks or sanitary latrines and 3% are not served. The San Jose Metropolitan area sewerage system provides no treatment and of the 12 cities with sanitary sewer systems only 6 provide some degree of treatment. There is no control of effluent quality. In the rural areas approximately 96% of the concentrated population are reported to have sanitary latrines or septic tanks and about 77% of the dispersed rural population to have sanitary latrines. However, there is a siqnificant percentage of latrines serving the rural population which are not in acceptable condition and, therefore, effective coverage may be less than the above figures would indicate. Moreover, available information regarding coverage of sewerage facilities under municipal administration is particularly inadequate.

A National Plan for Potable Water Supply has been prepared by AyA in 1977 but relevant goals are somewhat tentative, i.e. to provide by 1982 water supply to 95% of the urban and concentrated rural population through house connections . Implicit goals for the dispersed rural population are 47% coverage. A National Health Plan prepared by MH for the period 1974-80 indicates as a goal to have by 1980 70% of the urban

population covered by public waterborne sanitary sewer system and 100% of the concentrated as well as 90% of the dispersed rural population served by sanitary latrines. It should be noted, however, that these goals set for sanitary sewerage are not part of relevant AyA programmes. Moreover, the latrinization programme has been discontinued and rate of progress (as presently foreseen for 1980) of the ongoing water supply programme by MH for the dispersed rural population would, if continued, take over 30 years to cover relevant requirement.

Total sector investment through AyA, according to present plans, would amount to about C/.3.7 billion for the period 1965-1990 with some C/.0.7 billion already spent and about C/.1 billion for the ongoing and short-term programme (1978-1984). Of the approximately C/.2 billion envisaged for a medium term programme about C/.1.2 billion would be for a possible Rio Pirris project to augment the San Jose Water Supply by 2000 l/s. While over 90% of this contemplated future investment would be to cover improvements and extensions to existing urban water supply and sewerage facilities, less than 10% would be for water supply in the concentrated rural areas.

In the San Jose Metropolitan area 46% of the water produced is presently unaccounted for and in most other water supply systems, especially those administered by municipalities, this percentage is significantly higher. This is mostly due to incomplete metering and leakage. A more rational tariff structure (without penalizinq minimum consumption of $15m^2$/month per connection) should be instituted and accompanied by effective programmes of leakage control and reduction of unaccounted for water to 25% should be a realistic goal attainable by 1990.

AyA at the present time is not implementing a comprehensive programme of manpower training and development. Among others, there is a priority need for training of treatment plant operators since a number of new plants will shortly be constructed. It is also recommended that the efficiency of each of the various departments of AyA be evaluated and optimized since AyA has presently over 15 employees per 1000 connections. As a goal, this ratio may be reduced to 10 by 1990. There is also need for greater decentralization of managerial, administrative and project planning activities to the various Regions by AyA and this will require upgrading of Regional Offices.

Although established by legislation, there is no water quality control and surveillance by MH. AyA through its central laboratory exerts such control over the water sup ply systems under its administration. However, systems under municipal administration have no such quality control. It is re commended that MH be given the necessary resources to carry out its functions in these connections.

1.2.2 Dominican Republic

The Dominican Republic covers two thirds of the eastern part of the Spanish island with an area of 48,442 km^2 and a population of 5,431,879 (July 1980). About half of the population (49%) live in rural areas.

The most recent data (July 1980) provided by the National Institute of Water Supply and Sewerage (INAPA) shows 435 rural communities with a total population of 281,268 served with drinking water by house connections which corresponds to 10.5% of the rural population. Whereas at the same date about 60% of the urban population disposed of drinking water from house connections, in 1979, 25% of the urban population was connected to some kind of sewerage system. In the field of sanitary excreta disposal 27,000 latrines had been installed until 1978 and 59,175 latrines are planned to be constructed up to the year 1985.

The Government of the Dominican Republic attributes high priority to the improvement of public services, in particular of drinking water supply which is regarded as an important prerequisite for the health conditions of the population. Various organizations are responsible for a Programme for the Improvement of the Environment as, i.e., the State Secretary of Health, the Public and Social Assistance (SESPAS), the INAPA, the Water Supply and Sewerage Corporation of Santo Domingo, the Water Supply and Sewerage Corporation of Santiago, the Liga of Dominican Municipalities and of Santiago de los Caballeros. The coordination of their activities constitutes a fundamental objective for the achievement of the programme.

More specific data of the water supply and sanitation sector are not available because the Sector Study of the Dominican Reoublic is not yet completed under the WHO-PAHO/World Bank Cooperative Programme. They will be available at a later stage.

1.2.3 El Salvador

El Salvador is the smallest but most densely populated country in Central America with an area of 21,000 km^2. Its gross national product for 1978 was US$520. Recent growth has been relatively rapid but masks serious problems of unemployment, a skewed income distribution. Economic growth is much dependent upon the prices and markets for the country's traditional agricultural products, coffee, cotton and sugar.

The 1978 population was estimated at 4.5 million, of whom 41% urban and 59% rural. It is thought to be growing at 3.4% per annum without excessively high urban growth. Mortality and morbidity statistics

indicate high rates of water-related diseases with 4,200 deaths and 150,000 morbidity cases in 1977 diagnosed as enteritis and other diarrheal diseases. Infant mortality is gauged at 60 per thousand live births.

Water supply service levels were estimated for 1978 with 21% of the total population served through house connections, another 17% having access to piped water and the remaining 62% entirely lacking a public water supply. Urban areas were relatively better off with only 40% completely without either house connections or access while rural areas had 76% of its inhabitants without any. Sector progress since 1975 has been negative insofar as the share of population lacking any piped water rose from 57 to 62%.

Concerning sewerage and sanitation a low 15% of the total population in 1978 had sewerage connections, all of them in urban areas. Another 27% used latrines or septic tanks whereas 58% had neither.

The Salvadorean authorities have set two sets of service goals, one for 1982 related to the 'Plan Nacional de Bienestar para Todos', and another set of targets for 1990, the final year of the International Water Decade. The latter imply that nobody should be without piped water by 1990 although 30% would receive it through house connections and 70% with easy access only. Likewise, in sewerage and sanitation none would be without public sanitation in 1990 but 20 would benefit from sewerage connections and the remaining 80% would make do with septic tanks and latrines.

Meetinq the 1982 targets would require an additional 0.50 million to receive house connections, another 0.35 million sewerage and almost one million to receive latrines. Doing so would cost a total of US$90 million during the 1978-82 period or US$18 million per annum. In reachinq the 1990 targets about 0.70 million more as compared to 1978 should receive water and sewerage connections, and another 3.5 million would get easy access to public water and latrines. The required investment volume would be US$430 million, or an average US$33 million annually over the 1978-90 period.

Responsibility for executing the projects in the water supply and sanitation field is divided between 'Administración Nacional de Acueductos y Alcantarillados (ANDA)', and the 'Ministerio de Salud Pública y Asistencia Social (MSPAS)'. In addition, the 'Programa de Fomento de Cooperacion Comunal (FOCCO) has implemented small rural programs. Further, the Ministry of Interior (MI) and of Public Works (MOP) have been marginally involved through their housing programs.

ANDA was established in 1961 as an autonomous body. It has jurisdiction for water supplies and seweraqe systems in the urban and larger rural sectors and at present operates some 135 urban and 30 rural water supplies as well as 63 urban sewerage systems. In addition, there are plans for ANDA to take over another 70 water and 12 sewerage systems that have until now been operated by different municipalities. ANDA carries out all steps of project work, from the identification and design through the actual operation and maintenance of the constructed facilities.

In total, there are some 1,370 employees of whom those with an engineering or technical background amounting to some 90 (7%), those in administration around 460 (34%), and the remainder being unskilled personnel summing about 820 (60%). The number of people served either with water supply or sanitation by ANDA amounts to some 1,300 per ANDA employee which is a reasonable ratio. In terms of professional experience around 60% of the staff have more than five years of experience, another 28% have between one and five years, while 12% have less than a year. In the technical areas the personnel is relatively less experienced and the turnover is higher among these categories.

The emerging picture of staff instability principally among technical staff is compounded by the almost complete absence of training activities for the personnel. This situation cannot be allowed to continue if ANDA's investments and operations are to improve. It is, therefore, recommended that ANDA prepare a training program for all levels and categories of its personnel. The different requirements should be analyzed not only from ANDA's own viewpoint but should also include the needs of MSPAS and DIDECO. The possible sources of training should be identified, both within the country and abroad. It might prove of advantage to explore the possibilities for regional training efforts between the Central American countries, partly by drawing upon the different countries' specifically strong points. A scheme might be devised where exchanges between different water supply and sanitation entities could be brought about so as to give employees intensive on-the-job training.

Since 1972 the Ministry of Health is implementing rural water supply programs through its 'Departamento de Acueductos Rurales (DAR)'. Its systems are built in communities from 30 to 2,000 inhabitants and up to date 420 have been constructed . Once commissioned. local committees operate and maintain them.

1.2.4 Guatemala

In 1974, Guatemala had a total estimated population of 5.4 million with 37% of the inhabitants residing in urban areas and 63% in rural areas. Annual projected growth rates range from 5% in the Guatemala City metropolitan area to 1.8% in the rural areas. According to the National Health Council, waterborne diseases cause the greatest number of deaths, and infant mortality is high, particularly in rural areas where sanitary services are very poor.

The earthquake that struck Guatemala in February 1976 has compounded the problems of public health and future development of the water supply and sewerage sector. The need to rebuild will, of course, inevitably limit the investment funds available to increase present sector service levels.

Service levels are widely varying between the competing areas. In late 1974, 37% of the total population was supplied with public water, but urban areas had a much higher coverage than rural areas. The Guatemala City metropolitan area had 88% served, of which 50% through house connections; other urban areas had 61% served, of which 38% through house connections; and rural areas had a low 15%, of which only 2% through house connections. Additionally, service quality is at times deficient. Rationing is widespread in Guatemala City, water sources are sometimes polluted, and locally-operated urban and rural systems lack the necessary funds and personnel to maintain and improve service.

Sewerage levels are still lower. In urban areas some 26% are served with public sewerage and another 3% through other means. In rural areas sewerage is entirely absent although around 17% of the rural population make use of sanitary latrines.

Government institutions have ambitiously set the following water service targets for 1980: 90% in Guatemala City with 70% by house connection; 80% in other urban areas with 65% house connected; and 33% in rural areas, 15% house connected. Sewerage coverage is planned to expand from 48% to 70% in Guatemala City, from 14% to 23% in other urban areas, and 17% to 50% in rural areas.

The 1980 service goals would actually necessitate a total investment of US$177 million in 1976 prices during the 1975-80 period. Although the government's financial situation is satisfactory and in itself able to attract external loans, the sector has been unable to qualify for a sufficient level of foreign financing because of a limited capacity to prepare and implement projects. Financial constraints are, therefore, outgrowths of other sector problems. For this and other

reasons, it is probable that no more than half of the estimated US$177 million will actually be forthcoming, and only about US$34 million of that from internal sources. To alleviate or remove this deficit, the following three complementary measures may be employed.

Sector organization currently suffers from overlapping or fragmented responsibilities, varying project criteria, and a general lack of coordination between national planning and the investment programs of sector institutions. There are, for instance, three water entities and one sewerage entity in Guatemala City, and at least two entities competing in the rural field. It is recommended that responsibilities be consolidated so that (a) the National Planning Council oversees sector planning as well as financial and tariff policies; (b) the Institute for Municipal Development (INFOM) supervises urban financing; and (c) the Executing Unit for Rural Water Supply (UNEPAR) plans rural financing. Project implementation for each of the three developing areas --metropolitan, other urban, and rural-- should be consolidated under the aegis of a single entity for each area

There is presently a marked shortage of staff equipped to carry out sector development. It is recommended that the magnitude of sector training needs be clearly identified and prepared with a plan to train manpower in water and sewerage operations. In addition, each sectoral institution might provide training or in-service courses to personnel directly responsible for administering and operating water and sewer systems.

1.2.5 Honduras

Honduras has an area of some 112,000 km^2 and is relatively sparsely populated. Its per capita gross national product was US$390 in 1976, growing only slowly. The main obstacle to development is the inadequate human and physical infrastructure which has prevented the country from exploiting its agricultural and forestry potential. Since 1972 the Government is making considerable efforts in alleviating the constraints through a larqer public investment program, which depends upon external financing to supply two-thirds of total funding.

Uncertain population estimates for 1978 indicate a total population of 3.4 million of which 1.2 million (35%)is urban, and 2.2 million (65%) rural. It is thought to be growing at around 3% per annum which, if continued, would produce a 1990 population of 5 million with the urban share at 44%. Limited health data from 1972 show an infant mortality of 117 per thousand live births. Diarrheal diseases was the single most important death cause accountinq for some 20% of certified deaths. Life expectancy is gauged at 53 years.

Water supply service levels for 1978 are estimated with 27% of the total population served through house connections, another 25% having easy access and the remaining 48% without any. Urban areas were relatively better off with only 9% lacking a piped supply, while rural areas saw 70% of its population without either house connections or easy access. Sector progress since 1973 appears to have been positive in rural areas whereas service levels have been stagnant in urban areas. Quality of service is universally poor with only a handful systems with treatment and disinfection.

Sewerage and sanitation levels are even lower. Some 15% of the total population, all in urban areas, had waterborne sewerage in 1978 and another 14% had either latrines or septic tanks. Progress in sewerage and sanitation since 1973 is uncertain.

The Hondurean authorities have set two sets of goals. One is embodied in the current 5-year plan 1979-1983. The long-term 1990 targets foresee complete water and sanitation coverage in urban areas, but 10% and 25%, respectively, of the rural population would remain without piped water and sanitation in 1990.

Meeting either the 1983 or 1990 targets will require investments very much higher than past performance. Required annual investments to meet either set of goals are in the order of US$25 million annually as compared to yearly investments of US$4 million over the 1970-78 period. In total to reach the 1990 targets some 1.5 million would receive water house connections, an equal number would get easy access, about 0.9 million would receive sewerage, and 2.5 million latrines. Total required investments over the 1978-1990 period are estimated at US$370 million.

Even more important than financial constraints are those of scarce trained manpower. Of the total number of sector staff which is around 1,000, technical professionals constitute only 2% and other professionals 3 percent. The acute scarcity can only be gradually removed by expanding supply and the recommendations are that a comprehensive training program be prepared and launched. Its execution should preferably be arranged through existing universities and vocational schools in Honduras, supported when necessary by external technical assistance. Regional effort to enable staff to receive classroom and on-the-job training could well prove one practical way of drawing upon the different Central American countries' respective strengths.

1.2.6 Nicaragua

Nicaragua with its 128,000 km^2 is the largest Central American republic. Its economic development during the 1970's has been shaped by three momentous events, the 1972 earthquake, the 1973 oil price rise, and the civil war that ended with the overthrow of the Somoza regime on July 19, 1979. Economic growth has been erratic and negative since the 1978 civil war escalated. The gross national product in 1977 was US$830.

The 1978 population is estimated at 2.45 million divided equally between urban and rural areas. Population growth is above 3% per annum, with urban areas approaching 5% and rural about 1%. Health statistics are poor with large underreporting of both mortality and morbidity. Life expectancy was 53 years and infant mortality was calculated at 36 per 1000 live births. Three fourths of all communicable diseases originated through unsafe water and poor sanitation and one sixth of all deaths are estimated to be caused by unsafe water and lack of sanitation.

Since 1971 to 1978 the share of the total population with piped water has risen from 33 to 40%. In urban areas those with house connections rose from 67 to 73% and in rural areas the population with easy access to piped water climbed from 2 to 8%. Only in Managua is the water quality regularly monitored and the quality is satisfactory.

For sanitation, in 1978 some 19% of the total population was connected to public sewerage, 24% used latrines and 43% were completely without any.

The previous service level goals were to reach a 80% water coverage in urban areas and a 40% in rural areas, by 1980. In urban areas the targetted share to be sewered was 70% for both 1980 and 1990, and in rural areas the proportion with safe excreta disposal was 50%. These targets may change with the new government and its development plan, but probably not by much.

Achieving the targets in water supply and sanitation will require to provide about 3 million people with water or sanitation services. About 0.8 million urban inhabitants would have to receive house connections and around 0.65 million rural dwellers access to piped water. The combined cost would sum some US$230 million in 1978 prices, being divided in almost equal proportions between water supply and sewerage sanitation. Annually this is about US$18 million.

The full impact of the change of Government is yet to be felt the sector institutions. Under the present state of fermentation in the sector with numerous changes of personnel organization and policies it is

futile to pass a judgement whether the institutions will be the bottleneck for more rapid sector development.

There has been a slight decrease in the number of employees following the political change. More relevant than the number of staff are the skills. So far, the changes do not seem to have created any acute scarcity of trained staff, although the training needs are always there. It is recommended that a comprehensive training program be prepared and funded, possibly with external assistance. Such training program should also make use of existing academic institutions in Nicaragua.

1.2.7 Panama

The Republic of Panama has an area of some 77,000 km^2, comprising low lands, with abundant marshes and damp forests, high mountainous ranges, which on their pacific slopes have rich agricultural lands, and the Canal Zone, an area of intense economic development. Following the recent signature of a new Canal Treaty between the Government of Panama and the United States, Panama has since 1 October 1979 complete sovereignty and ownership over the Canal and the entire Canal Zone, while the United States retain the right to operate the Canal. The treaty will expire on 31 December 1999, at which time the Canal and all ancillary activities will totally revert to Panama.

Practically the entire urban population (1970) census definition: communities of more than 1,500 inhabitants) has the benefit of public water supply systems, either directly through private connections (serving more than 80% of the total), or indirectly through standposts, small municipal and private systems, as well as, provision through neighbours or other ways (including illegal connections). A similar coverage (estimated at 97%) also applies to urban sanitation, either by waterborne sewerage (serving 68% of the total) or by septic tanks (7%) and latrines (22%). In rural areas, 64% of the population is served with water, either from sanitary wells or by private connections to public systems and which account for 40% of the total population served in rural areas. Sanitary excreta disposal facilities are available to an estimated 80% of the rural population, mostly through the provision of latrines (about 5% have septic tanks, and 0.6% are served by waterborne sewerage). In terms of country-wide coverage for both water supply and sanitation, Panama ranks among the first countries in Latin America and in the developing world, with only 17% of the population without public water supply, and 11% without sanitary excreta disposal facilities.

Sector responsibilities are entrusted to two major agencies, the Ministry of Health (MH) and the National Water Supply and Sewerage Authority (IDAAN); IDAAN provides services to all communities of 500 inhabitants or more, and thus has the largest share in sector activities.

In terms of population remaining to be served, however, MH's forthcominq role appears as difficult as that of IDAAN; besides, MH retains nationwide responsibility for quality control, an essential condition to the attainment of the IDWSSD objectives.

Both MH and IDAAN have constraints related to the shortage or limited efficiency of manpower, finance and other resources. Since the appointment of IDAAN's new Executive Director, steps have been taken to correct this situation, but the proposed changes are likely to take time, and in the interim period IDAAN will be faced with the need to fulfil its main objective functions. These are defined in IDAAN's Plan as comprising in order of importance: maintenance of the existing assets and extension of coverage through the provision of new works.

The emphasis which is now placed on the maintenance function necessitates a difficult internal reorganization as well as more resources. This may not raise major financial problems, as IDAAN's self-financing capacity is expanding, external agencies are willing to participate and some benefits can be derived from a postponement of some of the investments in new works. Skilled manpower, integrated into the new institutional arrangement, is one of the basic needs to achieve proposed objectives.

2. MISSION'S BACKGROUND AND OBJECTIVES

PAHO has been working with the Water and Sanitation Authorities of the Region since the early 1970's, in order to increase the number of technicians that are available to operate and maintain their drinking water and sanitation systems. Under the GTZ/WHO Interregional Cooperation Project on National Planning for the International Drinking Water Supply and Sanitation Decade, Costa Rica and Honduras have first been selected among the Central American countries for project activities under Phase III Agreement starting in 1981.

As a result of the I Meeting of Managers and Directors of Water Supply and Sewerage Institutions of Central America and Panama held in Costa Rica from 10 to 11 May 1979, PAHO/WHO was requested to provide cooperation in drawing up a Training System for Technical Personnel in Central America and Panama (See Annex I).

In a meetinq of WHO/PAHO/GTZ representatives held in Washington on 6 February 1981, it was agreed to include the Training System for Technical Personnel in Central America and Panama into Phase III of the GTZ/WHO Interregional Cooperation Project and to send a joint PAHO/GTZ Mission to Panama, Costa Rica and possibly to the five other countries in

order to appraise the local situation, prepare a project document and to develop a report for PAHO/WHO and GTZ on potential cofinancing. The Terms of Reference prepared by PAHO and approved by WHO/GTZ were as follows:

(1) Appraise the project that was developed by the Association of Water and Sanitation Institutions (AIAS) of Central America and Panama for establishing a Coordinated Training Delivery Systems (CTDS).

(2) Develop a revised project document that could be submitted to GTZ for its final funding consideration.

(3) Develop the draft of a basic agreement document that would indicate each government's support of "The Project" and the commitment of one government to host the project headquarters.

(4) Develop a report for PAHO/WHO and GTZ on potential cofinancing sources for this and later phases of the project.

The joint mission used the occasion of the Extraordinary Meeting of Managers and Directors of Water Supply and Sewerage Institutions of Central America and Panama, held from 4 to 5 May 1981 in Panama City, to participate in meetings relevant to the project, and then travelled to San Jose, Costa Rica, in order to review the proposal to use the Training Center of AyA located in La Uruca for regional training activities and to discuss details of the project with the Permanent Executive Secretariat of the 'Comité Coordinador Regional para Centro América y Panamá de Instituciones de Agua y Saneamiento,' the Country Engineer of PAHO, and the Representative of IDB (For further details see Travel Report and institutions visited, Annex III).

The project document and report were then compiled in Washington by the joint PAHO/GTZ mission from 17 to 27 July 1981, using information obtained during the field visit from: a questionnaire which was distributed among the participating countries at the Extraordinary Meeting in Panama, from existing sector-study reports prepared by the WHO/World Bank Cooperative Program and from the Country Reports for the International Drinking Water and Sanitation Decade.

3. APPRAISAL OF THE SITUATION AND ASSESSMENT OF THE DEMAND FOR TRAINING OF TECHNICAL PERSONNEL.

3.1 Participating Institutions

3.1.1 Costa Rica

The Costa Rican Institute for Water Supply and Sewerage (AyA) is the most important government agency in the sector. It is autonomous and decentralized with authority to plan, design, construct, operate and maintain water supply systems (population above 200) and to carry out similar functions related to public waterborn sanitary sewerage. (Collection, treatment and disposal). Not all systems are operated by AyA. In 1977, individual municipalities operated 236 urban and rural water supply systems servicing about 52% of the population benefitted and AyA the remaining 48%, with 196 systems. For the municipal owned and operated systems, AyA acts as a financing agent by channeling funds obtained from other national, and international agencies, for the construction of municipal water supply and sewerage systems as well as providing relevant technical support in the design and supervision of construction. While AyA carries out relevant normative functions, storm water systems are also operated and maintained by their respective municipalities.

Table I shows the water supply systems operated by AyA and by individual municipalities.

The total population served by AyA in 1981, according to the questionnaire distributed by the mission is presented in Table II.

In 1978 the total number of water supply connections administered by AyA was 150,126 and of sanitary sewerage 62,648.

Diagram I presents the organization chart of March 1980 for AyA. Total staff at AyA amounted to 2,832 in 1981; it is interesting to note that the relevant figures in 1978 were 2,236 and 2,457 in 1977. Table III presents the relevant distribution according to level of service and their variations since 1977.

AyA has presently over 15 employees per 1000 water connections which is a rather high figure and could be reduced through rationalization.

The systems operated by AyA are generally in good condition and the quality of maintenance is far above average compared to the conditions in the other participating institutions except Panama.

Network supervision and leakage control is performed by AyA regularly and on high professional level. However, according to the Sector Study in the San Jose Metropolitan Area in 1978, out of 98,863 connections a total of 84,404 were metered but only 76,404 were functioning, and only 53.8% of the water produced was billed, indicating a high percentage of unaccounted and unbilled for water.

There is obviously a shortage of skilled and semi-skilled labour and AyA is quite aware of the importance to train its subprofessional technical staff. AyA, therefore, established in 1975 their own training facility for nonprofessional technical personnel in La Uruca.

TABLE I

WATER SUPPLY SYSTEMS ADMINISTERED BY INDIVIDUAL MUNICIPALITIES AND A y A (1976)

	Municipalities According to Province							A y A
Size of Community	San Jose	Alajuela	Heredia	Cartago	Guanacaste	Puntarenas	Total	Total
0-500	11	11	1	4	2	8	36	61
500-1,000	11	20	4	5	1	1	42	56
1-2,000	8	23	14	14	1	5	65	40
2-3,000	3	10	3	16	3	1	38	10
3-5,000	8	8	3	1	-	2	22	6
5-10,000	1	8	2	6	-	1	18	8
10-20,000	1	6	1	2	-	2	12	7
20-30,000	-	-	1	-	-	-	1	3
30-100,000	-	1	-	1	-	-	2	3
over 100,000	-	-	-	-	-	-	-	2
TOTAL	43	87	30	49	7	20	236	196

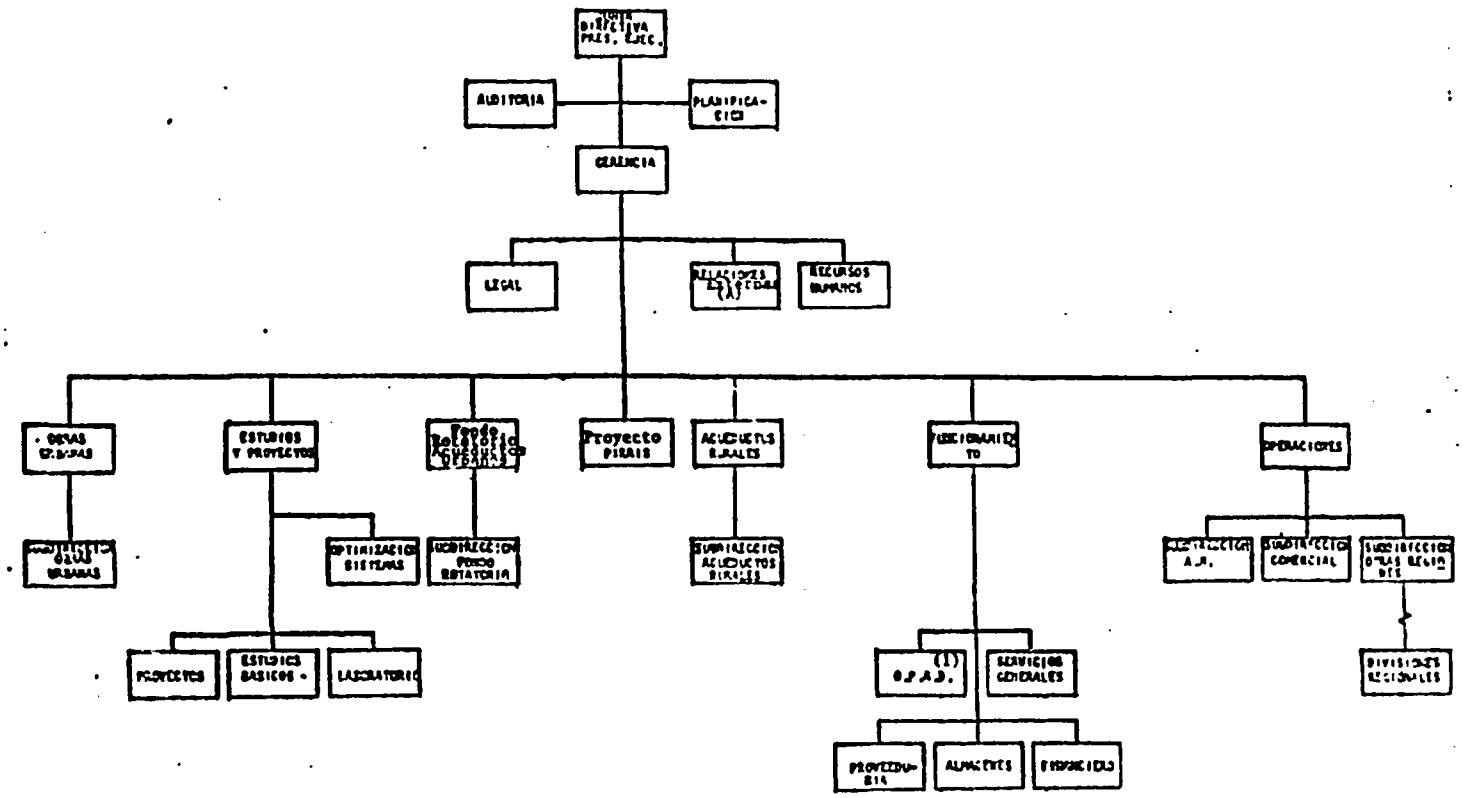
TABLE II

POPULATION SERVED BY A y A

	Water Supply		Sewerage	
	Pop.Served by A y A	% of Total Population	Pop.Served by A y A	% of Total Population
URBAN	599.485	63.4	392.000	41.5
RURAL	380.872	33.0	-	-
TOTAL	980.357	46.7	392.000	41.5

ORGANIGRAMA del A y A

Diagrama I



(1) Oficina de Procesamiento y Archiv. de datos (O.P.A.D.)

TABLE III

MANPOWER DISTRIBUTION AT A y A

Level of service	1981 Number	1981 %	1978 Number	1978 %	1977 Number	1977 %
Management (Top Level)	110	3.9	11	0.5	10	0.4
Professional			89	4.0	67	2.7
Technical	1,012	35.7	178	8.0	170	6.9
Management (Medium Level and foremen)			165	7.4	122	4.9
Skilled Labour			775	34.7	734	29.9
Semiskilled Labour	1,710	60.4	137	6.1	107	4.4
Unskilled Labour			881	39.3	1,247	50.0
T O T A L	2,832	100	2,236	100	2,457	100

3.1.2 Dominican Republic

According to the few information available, the National Institute for Water Supply and Sewerage (INAPA) seems to be the most important government institution in the sector. Further details about the legal status, organizational structure, manpower and level of services are not known. It also seems that water supply and sewerage services in the capital Santo Domingo and the next important city, Santiago de los Caballeros, are operated by individual corporations such as the Water Supply and Sewerage Corporation of Santo Dominqo and the Municipality of Santiago.

3.1.3 El Salvador

The National Administration for Water Supply and Sewerage (ANDA) was established in 1961 as an autonomous body. It has jurisdiction for water supplies and sewerage systems in the urban and larger rural sectors and at present operates some 135 urban and 30 rural water supplies as well as 63 urban sewerage systems. In addition, there are plans for ANDA to take over another 70 water and 12 sewerage systems that have until now been operated by different municipalities. ANDA carries out all steps of project work, from the identification and design through the actual operation and maintenance of the constructed facilities.

The number and skills of staff are mapped for the major sector agency as shown in Table X. In total, there are some 1,370 employees of whom those with an engineering or technical background amount to about 90 (7%), those in administration around 460 (34%), and the remainder of unskilled personnel about 820 (60%). The number of people served either with water supply or sanitation by ANDA amounts to some 1,300 per ANDA employee which is a reasonable ratio. In terms of professional experience around 60% of the staff have more than five years of experience, another 28% have between one and five years, while 12% have less than a year. In the technical areas the personnel is relatively less experienced and the turnover is higher among these categories.

Service quality is universally poor with intermittent service, low pressures and water being unsafe from the bacteriological point of view. The situation is a cause for concern, all the more since the high popula tion pressure and rising pollution levels in both surface and ground waters are going up.

Sewerage and sanitation service levels are low but at least did not drop from 1975 to 1978. Whereas in 1975 60% of the total population were without any public system whatsoever, in 1975 the share was slightlylower at 58%. Even so, the situation is serious, especially in conjunction with the intermittent water service. Groundwaters polluted for the lack of safe excreta disposal may enter the water network and cause epidemics.

TABLE IV

NUMBER AND SKILLS OF "ANDA" STAFF 1979

Personnel	Years of Experience			
	Less than 1 year	1-5 years	Above 5 years	Total
Sanitary engineers		3	2	5
Civil engineers	6	4	17	27
Industrial engineers		1		1
Electrical engineers		1	1	2
Mechanical engineers			1	1
Other engineers	2		1	3
Engineering students	9	10	2	21
Technicians		9	6	15
Topógraphers		2	3	5
Draftsmen	4	4	4	12
Lawyers		3	1	4
Financial analysts		1		1
Accountants	1	1	1	3
Accounting clerks	5	4	10	19
Administrative clerks	38	143	149	330
Secretaries	4	19	17	40
Drivers	10	16	39	65
Unskilled personnel	87	161	568	816
Total	166	382	822	1,370

Source: ANDA

3.1.4 Guatemala

The principal agencies associated with the water supply and sewerage sector are:

(i) the 'Empresa Municipal de Agua Potable (EMPAGUA)', in Guatemala City;

(ii) the Xaya-Pixcaya Water Supply Executing Unit, in Guatemala City;

(iii) the 'Compañia Mariscal', in Guatemala City;

(iv) the Guatemala City Municipality for sewerage;

(v) the Institute for Municipal Development (INFOM);

(vi) the Department of Water and Sewerage (DAyA) in the Ministry of Communications and Public Works;

(vii) individual Municipalities;

(viii) the Executing Unit for Rural Water Supply (UNEPAR) in the Ministry of Health; and

(ix) the Division of Environmental Sanitation (DSA) in the Ministry of Public Health and Social Assistance for rural sanitation.

The 'Empresa Municipal de Agua Potable (EMPAGUA)', furnishes drinking water service to Guatemala City. EMPAGUA presently supplies about 81% of the total volume of water consumed in the metropolitan area. A third water company, privately owned, 'La Compañía de Agua Mariscal (Cia. Mariscal)', supplies about 12% of the total consumption with the remaining 7% produced by individual consumers from wells and rainwater catchment tanks. In the future, 'Cia. Mariscal' may play only a marginal role in providing water to the metropolitan area since it will not be expanded from its present levels of service and eventually may be absorbed by EMPAGUA.

The Guatemala City Municipality is directly responsible for all phases of the city's sewerage work, including planning through operations.

The Institute for Municipal Development (INFOM) is an autonomous agency under the Presidency, with the broad purpose of giving financial and technical assistance to municipalities outside Guatemala City. The Director has broad authority to determine investment priorities and areas

of technical assistance. Sector work is carried out by INFOM's Water and Sewerage Division which prepares and executes works financed from INFOM funds, supervises the operations of all projects financed from INFOM or international funds, and provides technical assistance to municipalities that request such help. A separate division, the External Credit office, administers funds arising from international loans. It also provides technical assistance to municipalities for the operation and maintenance of their systems.

The Department of Water and Sewerage (DAyA) in the Ministry of Communications and Public Works is responsible for design and construction supervision of complex water and sewerage projects. The Execution and Supervision Section of DAyA works through the Ministry's ten local offices which are relatively experienced in carrying out construction programs but are ill-equipped for operational and maintenance activities. The systems built are turned over as grants to the municipalities.

All urban water and sewerage systems outside Guatemala City are administered, operated and maintained by the municipalities.

The Executing Unit for Rural Water Supply (UNEPAR), in the Ministry of Public Health and Social Assistance, is responsible for the design, construction and operation of some rural water supply projects. For villages with more than 400 inhabitants UNEPAR directly operates and maintains 20 large rural water systems. It supervises operations in 180 smaller rural water supply systems which are actually run by local committees, and it undertakes any major repairs. The design capacity of UNEPAR is 60 projects per annum. Its construction capacity is limited, and only about 25% of the construction is undertaken by UNEPAR, with the remaining 75% done by private construction firms.

The Division of Environmental Sanitation (DSA), also under the Ministry of Public Health, largely functions independently of UNEPAR and designs, executes and supervises minor sanitation projects in the rural area.

Recently in 1980, the Permanent Committee for the Coordination of Water Supply and Sanitation (COPECAS) has been established in order to coordinate all institutions working in the sector and in permanent consultation with the Ministry of Public Health and Social Assistance to prepare sector plans for the National Planning Council.

Due to the still existing diversification in the sector it is not known yet which institutions will finally participate in the Training System for Technical Personnel. At present, COPECAS seems to assume responsibility and it can be expected that COPECAS will nominate the institutions which should finally participate.

According to the questionnaire distributed by the Mission, UNEPAR is a governmental institution which employed 427 permanent staff in 1981.

The distribution according to level of service is presented in Table V.

Staff projections are given as follows:

1981	470
1983	520
1984	550
1985	600

The number of rural population served by UNEPAR in 1981 is 409,500, which corresponds to only 18.6% of the total 2.2 million living in rural areas and 12% of the total population.

TABLE V

MANPOWER DISTRIBUTION OF UNEPAR

Level of Service		1981 Number	1981 %
Professional:	Management	5	1.2
	Planning	3	0.7
	Design	8	1.9
	Construction	9	2.0
	Operation & Maintenance	2	0.5
	Others	3	0.7
T o t a l		30	7.0
Non Professional:	Management	55	12.9
	Construction	90	21.1
	Operation & Maintenance	76	17.8
	Others	69	16.2
T o t a l		290	68.0
Labourers (unskilled)		107	25.0
Grand Total		427	100.0

3.1.5 Honduras

The distribution of sector responsibility is clearly outlined in the 'Plan Nacional de Desarrollo 1979-1983'. The 'Servicio Autónomo Nacional de Acueductos y Alcantarillados (SANAA)', on the Board of which the Ministry of Health is represented has jurisdiction for water supply in communities above 500 inhabitants, for sanitary sewerage in all towns with more than 20,000 inhabitants, and for stormwater drainage in the largest urban cities. SANAA in practice only operates the sewerage in the capital of Tegucigalpa. It carries out its tasks via four regional offices.

The 'Ministerio de Salud Pública y Asistencia Social (MINSALUD)', through its 'Dirección de Saneamiento Ambiental' and its eight regional sanitary offices, should supply with water all communities below 500 inhabitants, and execute latrine programs in rural communities with more than 50 inhabitants and in marginal urban areas. In addition, it has the task to execute and operate sanitary sewerage and should set and supervise water quality norms.

Sector responsibility is divided between SANAA and municipalities in urban areas and between the 'Dirección de Saneamiento' in MINSALUD and smaller communities in the rural field. In reality, the demarcation line is blurred since SANAA also operates rural systems. All the involved institutions and, certainly, the municipalities, are short of trained manpower which slows their speed and quality of work. This, then, is the main institutional problem: although on paper the sector is logically organized with institutions operating under reasonable bylaws, in reality these remain skeleton entities lacking the skilled management and supporting staff to carry out the tasks. The weakness is, as mentioned, more pronounced in rural areas where existing institutions have mainly managed to extend coverage to communities with more than 2,000 inhabitants. The bulk of the rest with between 200 and 2,000 inhabitants, or 80% of the total number of 2,000 communities do not have any piped water system whatever.

SANAA serves 35% of the population through 21 urban water supply systems, 81 rural water supply systems and 1 sewerage system. Municipalities, at times with SANAA technical assistance, are operating 457 water supply systems and 33 sewerage systems.

Table VI shows the water supply and sewerage systems operated by SANAA and municipalities.

Table VII shows personnel by skill and sector institution. In total, there are some 1,050 sector staff, of whom 750 in SANAA, another 150 in the municipalities, almost 100 in the Ministry of Health and about 50 in the 'Dirección de Asesoría Técnica Municipal' in the 'Ministerio de

Gobernación y Justicia'. These numbers mark serious shortage of managers and professionals. Professionals in the technical field amount to only 2% of the total, and other types of professionals constitute only 3 percent. The total number of midlevel technicians amounts to a further 6% of the total number of sector staff.

Quality of service is almost with no exceptions most deficient. Waters are turbid, contaminated bacteriologically, and intermittent service or rationing are commonplace. The reasons are the absence of any type of treatment in most systems, and that only in the largest cities is chlorination practiced. Underlying all this, is inadequate operation and maintenance, explained by the low levels of training of operators.

TABLE VI

COMMUNITIES WITH WATER SUPPLY SYSTEMS AND SANITARY SEWERAGE BY POPULATION RANKS AND ADMINISTRATIVE ENTITIES, DECEMBER 1978

Population Ranks	Total Communities	WITH SERVICES				WITHOUT SERVICE	
		Administered by SANAA		Administered by Village Governments and Water Boards			
		Water Supply	Sewerage	Water Supply	Sewerage	Water Supply	Sewerage
up to 199	18,700	-	-	66	-	18,700	18,700
200 - 499	1,520	23	-	144	-	1,360	1,520
500 - 999	365	36	-	131	3	198	362
1,000 - 1,999	123	19	-	60	2	44	121
2,000 - 2,999	42	9	-	31	4	2	38
3,000 - 4,999	14	4	-	10	5	-	9
5,000 - 9,999	14	4	-	9	7	1	7
10,000 - 19,999	7	2	-	5	7	-	-
20,000 - 49,999	4	4	-	-	4	-	-
More than 50,000	2	1	1	1	1	-	-
Totals	20,791	102	1	457	33	20,301	20,751

TABLE VII

SECTOR MANPOWER RESOURCES, 1978

Type of Personnel	Rural Water Supply Ministerio de Salud Pública	SANAA	Dirección Asesoría Técnica Municipal	Municipal-ities	Total
Administrative Personnel	9	280	17	--	306
Technical Personnel					
Professional Staff	6	45	5	--	56
Technical Staff	73	49	16	--	138
Other Staff	--	385	15	153	553
Sub-total Technical	79	479	36	153	747
Total Sector	88	759	53	153	1,050

3.1.6 Nicaragua

As a result of the change of government the water supply and sanitation sector is being reorganized. Previously, the Empresa Aguadora de Managua (EAM) handled the water supply for the capital. The 'Departamento Nacional de Acueducto y Alcantarillado (DENACAL)' was responsible for the remaining urban water supplies and all sewerage. The Ministry of Health was responsible for rural water supplies and sanitation with the exception of the larger agglomerated rural center that were under DENACAL. To this end a special program, PLANSAR, concentrating on the needs of the rural communities wih less than 500 inhabitants was established.

With Governmental Decree No.20 of 25 July 1979, EAM and DENACAL were merged creating the National Nicaraguan Institute for Water Supply and Sewerage (INAA).

Based on the figures in the Sector Study 1979 the total number of staff employed in the sector was 1,894. Their distribution to staff categories and number of connections is shown in Table VIII.

Progress since 1971 appears to have been solid. The share of the total population with piped water has risen from 33 to 40%. In urban areas those with house connections rose from 67 to 73%, and in rural areas the population with easy access to piped water climbed from 2 to 8%. The gratifying results are the evidence of the special interest in the sector. This is evidenced by the share of public investments devoted to water, sewerage and urban development rose from 13% in the 1970-72 period to 21% over the 1973 to 1976 period. Water and sewerage alone over the 1971 to 1976 period averaged some 8% of the total public investments.

Only in Managua the water quality is regularly monitored and the quality is satisfactory. In other cities and towns water quality monitoring is erratic. The fact that water resources are still abundant in relation to needs, and that 80% of all supplies draw from groundwater make it likely that the quality is rather good. However, the increasing use of chemicals in agriculture and the absence of sewage treatment have lowered the quality of raw waters. If unchecked, the trend would become a real risk to safe water quality.

TABLE VIII

Sector Human Resources by Skill and Productivity, 1979

	DENACAL			EAM	PLANSAR	
	Central Office	Regional Offices IX 1979	Total IX 1979	IX 1979		Total Sector
Staff Category						
University trained staff	61	N.A.	N.A.		17	
Skilled technical staff	83	N.A.	N.A.	148	73	
Administrative staff	265	N.A.	N.A.			
Unskilled staff	178	N.A.	N.A.	407	144	
Total	587	518	1,105	555	234	1,894
Number of Connections						
Water Supply			62,000	64,000	16,000b/	142,000
Sewerage			63,000 a/	c/		63,000
Total Water & Sewerage			125,000	64,000	16,000	205,000
Connections per staff			113	115	68	108

a/ Estimated on the basis of 50% of those with water house connections assumed to have sewerage (1971 census data)

b/ Equivalent at 5,9 persons per connection

c/ EAM is not responsible for sewering Managua. This is DENACAL's responsibility

Source: IMAA, Ministry of Health.

3.1.7 Panama

Created in 1961, the Institute for National Water Supply and Sewerage (IDAAN) is the principal agency active in the sector, and has a country-wide mandate for the provision of water supply and sewerage facilities, the sharing of the rural water supply subsector with MH being the result of mutual agreement rather than legislation. Although it operates within the context of environmental health activities, and under the umbrella of the Ministry of Health, IDAAN enjoys complete administrative and financial autonomy subject, however, to ministerial direction and control, as provided by representation on the Board of Directors. Besides, IDAAN is in constant relationship with the Ministry of Health, and in view of the quality of information exchanged between the two Agencies, the sector as a whole can be regarded as well integrated.

IDAAN has one metropolitan and ten regional offices for operation and maintenance and an important central office for administrative, technical and financial management. The central structure includes a planning and programming section, as well as posts of project coordinators for the programmes undertaken with the participation of external agencies.

The commercial performance of IDAAN's system is presented in Table IX. It shows that IDAAN's commercial and financial results could be very much improved if two courses of action were followed in sequence: (i) meter installation and repair: two-thirds of the connections, representing nearly one-half of total consumption, have their meters out of order or are without meters. Some 1,500 residential and industrial connections with average consumptions of more than 100,000 gallons per month each and representing toqether nearly 20% of IDAAN's total sales, are not metered; and (ii) study and implementation of a progressive tariff structure based on consumption. Among several examples of distortions and inadequacies of the present tariff structure, is the case of residential connections with consumptions of more than 100,000 gallons per month, which represent in total nearly 30% of total IDAAN's sales, i.e. three times as much as consumptions of commercial and industrial connections in the same category. While the present tariff tends to penalize commercial and industrial connections, actual wastage and superfluous consumption probably originate in those residential connections which have very high consumption.

Table IX also shows IDAAN's commercial performance in terms of its ability to collect revenues from the two components of the water bill, which are the water tariff and the valorization tax, a special tax based on value added to property through the installation of infrastructure systems, thus necessitating a rather complex inventory and evaluation system, which is largely invalidated by the fact that it is not equally

applied throughout the country. Table IX shows that nearly 20% of revenues from water tariff, and 25% of revenues from valorization tax, are not collected.

IDAAN had 2,186 employees in 1978, and has 2,328 at present, being one of the largest employers in the country. There are 17 employees per thousand connections, and while this proportion is higher than in many similar agencies in other countries, the Authority is often short of qualified personnel in the most useful categories, particularly skilled labour for maintenance of systems.

IDAAN's Manpower Distribution according to the questionnaire distributed by the mission is presented in Table X.

Staff projection for 1982 is given at the same figure of 2,328, which indicates that there is no intention of increasing the number of employees in the coming years.

Practically the entire urban population (1970 census definition: communities of more than 1,500 inhabitants) has the benefit of public water supply systems, either directly through private connections (serving more than 80% of the total), or indirectly through standposts, small municipal and private systems, as well as, provision through neighbours or other ways (including illegal connections). A similar coverage (estimated at 97%) also applies to urban sanitation, either by waterborne sewerage (serving 68% of the total) or by septic tanks (7%)and latrines (22%). In rural areas, 64% of the population is served with water, either from sanitary wells or by private connections to public systems and which account for 40% of the total population served in rural areas. Sanitary excreta disposal facilities are available to an estimated 80% of the rural population, mostly through the provision of latrines (about 5% have septic tanks, and 0.6% are served by waterborne sewerage). In terms of country-wide coverage for both water supply and sanitation, Panama ranks among the first countries in Latin America and in the developing world, with only 17% of the population without public water supply, and 11% without sanitary excreta disposal facilities.

In terms of service level, IDAAN ranks high, with services mostly by private connections and average consumption figures close to 70 gcd in the 15 major cities, and close to 30 gcd in the 141 other IDAAN systems. However, unaccounted-for water is high, averaging 38% for all IDAAN systems.

In terms of quality standards, urban sanitation may pose more problems than urban water supply. The level of service provided is not so much in question as the use which is made of the service. Although there exist a series of estimates regarding number of connections, there is no

systematic statistical data collection. Flow and load estimates indicate that waterborne sanitary sewage systems are largely underutilized, so that the level of service in terms of population served may be overestimated. Moreover, while such public systems are available in most towns, there is no treatment prior to disposal. In coastal areas, the effluent is disposed directly into the sea. (In Panama City fishing is forbidden in a zone extending 5 miles from the coast). The only significant (1 mile long) sea outfall exists in Colon, but its physical condition has deteriorated. Several city effluents are rejected directly into the sea through combined sewer systems, at other points of the coast and near densely populated areas.

TABLE IX

COMMERCIAL PERFORMANCE OF IDAAN'S SYSTEMS (1978)

Breakdown of consumption 4/ (000 gallons per month)	PANAMA		COLON		OTHERS		TOTAL	
	Number	Consumption	Number	Consumption	Number	Consumption	Number	Consumption
Residential connections - with consumptions from:								
1 to 5	7,680	28,840	90	353	40,000 1/	176,000 1/	47,770	205,193
6 to 15	44,150	390,493	931	8,330	13,000 1/	96,000 1/	58,081	494,823
15 to 100	8,441	276,622	784	36,884	2,216 1/	56,347 1/	11,441	369,853
above 100	1,386	460,512	514	124,159	57 1/	23,000 1/	2,457	607,671
Commerce and Industry:								
1 to 5	203	734	20	85	906	3,750	1,129	4,569
6 to 15	468	4,927	84	889	728	6,842	1,280	12,658
15 to 100	914	40,997	129	5,755	393	14,828	1,436	61,580
above 100	403	168,062	67	18,622	46	24,633	516	211,317
Government 2/	337	83,829	59	31,767	575	49,599	971	165,195
TOTAL	64,482	1,455,016	2,678	226,844	57,921	450,999	125,081	2,132,859
of which								
-residential and industrial	64,145	1,371,187	2,619	195,077	57.346	401,400	124,110	1,967,664
from: 1 to 5	7,883	29,574	110	438	40,906	179,750	48,899	209,762
6 to 15	44,618	395,420	1,015	9,219	13,728	102,842	59,361	507,481
15 to 100	9,355	317,619	913	42,639	2,609	71,175	12,877	431,433
above 100	2,289	628,574	581	142,781	103	47,633	2,973	818,988
Consumption not metered 3/	40,084	816,583	1,538	117,529	41,706	96,430	83,328	1,030,542
of which								
-residential and industrial above 100	1,197	314,800	270	59,464	23 1/	4,917 1/	1,490	379,181

1/ Estimated breakdown based on 1977 data.
2/ Most Government connections are above 100 (538 for Colon, 249 for Panama, 86 for others).
3/ Meters out of order or no meters.

Source: IDAAN and Mission estimates

TABLE X

MANPOWER DISTRIBUTION OF IDAAN

Level of Service		1981 Number	%
Professional:	Management	5	0.2
	Planning	3	0.1
	Design	-	-
	Construction	30	1.3
	Operation & Maintenance	33	1.4
	Others	17	0.8
Total		88	3.8
Non-professional:			
	Administration	451	19.4
	Engineering	73	3.4
	Operation & Maintenance	66	2.8
	Others	4	0.2
Total		600	25.8
Labourers (unskilled)		1,640	70.4
GRAND TOTAL		2,328	100.0

3.2 Assessment of the Demand for Training of Technical Personnel.

An examination of the manpower available for operating and maintaining the water supply and sewerage systems in the area of Central America, Panama, and the Dominican Republic, immediately shows that there is a lack of formally-trained technical personnel, as well as of appropriate materials for such training. In addition, the specialized institutions or centers for training personnel do not fully and adequately meet the training needs of the sector. This situation becomes even more critical when future requirements are analyzed.

If financial resources are obtained to meet the goal of the International Decade for Water Supply and Sanitation by the Year 1990, it is essential to review the existing training resources and to conduct programs for the mass training of the existing personnel and of that which will be recruited in the future in Central America, Panama, and the Dominican Republic. It must be recognized that the training provided for the present personnel and the methods used have not been the most appropriate for maintaining the existing systems. This is reflected in the high rate of failures in rural water supply systems and in the water losses and unaccounted-for in urban systems, which ranges between 30 to 60% of the total water produced at present.

The potential demand of the personnel to be trained was assessed by the mission using the information presented in Chapter 3.1 above and additional data obtained from the PAHO-Area Engineer. Only the figures for the Dominican Republic were estimated based on the population covered by the relevant institutions.

The result is presented in Table XI, showing the total number of non-professional technical personnel in the participating institutions with 1,127. The total number of professional personnel in the institutions amounts to 4,890 and the total number of semi and unskilled labourers to 8,452. It can be assumed that indirectly 13,342 people might benefit from the Training System if training of trainers and a certain dissemination effect is taken into account. In the I Phase over a period of 30 months, it seems realistic to assume that more than 500 persons would receive training which might represent 35% of an estimated total of 1,400 persons, providing for increase and turnover.

TABLE XI

NON-PROFESSIONAL TECHNICAL PERSONNEL TO BE TRAINED AND OTHER PERSONNEL BENEFITTING OF THE PROJECT

Country/ Organization	Costa Rica	Dominican Republic	Guatemala	Honduras	Nicaragua	Panama	El Salvador	Total
	A y A	INAPA Municipal-ities (Estimate)	EMPAGUA UNEPAR	SANAA Municipal-	INAA	IDAAN	ANDA	
Non-Professional	178	60	187	49	133	145	53	
Technical	-	160	166	16	-	-.	-	
Subtotal	178	220	353	65	133	145	53	1.127
Non-Professional	1.012	400	442	434	474	600	402	
(Benefitting)	-	800	290	36	-	-	-	
Subtotal	1.012	1.200	732	470	474	600	402	4.890
Semi and Unskilled	1.710	600	1.479	479	585	1.640	896	
(Benefitting)	-	1.000	107	36	-	-	-	
Subtotal	1.710	1.600	1.586	515	585	1.640	816	8.452
TOTAL	2.720	2.800	2.318	985	1.059	2.240	1.218	13.342

3.3 Existing Training Resources in the Area of Central America, Panama, and the Dominican Republic.

There is a considerable weakness in terms of existing training and education resources and facilities especialized in the area of water and wastewater.

Although for university students there is the Regional Graduate School of Sanitary Engineering (ERIS - Escuela Regional de Ingeniería Sanitaria) in Guatemala and a course for Technicians in Sanitary Enqineering at the University of Panama, no institution exists for vocational education for the area of water and sanitation.

For vocational training in different trades there are well organized systems in 5 out of the 7 countries, i.e.: Costa Rica (INA); Guatemala; Honduras (INFOP); Panama (CENAFORM) and Dominican Republic (S.F.P.). These institutions are generally well equipped and have technical personnel well trained through international cooperation programs. They could be seen as potential resources for the proposed project, by adapting part of these curricula to fit the needs of the water and sanitation industries. Human and material resources could be made available from these sources for the proposed project.

The existing private and governmental training centers are mainly specialized in the area of administration although some training centers for laborers exist, i.e.: Escuela Técnico Obrero; Laborer Union Training Centers. Little collaboration can be expected from these sources on short terms.

A joint program Government of Costa Rica/PAHO established in San Jose, Costa Rica a specialized center for training of health personnel and production of training resources. This center is likely to be considered the main collaborator to the proposed project, in terms of production of training material.

In terms of the existinq training facilities within the participating water and sanitation institution, the unit in La Uruca, San Jose, owned by AyA deserves special consideration. Among other units, AyA installed a training unit at La Uruca with special aim to technical personnel for distribution systems. It has served so far only for AyA's purposes, but it is entirely capable of serving regional purposes as well. The Center at AyA has a workshop for training activities, with trenches and facilities to perform all plumbing tasks.

Although classrooms are presently not installed, there is space available to improve facilities with classrooms and rooms for support services.

Major contribution to this project can be expected through PAHO/CEPIS (Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente), which is PAHO's specialized centre for water and sanitation technology. CEPIS is presently carrying out an intercountry project sponsored by IDB for the Andean area. Most of the technical and instructional resources developed there could be utilized in Central America with no or minor adaptations. PAHO/CEPIS could even be considered as a source of specialized instructors and consultants.

Similar contribution can be expected from the Caribbean Water Basin Management Project, which produced several training materials applicable elsewhere after translation and adaptations.

3.4 Legal Aspects

The existing "Committee of Managers of Water and Wastewater Institutions of Central America and Panama" has not yet a legal personality and can not so far make commitments on behalf of their governments.

Since for the purpose of this project, international agencies have to be approached through official governmental channels, it is necessary that an already legally existing organization submit the request on behalf of all participating countries.

In consideration of the resolution during the I Extraordinary Meeting of the Committee of Managers (Panama, May 1981), AyA is in the best position to give such legal support to the project. Therefore, it is necessary that all participating countries give a specific mandate to AyA. Furthermore, AyA should sign a memorandum of understanding and a basic agreement document with each participating institution. Such documents should be signed at the ministerial level in each country.

Then AyA could appoint the Regional Project Coordinator as a regular staff member, but allotted to the project's budget. The Permanent Technical Advisor should be recruited by an International Institution (e.g. PAHO) and also be allotted to project's budget.

Technical and financial accountability should always lie on AyA unless other arrangements would be necessary due to donor agency procedures. Therefore, A y A should always be considered as the Executing Agency on behalf of all participating institutions.

The already existing Committee of Managers plus representatives of technical cooperation institutions should function as executive committee to assure vital participation of all involved agencies.

3.5 Summary Conclusions of the Mission.

On the basis of the above-mentioned facts and findings, the mission concluded the following:

a) Need for the project.

- The sector employs approximately 1,127 persons in technical nonprofessional positions.
- The existing operation and maintenance service level does not attend desirable standards.
- Lack of skilled personnel for adequate operation and maintenance is one of the main obstacles to achieve better service performance.
- Training and development of human resources is not yet a permanent institutional function in most of the organizations in the sector.
- There is a lack of specific training resources in the Region in terms of facilities, material, technology and human resources.
- Institutions generally lack funds for implementation of training programs.

b) Conditions for the proposed project

- There is an awareness at the decision-makinq level in all participating institutions of the need for training.
- Top decision-making managers are already committed, through the Committee of Managers, to support and participate in the project.
- AyA has already stated their availability to give major support to the project, in terms of facilities, personnel, legal and administrative matters.

- The already existing Committee of Managers is in perfect position to constitute the Executive Committee for the project if participation of collaboratinq agencies is assured.

- PAHO can be made available to collaborate with the project in all phases, through its Country, Area or Headquarters' offices.

- Inter-American Development Bank (IDB) has expressed its interest for technical cooperation.

- There is potential possibility to make use of existing educational systems as well as the involvement of some training resources already available in the Region. Furthermore, PAHO can contribute substantially with specific material and other resources developed in similar projects in the Region.

c) Feasibility

- The Mission concludes that the proposed project (See Annex IV) will be feasible if executed by AyA on behalf of the mentioned institutions with technical and financial support by IDB and PAHO/GTZ and, therefore, the necessary activities are recommended in the following item 4.

4. RECOMMENDATIONS

In consideration of the objectives, findings, and conclusions, the members of the mission recommend the followinq:

- AyA should seek legal support from competent Ministries of all participating countries.

- AyA should sign memorandum of understanding and basic agreement document with participating institutions.

- AyA should submit request for technical cooperation and financial support to IDB and PAHO/GTZ through representatives in Costa Rica.

- AyA should appoint a Regional Project Coordinator.

- AyA should request permanent technical advisory services from PAHO.

- PAHO should take the initiative in establishing the permanent executive committee, consisting of top managers of participating institutions, PAHO/GTZ representatives and IDB representative. Project Manager should be Secretary of this Committee.

- Regional Project Coordinator and Permanent Technical Advisor should prepare a Plan of Operations to be submitted and approved by the executive committee, IDB and PAHO/GTZ.

- The project should be implemented according to approved plan of operations under the supervision of the executive committee.

Enclosures: ANNEXES I, II, III, and IV.

ANNEX I

RESOLUTION V

WHEREAS:

The preparation of the manpower of the Region at all levels is of vital importance for the conduct and implementation of the action plan proposed at this Meetinq;

In the Area there is a teaching institution qualified to train the necessary manpower at post-graduate level;

It is also essential to adequately train nonprofessional technical personnel,

The I Meeting of Managers and Directors of Water Supply and Seweraqe Institutions of Central America and Panama,

RESOLVES:

1. To draw up and submit to ERIS at the next meeting of the Coordinating Committee for Central America and Panama, a plan of priorities for training sanitary engineers at the postgraduate level.

2. To strengthen the operatinq capacity of the Regional School of Sanitary Engineering (ERIS) to enable it to meet the priority needs of the area.

3. To draw up and present a training plan for nonprofessional technical personnel to the next meeting of the Coordinating Committee for Central America and Panama.

4. To accept the offer of Nicaragua to prepare the above-mentioned plans and to thank it for its offer.

5. To request PAHO/WHO to provide cooperation in preparing these plans and strengthening the institutions involved in carrying them out.

ANNEX II

RESOLUTION V

Plan for Training of Nonprofessional Technicians for the Water and Sewerage Institutions of Central America and Panama.

The II Meeting of Managers and Directors of the Water and Sewerage Institutions of Central America and Panama, considering:

1. That the approach given by Nicaragua to the Plan for Training of Nonprofessional Technicians fully satisfies the needs of the institutions in charge of the water and sewerage services of the Central American Isthmus;

2. That the training of instructors is an efficient way of obtaining the multiplier effect for training field personnel;

3. The development of the plan based on the facilities now existing in Costa Rica will accelerate its implementation and lower its costs;

4. That the discussions between Costa Rica and the Government of the Federal Republic of Germany to finance the plan are well advanced,

RESOLVES:

1. To adopt the plan for training of nonprofessional technicians that was presented by Nicaragua and in this manner initiate in an effective manner the technical cooperation activities between the institutions of potable water and sewerage in the Central American Isthmus.

2. To commit themselves to give their full support to the implementation of the Plan in the shortest possible time.

3. To request Costa Rica to continue its discussions with the Government of the Federal Republic of Germany to obtain the financing necessary to carry out the plan.

4. To urge all of the potable water and sewerage institutions of the area to organize as of now their Training Units when there is none to provide opportunely their support to the realization of the plan.

ANNEX III

Travel Report and Institutions Visted
Panama - Costa Rica
2-9 May 1981

Members of the Mission: En.. Horst Otterstetter/PAHO

Mr. J. Muehlbauer, Prof.Duty/GTZ

4 May 1981

1) The mission assembled at 9:00am and participated in the opening of the I Extraordinary Meeting of Directors and Managers of Water Supply and Sewerage Institutions of Central America and Panama in Panama City.

2) The mission briefed each other on the background of the project and the policies and procedures to be followed.

3) The Terms of Reference of the mission were discussed and a Questionnaire on institutional data was prepared to be delivered to each participating institution in the project. It was decided by the mission that the Questionnaire to be returned by the institutions before the end of May 1981, should serve as an additional tool for the compilation of the Appraisal Report 13 to 17 July 1981 in Washington. Considering the information and data available, it was deemed unnecessary for the mission to visit all the participating institutions as a prerequisite for the compilation of the report.

5 May 1981:

1) A regional project for Institutional Strengthening and Human Resources Development was presented throuqh PAHO Area Engineer, Carlos Hilburg, at the Meeting and discussed by the participants.

2) The members of the mission informed the participants about their objectives, the purpose of the GTZ/WHO-PAHO Cooperation Project and the documents and procedures required for the approval and financing of a Training System for Technical Personnel of Water Supply and Sanitation Institutions in Central America and Panama. It was also proposed by the mission that the Dominican Republic should be possibly included in the Training System at a later stage.

3) The I Extraordinary Meeting of Directors and Managers of Water Supply and Sewerage Institutions of Central America and Panama decided then, amonq others:

- to establish the Permanent Executive Secretariat of the Committee in AyA - Costa Rica for the period 1981-1983;
- to combine the regional projects for Institutional Strengthening and Human Resources Development;
- to seek governmental support through a joint resolution of the Ministers of Health at the next reqional meeting to be held in Nicaragua in June 1981;
- to seek PAHO's cooperation for the project in order to coordinate among international agencies (IBRD, IDB) and GTZ/WHO; and
- to delegate to the Permanent Executive Secretariat in Costa Rica authority to seek fundings and collaboration from international agencies through PAHO.

6 May 1981:

1) The mission proceeded to San Jose, Costa Rica and had a first meeting with the Permanent Secretariat of the 'Comité Coordinador Regional para Centro América y Panamá de Instituciones de Agua y Saneamiento', to discuss details of the project and GTZ's policies for financial support.

7 May 1981:

1) The mission visited AyA's training facilities in La Uruca (San Jose). The training facility is located at AyA's main Distribution Depot. The training programs and the facilities are managed by a Training Officer who is assisted by three support staff. Additionally, a full-time technical instructor is executinq training programs which mainly comprise:

- a four-week practical course for manual operators covering basic and refresher training in the construction, operation and maintenance of mains and service installations. This well conceived and effective course is offered six times per year with an annual output of about seventy trainees. A limited number of course places is offered from time to time to neighboring country water institutions. This program is well known and is highly regarded within the Region.

- The existing training facilities consist of 2 offices, a classroom of about 140 m^2, offices app. 40 m^2 and a dormitory for the accommodation of 20 trainees. The central work and repair shops of AyA having among others a pump and a meter repair unit can be used for demonstration purposes. Training and demonstration material contains manuals, pipes, valves, meters, leak detection equipment, etc.

2) The mission had a meeting with the IDB Representative, Mr. Laureano Rodrigo, in order to discuss the possibilities of IDB/GTZ's cofinancing of the projects.

8 May 1981:

The mission together with Eng. Arturo Castro, a local Committee member, the Area Engineer of PAHO and the Country Engineer initiated a first draft of the project document to be submitted by AyA-Costa Rica to GTZ and IDB.

Mr. J. Muehlbauer left for Washington in order to debrief the findings of the mission with PAHO and to discuss the further activities of the mission.

9 May 1981:

A meeting was organized, at AyA, between Eng. Arturo Castro, Eng. Alejandro Castro, Eng. Carlos Hilburg, and Eng. Horst Otterstetter to continue activities aimed to produce a draft project proposal to be submitted by the countries to GTZ and IDB. It was finally decided that Eng. Otterstetter should contact IDB officials in Washington, to obtain technical instructions on how to prepare such document according to IDB standards.

PROYECTO DE COOPERACION TECNICA PARA LA IMPLANTACION DE UN SISTEMA DE ADIESTRAMIENTO DE PERSONAL TECNICO DE LAS INSTITUCIONES DE AGUA POTABLE Y SANEAMIENTO DE AMERICA CENTRAL PANAMA Y REPUBLICA DOMINICANA

1 ANTECEDENTES

1 1 Antecedentes del proyecto en sí

El crecimiento demogrático de las áreas urbanas y rurales de América Central, Panamá y República Dominicana ha traído como consecuencia la construcción en gran escala de obras de agua potable y alcantarillado que han contado con el amplio apoyo econonómico, tanto de los países mismos como de los organismos internacionales de las agencias de cooperación técnica.

Lamentablemente, la atención prestada a la construcción de los sistemas de agua y alcantarillado no se ha otorgado también a su operación y mantenimiento, habiéndose relegado a un plano secundario. En general, se han realizado los servicios de mantenimiento con un criterio correctivo, en vez de hacerlos en forma preventiva. Igualmente, poca atención se ha dado al deterioro de los equipos las condiciones de funcionamiento de los sistemas de distribución y recolección lo que ha motivado que frecuentemente el nivel de servicio está muy abajo de los niveles mínimos aceptables.

Esta situación que, en las grandes urbes aun puede ser remediada, en pequeñas ciudades y en localidades rurales se hace crítica pues en muchos casos el servicio se suspende hasta por largo tiempo. Esto crea un círculo vicioso. La interrupción del servicio origina el escaso interés de la comunidad de solicitar la conexión al sistema y en los casos en que ya existe esa conexión, hay resistencia para pagar el costo de los servicios por no ser satisfactorios Consecuentemente, los ingresos resultan insuficientes para atender los costos de operación y mantenimiento de los sistemas.

La preocupación por estos problemas hizo que se realizara en mayo de 1979, en San José, Costa Rica, la I Reunión de Agua y Alcantarillado de Centroamérica y Panamá para discutir las políticas y estrategias necesarias para mejorar la calidad de los servicios de agua potable, establecer los mecanismos de cooperación entre los países y estrechar las relaciones de amistad y trabajo.

Durante esa Reunión, los gerentes y directores revisaron las recomendaciones emanadas del Seminario y discutieron las políticas y estrategias que son necesarias de aplicar para implantarlas y así alcanzar el objetivo propuesto, habiendo suscrito un Convenio de Intención de Cooperación Técnica y Económica Interregional, en el cual acordaron crear un Comité Centroamericano con los fines que se indican a continuación:

-Racionalizar la disponibilidad de los recursos técnicos de la Región.

-Ejecutar programas con cooperación técnica interregional.

-Prestar apoyo en casos de desastre.

-Proveer suministros entre los países miembros, en casos de emergencia.

-Promover la estandarización de equipos, repuestos y materiales para facilitar el intercambio.

Estudiar la posibilidad de crear un fondo rotatorio para financiar los requerimientos de operación y mantenimiento, con aportes institucionales, de los gobiernos y de organismos de crédito internacional.

Además, aprobaron varias resoluciones, entre las que encuentran. (i) la relacionada con la integración de un equipo multidisciplinario altamente calificado en las áreas de operación, mantenimiento, calidad de agua y desarrollo institucional y de recursos humanos, para preparar un plan de acción que impulse aceleradamente las actividades dirigidas al fortalecimiento de la operación y mantenimiento de los servicios de agua y alcantarillado de Centroamérica y Panamá y que incluya políticas y estrategias técnicas, administrativas, económicas y financieras. La coordinación de este trabajo se encomendó a la Unidad Ejecutora del Programa de Acueductos Rurales (UNEPAR) de Guatemala; e (ii) la que tiene que ver con la preparación de recursos humanos, en donde, entre otros asuntos, se juzgó necesario formular un plan de adiestramiento para el personal técnico no profesional de las instituciones de agua potable y alcantarillado del istmo centroamericano. -Esta labor fue encargada a la delegación de Nicaragua

La II Reunión de Gerentes y Directores de las Instituciones de Agua Potable y Alcantarillado de Centroamérica y Panamá se efectuó del 27 al 29 de octubre de 1980 en Tegucigalpa, Honduras. En ella se aprobó el Reglamento del Comité Coordinador Regional para Centroamérica y Panamá de Instituciones de Agua Potable y Saneamiento y se designó a Panamá como la sede provisional de su Secretaría Ejecutiva. Además se adoptó el PLAN DE ADIESJTRAMIENTO DE PERSONAL TECNICO NO PROFESIONAL DE LAS INSTITUCIONES DE AGUA POTABLE Y ALCANTARILLADO DE CENTROAMERICA Y PANAMA elaborado y presentado por el Instituto Nicaragüense de Acueductos y Alcantarillados (INAA), plan que está basado en la utilización de las instalaciones de la escuela de Fontanería localizada en el Plantel de la Uruca de AyA en San José, Costa Rica.

La la. Reunión Extraordinaria de Gerentes y Directores de las Instituciones de Agua Potable y Alcantarillado Sanitario de Centroamérica y Panamá se efectuó en la Ciudad de Panamá durante los días 4 y 5 de Mayo de 1981. En ella se designó a Costa Rica como sede la Secretaría Ejecutiva durante el bienio 81 a 83, y simultáneamente se encargó a AyA de efectuar gestiones junto a la Gesellschaft fur Technische Zusammenarbeit (GTZ) del Gobierno de la República Federal de Alemania y al Banco Interamericano de Desarrollo (BID), para obtener colaboración técnica y financiera para la ejecución del proyecto.

Este proyecto se encuadra perfectamente con los planes y programas nacionales para lograr los objetivos del Decenio Internacional del Abastecimiento de Agua Potable y del Saneamiento; contempla los principios de cooperación horizontal y se apoya en una serie de proyectos de desarrollo institucional que se ejecutó en las instituciones participantes.

1.2 Descripción breve del sector del agua potable y saneamiento en los países participantes.

1.2.1 Costa Rica

La planificación nacional general corresponde a la Oficina de Planificación del Gobierno (OFIPLAN). Los principales organismos relacionados con el sector de abastecimiento de agua y saneamiento son:

i) Instituto Costarricense de Acueductos y Alcantarillados (AyA)
ii) Municipios
iii) Ministerio de Salud Pública.

AyA es el organismo gubernamental más importante en el sector. Es autónomo, está descentralizado y tiene autoridad para planificar, diseñar, construir, operar y mantener sistemas de abastecimiento de agua (población más de 200 habitantes), y asume funciones en lo que respecta a alcantarillado higiénico con arrastre de agua (desagüe, tratamiento y evacuación) AyA no se encarga de todos los sistemas. En 1977, los municipios tenían a su cargo 236 sistemas urbanos y rurales de abastecimiento de agua atendiendo al 52% de la población, y el AyA servía al 48% restante con 196 sistemas. En los sistemas de propiedad o explotación municipal, AyA actúa como entidad de financiamiento; en esa calidad, utiliza fondos de organismos nacionales (por ejemplo, FRAU) e internacionales para costear sistemas municipales de abastecimiento de agua y alcantarillado, y presta apoyo técnico apropiado para trazado, supervisión y construcción de instalaciones. Mientras AyA asume las funciones normativas pertinentes, los municipios operan y mantienen sistemas de evacuación de aguas torrenciales.

El Ministerio de Salud Pública, por conducto de sus divisiones Ejecutiva (programas regionales) y de Higiene Ambiental, es responsable por la higiene del medio, inclusive programas de letrinas para zonas rurales y de abastecimiento de agua (instalación de bombas manuales) para la población rural dispersa. Conforme a la legislación sanitaria general, el Ministerio se encarga también de la inspección de la calidad del agua.

Se estima que en 1978 alrededor del 75% de la población total disponía de servicios públicos de agua. En el subsector urbano, la cobertura notificada era de alrededor del 100%, (lo cual incluye 94% de conexiones a domicilio); en el subsector rural de población concentrada, del 89% (casi exclusivamente conexiones a domicilio); y en el subsector rural de población dispersa, del 39% (en su mayor parte conexiones a domicilio). Esas cifras no reflejan la población que tiene un abastecimiento de agua intermitente, de poca presión o de mala calidad.

En las zonas urbanas, así como en las rurales de población concentrada, la calidad del agua suele ser aceptable cuando proviene de un pozo o un manantial.

1.2.2 El Salvador

Se considera que el 47.8% de la población total del país tiene acceso a los sistemas públicos de agua. Los niveles de servicio en las áreas urbana y rural son de 66.8% y 34.1%, respectivamente. La cobertura con conexiones intradomiciliaries es de 76.9% en San Salvador, 49.6% en

otras áreas urbanas y únicamente 5.4% de la rural. Generalmente, el servicio que prestan los sistemas de agua es deficiente, tanto en el medio urbano como rural.

Aproximadamente el 46.9% de la población urbana es servida con sistemas de alcantarillado y 32% por medio de tanques sépticos y letrinas. En San Salvador el 67.2% de la población tiene descargas domiciliarias, el 16% utiliza otros sistemas públicos (83.2% de la población total de la capital goza del servicio), en otras áreas urbanas, sólamente el 32.7% tiene descarga domiciliaria y el resto (43.2%) está servida por otros sistemas públicos (75.9% de cobertura). En ambas áreas, las aguas negras son descargadas sin ningún tratamiento, de tal forma que los cuerpos receptores de agua generalmente están contaminados. Aproximadamente el 25.7% de la población rural tiene servicios sanitarios proporcionados por letrinas o fosas sépticas.

La planeación global del sector es responsabilidad del Ministerio de Planificación y Coordinación del Desarrollo Económico y Social (MIPLAN).

Las principales agencias involucradas en el suministro de agua y el servicio de disposición de excretas son las siguientes:

-Administración Nacional de Acueductos y Alcantarillados (ANDA), y el Ministerio de Salud Pública y Asistencia Social (MSPAS), a través del Departamento de Acueductos Rurales (DAR), y de la División de Saneamiento Ambiental (DSA).

La Administración Nacional de Acueductos y Alcantarillados (ANDA), es la agencia principal del gobierno en este campo. Sus funciones incluyen la planificación construcción, operación y mantenimiento de los sistemas de abastecimiento de agua y alcantarillado en todo el país. Tiene bajo su responsabilidad 135 sistemas urbanos de abastecimiento de agua incluyendo San Salvador), 30 sistemas de agua potable rural y 63 sistemas de alcantarillados urbanos.

La política de ANDA está enfocada a extender sus servicios a la población urbana a través de conexiones domiciliarias y la eliminación gradual del servicio por pilas públicas. En el área rural recientemente se ha cambiado la política a fin de cubrir el máximo posible de población bajo la base de una reducción en el nivel de servicio.

La política tarifaria en el área urbana tiende a cubrir la operación y el mantenimiento de los servicios, pero a la fecha las tarifas son inadecuadas en la mayor parte del país. En San Salvador escasamente son suficientes para cubrir gastos de operación y mantenimiento.

Se ha establecido un comité interinstitucional a fin de coordinar las actividades de la década internacional del agua y del saneamiento.

Los principales problemas que frenan el desarrollo del sector son: escasez de personal técnico y profesional especializado y con experiencia en agua potable y aguas negras; lo inadecuado de las tarifas de cobro; la falta de proyectos específicos para aprovechar el financiamiento exterior; y la limitada disponibilidad financiera de contrapartida.

1.2.3 Guatemala

El servicio de Agua Potable del área urbana está a cargo de la Empresa Municipal de Agua de la Ciudad de Guatemala (EMPAGUA), que sirve a la ciudad capital y del Instituto de Fomento Municipal (INFOM), que cubre al resto de la población urbana del país, mediante asesoría técnica y financiera, dado que la responsabilidad del servicio corresponde a las municipalidades.

El servicio de alcantarillado, en forma similar, está atendido por la Municipalidad de Guatemala para la ciudad capital y el Instituto de Fomento Municipal que cubre las cabeceras municipales del país.

En el área rural trabajan la División de Saneamiento Ambiental (DSA), y la Unidad Ejecutorea de Programas de Acueductos Rurales (UNEPAR), que pertenecen al Ministerio de Salud Pública y Asistencia Social, así como la Dirección de Desarrollo de la Comunidad que depende de la Presidencia de la República. La coordinación de las actividades del sector están a cargo del Comité Permanente de Coordinación de Agua y Saneamiento (COPECAS).

Los niveles de servicio que se espera alcanzar en materia de agua potable y alcantarillado en el próximo decenio se detallan a continuación:

AGUA POTABLE	No. Habitantes en 1970 (en miles)	%
1) Población urbana beneficiada	3,806	100
Con conexión domiciliaria	2,854	75
Con fácil acceso	952	25
2) Población rural beneficiada	2,935	50
Con conexion domiciliaria	1,174	20
Con fácil acceso	1,761	30
DISPOSICION DE EXCRETAS		
1) Población urbana beneficiada con alcantarillado	3,045	80
2) Población rural con servicio de eliminación de excretas	4,696	80

La tendencia actual en las empresas de agua es que la tarifa cubra los costos de administración, operación y mantenimiento, el servicio de la deuda y un remanente para pequeñas ampliaciones. Debido al impacto de la inflación en los costos de prestación de los servicios se pretende establecer un mecanismo que permita reajustar el valor de las tarifas para mantener su valor.

Consecuentemente, con los objetivos sociales del Gobierno, la política se encamina a implementar tarifas diferenciales que signifiquen una redistribución del ingreso en beneficio de los grupos de población económicamente más débiles.

En vista de la diversidad de instituciones gubernamentales participantes y de la debilidad institucional del sector, se ha creado el Comité Permanente de Coordinación de Agua y Saneamiento (COPECAS). Este Comité fue creado bajo los auspicios de la Secretaría General del Consejo Nacional de Planificación Económica, con el propósito de coordinar las acciones tendientes a la formulación del Plan Decenal del Agua Potable y del Saneamiento, así como proponer políticas que procuren la eficaz implementación del mismo.

El Plan Nacional de Desarrollo 1979-1982 contempla dentro de las políticas del Sector Salud los siguientes propósitos: a) aumentar el suministro de agua potable con énfasis en el área rural; b) controlar la contaminación fecal del suelo; c) promover y participar en las acciones tendientes a la conservación de los recursos naturales; y d) promover y participar en el plano intersectorial en el mejoramiento y control de la calidad del medio ambiente.

Los factores que obstaculizan el desarrollo del Sector se describen a continuación:

a) Escasez de recursos humanos, calificados, dedicados al sector y ausencia de planes de adiestramiento.

b) Limitaciones para contratar y retener personal ya que los salarios no son competitivos con los de la iniciativa privada.

c) Dificultades en los trámites administrativos para la contratación de bienes y servicios.

d) Escasez de recursos de preinversión y de la consiguiente preparación de proyectos.

e) Limitado aprovechamiento del aporte comunitario en la mayoría de los sistemas, tanto en la etapa de construcción como en la de operación y mantenimiento de las obras.

f) Limitada utilización de los servicios por parte de la comunidad beneficiada, debido a la falta de motivación o incapacidad económica para obtener la conexión al servicio.

g) La falta de una definición de política tarifaria que permita que las empresas del sector logren su autofinanciación y cada vez menor dependencia de las asignaciones presupuestarias, otorgadas por el Gobierno.

2.1.4 Honduras

La planificación global del sector es responsabilidad de la Secretaría Técnica del Consejo Superior de Planificación Económica (CONSUPLANE) que elabora, impulsa, coordina y evalúa los planes y programas de las diversas instituciones de abastecimiento de agua y saneamiento. Las principales entidades nacionales activas en este campo son:

-El Servicio Autónomo Nacional de Acueductos y Alcantarillados (SANAA), responsable de la planificación, diseño, construcción, operación, mantenimiento y administración de sistemas de agua potable y alcantarillado, actualmente tiene a su cargo 102 acueductos y el alcantarillado de la ciudad capital.

-El Ministerio de Salud Pública y Asistencia Social (MSPAS), por intermedio de la Dirección de Saneamiento Ambiental y de las Regiones y Areas de Salud, desarrolla una importante labor de saneamiento básico rural integrada a la extensión de cobertura de servicios de salud.

-Las municipalidades y juntas administradoreas tienen la tarea de operar y mantener 460 acueductos y 33 sistemas de alcantarillado.

La planificación nacional ha señalado una alta prioridad a la salud de la población rural y marginal urbana, la cual se traduce en políticas específicas del área de atención al medio ambiente tendientes a aumentar la cobertura del saneamiento básico para estos grupos.

Los objetivos sociales del Gobierno en relación al sector del agua se cumplen a través de la asignación de una parte importante del presupuesto total de inversiones del sector salud y de la subvención de las instituciones y programas, puesto que lo recaudado por concepto de tarifas es insuficiente.

Las políticas tarifarias actuales de abastecimiento de agua tienden a la recuperación de los gastos operativos y de inversión en el área urbana y sólo operativas en el área rural. Unicamente en el alcantarillado de la capital se cobran tarifas para operación y mantenimiento.

Tal como se manifestó anteriormente, CONSUPLANE coordina las instituciones del sector, impulsa y evalúa la planificación, la programación anual y los proyectos específicos. Además, le corresponde la función de integrar al sector del agua con la planificación general del país.

Las principales restricciones existentes en el sector son la baja capacidad operativa de las instituciones, tanto en preparación de estudios y proyectos como en ejecución, y mantenimiento de los servicios. Las tarifas aun no generan los fondos requeridos para asegurar un grado aceptable de autonomía financiera a las instituciones.

El personal es insuficiente y carece de preparación para responsabilizarse de las actividades previstas para el decenio; la falta de remuneraciones e incentivos adecuados causa deserción de elementos calificados de los servicios de agua y saneamiento.

En cuanto a los servicios mismos, su estado general es precario ya que muchos están obsoletos y proporcionan agua insuficiente sin ningún tipo de tratamiento, siendo muy bajo el nivel de operación y mantenimiento.

2.1.5 Nicaragua

El organismo responsable del sector es el Instituto Nicaragüense de Acueductos y Alcantarillados (INAA), creado segun Decreto No. 20 del 25 de julio de 1979, el cual le confiere autonomía, personería jurídica, duracion indefinida y capacidad plena para adquirir derechos y contraer obligaciones.

El domicilio del Instituto es la ciudad de Managua, capital de la República y posee sucursales u oficinas en diferentes localidades del territorio nacional.

De acuerdo al Decreto No. 123 del 23 de octubre de 1979, el Instituto es el encargado de realizar la planificación, ejecución y control de los sistemas municipales y locales del país, los cuales se declaran obras de interes nacional y de utilidad publica.

El Instituto Nicaragüense de Acueductos y Alcantarillados ha formulado una serie de proyectos encaminados a satisfacer las necesidades tanto de la población en el sector rural, como de la urbana de escasos recursos.

Es importante apuntar que las tarifas de agua vigentes en la mayoría de las empresas del sector urbano, son insuficientes para cubrir todos los gastos de explotación de los sistemas. Lo mismo sucede en el

sector rural. Por tal motivo, es el Estado quien, mediante transferencia de fondos al INAA, se encarga de cubrir los déficits operativos de los sistemas.

A pesar de lo apuntado anteriormente, las tarifas vigentes tratan de reflejar en lo posible, la capacidad de pago de los consumidores y sólo en el caso de los puestos públicos es cuando se refleja el nivel de servicio brindado.

Los objetivos planteados para el quinquenio, 1981-1985, se pueden fijar a partir de las metas, de la siguiente manera:

a) EN AGUA POTABLE:

a.1 SECTOR URBANO:
Cubrir para 1985 a por lo menos el 75% de la población del país.

a.2 SECTOR RURAL:
Cubrir para 1985 a por lo menos el 50% de la población del país.

b) EN ALCANTARILLADO SANITARIO

b.1 SECTOR URBANO

Cubrir para 1985 a por lo menos el 50% de la población urbana del país.

c) OTRAS FORMAS DE DISPOSICION DE EXCRETAS

c.1 SECTOR RURAL
Actualmente en diagnóstico. Las metas se fijarán posteriormente en base al mismo.

Hay aproximadamente 2,000 empleados en el sector de agua potable y saneamiento. El adiestramiento y utilización adecuado es una de las mayores prioridades del sector.

2.1.6 Panamá

El Sector Agua Potable y Saneamiento Ambiental es atendido en la República de Panamá por el Instituto de Acueductos y Alcantarillados Nacionales (IDAAN) y por la Dirección de Salud Ambiental del Ministerio de Salud.

En materia de agua potable, al IDAAN le corresponde todo el medio urbano y las comunidades del medio rural con población superior a los 500 habitantes o 100 viviendas convenientemente concentradas.

El IDAAN es responsable de la recolección y disposición final de las aguas servidas en el medio urbano, mediante sistemas de alcantarillado.

Dentro de su política de "SALUD IGUAL PARA TODOS" adoptada desde 1969, el Gobierno Nacional ha venido asignando a través de todos estos años, una primera prioridad al tema del agua potable con énfasis en las zonas rurales y en las barriadas marginales de los centros urbanos.

Más de 700 nuevos sistemas de acueductos rurales han sido construidos durante la década del 70 y se ampliaron y mejoraron sensiblemente todos los acueductos existentes con anterioridad a la década.

Es política del país que todos los usuarios de los servicios de acueductos paguen por los mismos. Sin embargo, esta política se orienta en base a la realidad socioeconómica de estos usuarios de la siguiente manera:

a) Los acueductos rurales construidos por el Ministerio son operados y administrados por las propias comunidades a través de una "Junta Administradora".
Las tarifas que se aplican son aprobadas por el Ministerio y se diseñan para cubrir sólamente los gastos de operación y mantenimiento y ampliaciones del sistema.

b) Los acueductos rurales construidos por el IDAAN son operados y administrados por el IDAAN a través de sus Divisiones Regionales. Las tarifas para estos acueductos se diseñan para lograr un punto de equilibrio o sea que incluyen:

Costos de capital
Costos de operación y mantenimiento
Costos financieros (en lo posible).

c) Los acueductos urbanos son manejados por IDAAN y de ellos se espera una rentabilidad que varía según las características de la comunidad.

Los planes del sector se coordinan a través de una Comisión Nacional de Planificación del Sector Salud.

Se hacen esfuerzos importantes por acelerar el desarrollo de recursos humanos en el sector, como factor indispensable para la institucionalización del mismo.

En el medio rural, la participación de las propias comunidades seguirá siendo un factor determinante en la ejecución de los proyectos que para el mismo se diseñen.

2.1.7 República Dominicana

El Estado Dominicano reconoce el saneamiento del medio, y particularmente el abastecimiento de agua potable, como uno de los condicionantes más importantes del nivel de salud. Según los datos disponibles para 1979, el 53% de la población urbana estaba servida con conexiones domiciliares y sólamente el 10% de la población rural disponía de agua potable. De acuerdo con los informes más recientes del Instituto Nacional de Aguas Potables y Alcantarillado (INAPA) para julio de 1980 recibían agua potable 435 comunidades rurales cuya población servida por conexión domiciliaria ascendía a 281,268 habitantes, es decir, el 10.5% de la población rural total. La población urbana servida mediante conexiones domiciliarias para la misma fecha fue de 60%. En lo que al alcantarillado sanitario se refiere, para 1979 la población urbana servida alcanzaba el 25%. La disposición sanitaria de excretas a través de 27,000 letrinas instaladas hasta 1978 alcanzó un 5.3% de la meta propuesta, y se plantea una meta tentativa de 59,175 letrinas (15%) para 1985. El Programa de Saneamiento Ambiental es responsabilidad de varios organismos, entre ellos la

Secretaría de Estado de Salud Pública y Asistencia Social (SESPAS), el INAPA, la Corporación de Acueductos y Alcantarillados de Santo Domingo, la Corporación de Acueductos y Alcantarillado de Santiago, la Liga Municipal Dominicana y el Ayuntamiento de Santiago de los Caballeros. La coordinación de acciones de dichos organismos constituye uno de los objetivos fundamentales contemplados en los planes de saneamiento ambiental de nivel nacional. Durante 1980 se ha definido la estrategia, objetivos y metas del país en materia de agua potable y alcantarillado sanitario para el decenio 1981-1990.

1.3 Instituciones solicitantes e institución ejecutora

Las solicitantes de esta cooperación técnica son las instituciones de agua potable y alcantarillados que a continuación se enumeran, debidamente autorizadas por los Ministerios competentes en sus países.

-Costa Rica: Instituto Costarricense de Acueductos y Alcantarillados (AyA).

-El Salvador: Administración Nacional de Acueductos y Alcantarillados (ANDA).

-Guatemala: Instituto de Fomento Municipal (INFOM).

-Honduras: Servicio Autónomo Nacional de Acueductos y Alcantarillados (SANAA).

-Nicaragua: Instituto Nicaragüense de Acueductos y Alcantarillados (INAA).

-Panamá Instituto de Acueductos y Alcantarillados Nacionales (IDAAN).

-República Dominicana: Instituto Nacional de Agua y Alcantarillados (INAPA).

Todas estas organizaciones son representadas mediante autorización formal por el Instituto Costarricense de Acueductos y Alcantarillados (AyA) para efecto de esta solicitud.

La institución ejecutora de este proyecto a nivel regional, es el Instituto Costarricense de Acueductos y Alcantarillados (AyA) con sede en San José, Costa Rica, con apoyo a nivel nacional de las otras organizaciones beneficiarias, contando aún con la asesoría de agencias especializadas para llevar a cabo este proyecto.

1.4 Actuará como agencia cofinanciadora del proyecto la Gesellschaft Fur Technische Zusammenarbeit (GTZ), del Gobierno de la República Federal de Alemania, por intermedio del Programa Cooperativo OMS/GTZ, representado por la Organización Panamericana de la Salud (OPS). Además, la OPS proporcionará la cooperación técnica internacional para el desarrollo integral del proyecto, para lo que subscribirá los convenios necesarios.

2. Objetivos del proyecto

2.1 Propósito de la contribución

El propósito de la contribución, de carácter no reembolsable, solicitada al BID y a la GTZ, sería para colaborar con el financiamiento de un programa de trabajo que llevará a cabo el Instituto Costarricense de Acueductos y Alcantarillados (AyA) con la colaboración de las otras organizaciones participantes, y con la cooperación técnica de la OPS/OMS para el mejoramiento del nivel de operación y mantenimiento de los sistemas de agua potable y alcantarillado en los países participantes.

2.2 Objetivos inmediatos

Los objetivos inmediatos del programa son:

a) Proporcionar asistencia técnica a las instituciones de agua potable y alcantarillado participantes para el fortalecimiento y desarrollo de su capacidad técnica y administrativa para el desarrollo y adiestramiento de sus recursos humanos de manera integrada con los objetivos globales de la institucion.

b) Proporcionar asistencia tecnica a las instituciones de agua potable y alcantarillado participantes para el incremento de tecnología necesaria para optimizar la operación y mantenimiento de sus sistemas, con énfasis en control de pérdidas en los sistemas de distribución.

c) Incrementar en cada institución participante las disponibilidades de mano de obra adecuada por intermedio de procesos de desarrollo y adiestramiento.

d) Desarrollar y adaptar recursos de adiestramiento y de enseñanza adecuados a las necesidades y condiciones locales.

e) Crear en cada país participante un grupo de adiestramiento y expertos que podrán en el futuro participar en programas a nivel nacional.

f) Crear, en la Región, condiciones para hacer uso de los conocimientos ya existentes y de las capacidades ya instaladas para desarrollar programas de adiestramiento y de mejoría de los servicios.

g) Realizar un mínimo de 40 cursos de adiestramiento, con contenido técnico, en las instituciones participantes, contando con no menos de 560 participantes.

h) Realizar un mínimo de 10 cursos para adiestrar instructores y supervisores en técnicas de adiestramiento en clase y en el empleo.

i) Instalar y equipar una unidad de adiestramiento y una unidad de detección y control de fugas en cada una de las instituciones participantes.

2.3. Objetivos finales

Los objetivos finales del proyecto están enteramente integrados en el esfuerzo global que se hace en el Decenio Internacional de Abastecimiento de Agua Potable y Saneamiento que la ONU acaba de lanzar. Básicamente, los objetivos son el desarrollo económico y social de los países como consecuencia de la mejoría de los niveles de salud de la población por intermedio de la mejoría de los servicios de abastecimiento de agua y de saneamiento.

3. DESCRIPCION DEL PROYECTO

El proyecto integral se desarrollará en 4 fases coordinadas y armónicas que son:

Fase 1: Instalación y programación.

En esa fase serán realizadas las siguientes actividades:

1.1.) Selección y contratación del coordinador regional del proyecto. Este profesional deberá ser reclutado preferencialmente entre los países participantes.

1.2.) Selección y contratación del asesor técnico del proyecto, con experiencia en gerencia de sistemas de adiestramiento en operación y mantenimiento de sistemas de agua y alcantarillado. Este profesional deberá ser reclutado en el mercado internacional.

1.3.) Instalar la oficina regional de coordinacion del proyecto en las instalaciones de AyA en San José, Costa Rica.

1.4.) Efectuar en cada institución (país) participante lo siguiente:

-Diagnóstico de las necesidades generales de adiestramiento del personal técnico no profesional.

-Catastro de los recursos de adiestramiento existentes en la institución (país).

-Identificación de políticas y reglamentos de personal y de adiestramiento.

1.5.) Elaboración del plan detallado de trabajo que englobará actividades a ser desarrolladas a nivel regional y a nivel de cada país.

1.6.) Obtener aprobación del comité ejecutivo para el plan de trabajo. Este comité ejecutivo estará constituido por un representante de cada institución de Agua y Alcantarillado participante; por un representante del BID y por un representante de OPS.

El tiempo necesario para llevar a cabo esta fase se estima en 6 meses.

Los resultados directos de esta fase son:

-Oficina de Coordinación Regional del Proyecto instalado y personal contratado.

-Plan detallado de trabajo aprobado por el comité ejecutivo.

Fase 2: Creación de la infraestructura operacional del proyecto en las instituciones participantes como contrapartes nacionales del proyecto.

En esta fase se realizarán las siguientes actividades:

2.1.) Asesorar las instituciones participantes en planear e instalar sus unidades de adiestramiento (U.A.), identificando y especificando personal, instalaciones y equipos necesarios.

2.2.) Asesorar las instituciones participantes en planear e instalar sus unidades de detección y control de fugas (UDCF), identificando y especificando personal; instalaciones y equipos necesarios.

2.3.) Adquirir los equipos y materiales para la operación de la unidades de adiestramiento (UA), y de detección y control de fugas (UDCF).

2.4.) Contratar consultores especialistas para los trabajos de esta fase.
Esta fase será realizada parcialmente en paralelo con la fase siguiente, y el tiempo necesario para llevarla a cabo se estima en no más de 3 meses.

Los resultados directos de esta fase son:

-Siete unidades de adiestramiento instaladas y equipadas con personal y material.

-Siete unidades de detección y control de fugas instaladas y equipadas con personal y material.

Fase 3: Adiestramiento de los coordinadores de UA; de los coordinadores de UDCF y de instructores en técnicas de adiestramiento.

En esta fase se realizarán las siguientes actividades:

3.1.) Selección y contratación de los expertos que se dedicarán al desarrollo del material didáctico y al dictado de los cursos para coordinadores de las UA, para coordinadores de las UDCF, e instructores.

3.2.) Desarrollo y producción del material especificado en el punto 3.1.) anterior.

3.3.) Realización, en Costa Rica, de un curso de 6 semanas de duración, destinado a los coordinadores de las unidades de adiestramiento y sus eventuales sustitutos, de cada una de las instituciones que se beneficiarán del programa.

3.4.) Realización, en Costa Rica, de un curso de 6 semanas de duración, destinado a los coordinadores de las unidades de detección y control de fugas y a sus eventuales sustitutos de cada una de las instituciones que se beneficiarán del programa.

3.5.) Realización de dos cursos, de 6 semanas de duracion cada uno destinado a adiestrar cerca de 60 supervisores (8 por país) en técnicas de adiestramiento y de desarrollo de material didáctico.

El tiempo necesario para llevar a cabo esta fase se estima en no más de 7 meses y será en parte ejecutado paralelamente con la fases 2 y 4.

Los resultados directos de esta fase son:

-un manual para adiestramiento de coordinadores de UA.

-un manual para adiestramiento de coordinadores de UDCF.

-un manual de adiestramiento de instructores.

-catorce técnicos adiestrados en coordinación con actividades de detección y control de fugas.

-catorce técnicos adiestrados en coordinación y ejecución de actividades de adiestramiento y desarrollo de recursos didácticos.

-sesenta supervisores adiestrados en técnicas de adiestramiento y desarrollo de material didáctico.

Fase 4: Adiestramiento de personal técnico no profesional en operación y mantenimiento de sistemas de agua y alcantarillado; evaluación del programa

En esta fase, se realizarán las siguientes actividades:

4.1.) Realización de no menos de 30 cursos de carácter técnico práctico, con énfasis en operación y mantenimiento, con una duración de 2 semanas como término medio, adiestrando cerca de 380 personas de nivel técnico no profesional.

Estos cursos se realizarán en la UA de AyA (La Uruca) o en la UA de cualquier institución participante, abordando alguna de las siguientes áreas:

AREA DE OPERACION

- Operadores de plantas de tratamiento (incluye cloración)
- Operadores de estaciones de bombeo (incluye pozos y cloración)
- Operadores de acueductos rurales (bombeo y gravedad)
- Operadores del sistema de distribución (incluye detección y control de fugas)

AREA DE MANTENIMIENTO (PREVENTIVO Y CORRECTIVO)

- Motores eléctricos y paneles de control
- Motores a combustión y (diesel y gasolina)
- Bombas centrífugas y otras
- Medidores domiciliares
- Equipos de cloración
- Equipos de tratamiento de agua, incluyendo filtros
- Pozos profundos
- Sistema de distribución
- Redes y tanques

OTRAS AREAS

- Trabajos con la comunidad
- Fontanería
  Revisión de instalaciones domiciliares

4.2.) Realización de siete cursos, uno por institución participante, destinados a adiestrar supervisores en técnicas de adiestramiento en el servicio de sus subordinados. Estos cursos serán ejecutados en la UA de cada una de las instituciones participantes, tendrán una duración de tres semanas y adiestrarán un total de aproximadamente 100 supervisores (15 por institución).

4.3.) Selección y contratación de los expertos que se dedicarán a la compilación y desarrollo del material didáctico y al dictado de los cursos. En esta actividad se hará máximo uso de los expertos ya existentes en las instituciones (países) participantes.

4.4.) Producción del material didáctico necesario para el dictado de los cursos.

4.5.) Realización de dos evaluaciones de ejecución y una evaluación del impacto del proyecto en las instituciones participantes con vistas a la formulación de la continuación del programa.

Las evaluaciones de ejecución deberán ser realizadas por el coordinador regional del proyecto y deberá ser sometida al comité ejecutivo 12 y 24 meses después del inicio del proyecto.

La evaluación del impacto del proyecto deberá ser realizada por dos consultores, específicamente contratados seis meses antes del final del proyecto, para ser sometido al comité ejecutivo con las recomendaciones para la continuación del programa.

Además de estas evaluaciones, cada curso deberá ser evaluado para medir los resultados y compararlos con los objetivos establecidos, para el eventual rediseño del curso.

El tiempo necesario para llevar a cabo esta fase se estima en aproximadamente 18 meses. Los resultados directos de esta fase son:

-No menos de 480 técnicos adiestrados en no menos de 37 cursos con duración de dos semanas como término medio.

-No menos de 15 manuales de adiestramiento/operación en el área técnico de operación y mantenimiento.

-Tres informes de evaluación.

-Un borrador de propuesta de continuación del proyecto. Las actividades serán realizadas para lograr los objetivos del proyecto y correlacionarse entre ellas y el tiempo como se muestra en el cronograma a seguir:

4. ELEMENTOS NECESARIOS PARA LA EJECUCION DE LAS ACTIVIDADES

4.1) A nivel de planeamiento y control

- Comité Ejecutivo constituido por un representante de cada institución participante, un representante del BID y un representante de la OPS.

- Una reunión del Comité con costos de viáticos y pasajes.

4.2.) A nivel de administración y coordinación del proyecto

- Coordinador regional

- Asesor técnico permanente

- Material de apoyo

- Personal de apoyo

- Pasajes y viáticos para hacer el diagnóstico general

- Pasajes y viáticos para asesoría del coordinador y del asesor técnico a las instituciones participantes

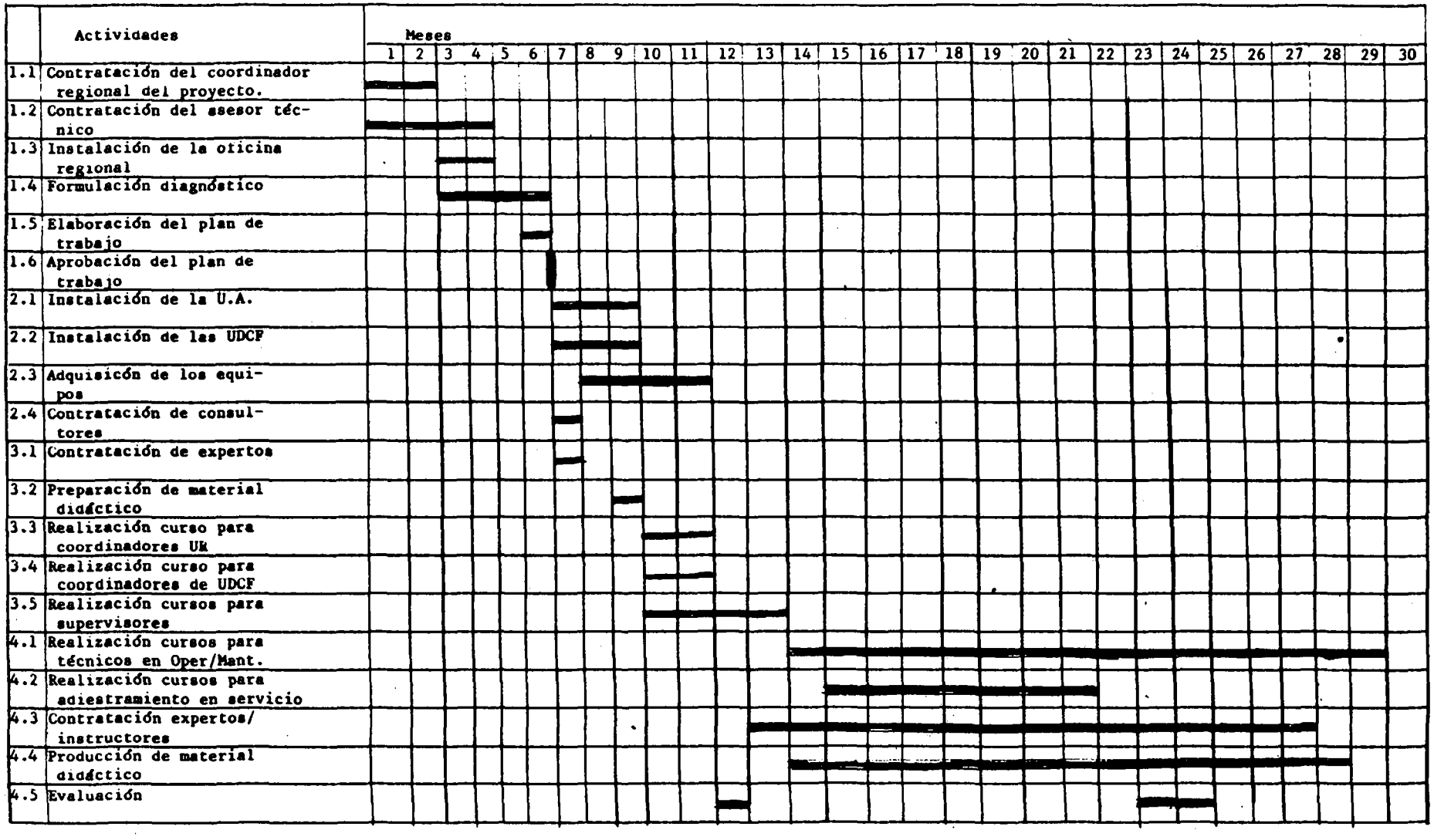
4.3.) A nivel de implementación del proyecto

- Pasajes y viáticos para la cooperación en organización de las UA y UDCF en cada uno de los países
- Pasajes y viáticos para la realización de los dos cursos para instructores
- Consultores a corto plazo
- Pasajes y viáticos para la realización de 30 cursos técnicos en los países y La Uruca
- Pasajes y viáticos para la realización de 7 cursos para supervisores
- Producción de manuales y otros recursos didácticos
- Equipos para las UA
- Equipos para las UDCF

4.4.) A nivel de evaluación

- Pasajes y viáticos para el coordinador y el asesor técnico para la recolección de datos
- Pasajes y viáticos para los consultores para la evaluación del impacto
- Consultores para la evaluación y la preparación del informe final
- Dos reuniones del Comité Ejecutivo (1ra. y 2da. evaluación anual)

4. CRONOGRAMA DE ACTIVIDADES



5. PRESUPUESTO

	BID	GTZ	AyA	Otras Particip.	Total
Coordinador Regional/Asesor Permanente/ Consultores a Corto Plazo	662,400.	210,000.			872,400.
Viáticos y Pasajes en Misión Oficial Internacional	17,972.	116,800.			288,772.
Viáticos y Pasajes en Misión Oficial Nacional			33,400.	334,000.	367,400.
Personal y Material de Apoyo	17,625.		91,320.	795,200.	904,145.
Muebles y Utiles	25,000.				25,000.
Equipos y Materiales	300,000.	84,000.			384,000.
Materiales Didácticos	63,350.	30,000.			93,350.
Subtotal	1.240,347.	440,800.	124,720.	1.129,200.	2.935,067.
Imprevistos	124,653.	44,200.	12,480.	112,800.	294,133.
T o t a l	1,365.000.	485,000.	137,200.	1,242.000.	3,229.200.

6. JUSTIFICACION

De acuerdo con estudios realizados en los países mencionados, principalmente los estudios realizados con la cooperación de la Organización Panamericana de la Salud indican claramente que los servicios de abastecimientos de agua potable, los servicios de recolección de alcantarillado y la disposición de excreta humana necesitan una considerable mejoría en prácticamente todas las regiones.

Aunque la construcción de nuevos sistemas sea también una necesidad, la operación y el mantenimiento de los sistemas existentes es en realidad la acción más urgente.

Con una adecuada operación y un apropriado mantenimiento los sistemas existentes podrán atender a una población mayor con un servicio de calidad mejor.

Dos son los factores que podrán decididamente contribuir para el alcance de esta situación deseada: el desarrollo de la institución y la adecuación de los recursos humanos. Programas de desarrollo institucional están siendo o ya fueron ejecutados en distintas instituciones de agua y alcantarillado en la región. Programas de adiestramiento y desarrollo de recursos humanos, tal como esta programa que aquí se plantea tienen la posibilidad de completar esfuerzos ya hechos.

Es ampliamente conocido que programas de adiestramiento en las instituciones tienen que ser permanentes y para tanto las instituciones necesitan de una infraestructura y una tradición de adiestramiento para lograr sus objetivos.

Los programas de adiestramiento tienen una alta inercia en términos de costo, pero una vez en ejecución pueden transformarse en programas permanentes en costos compatibles con la naturaleza de las instituciones de saneamiento.

Las instituciones solicitantes necesitan de la cooperación de las agencias internacionales para vencer la inercia de costos del proceso de adiestramiento para poder alcanzar sus objetivos sociales de acuerdo con los planes de cada país y con los esfuerzos internacionales de la Década Internacional del Abastecimiento de Agua Potable y del Saneamiento.

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