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SUMMARY OF THE COMMUNITY WATER SUPPLY PROGRAMS
IN
CENTRAL AMERICA AND PANAMA

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I. Summary and Conclusions

1. The U.S. is investing through A.I.D., Ex-Im Bank, IDB and PAHO almost \$30 million in community water supply programs most of which are urban. Of this amount A.I.D. has loans amounting to \$11.65 million in four countries.
2. Urban water supply programs are underway in each country with emphasis on the capital cities.
3. Rural water supply programs need to be implemented with external assistance.
4. Urban water supply programs need continuing external assistance in administration, management and training of local personnel.
5. PAHO has an engineering advisor for community water supply in each of the five CAP countries. With some additional highly competent personnel in specialized fields, PAHO could provide the necessary technical assistance for these programs.
6. A.I.D. has one engineer assigned to USAID/Costa Rica.
7. There will be a lack of national engineers, surveyors, draftsmen, construction supervisors, maintenance men and administrative and general service personnel to meet the requirements of an expanded program. Regional training facilities to meet these needs are necessary.
8. The community water supply programs need assistance on a regional basis for planning and implementation. PAHO or A.I.D. should provide this assistance.
9. A study should be made of the methods of procurement and supply and the ways by which commodities can be purchased regionally and locally to facilitate effective programming.
10. A study should be made as to the possibilities of establishing and expanding industries to produce commodities on national and regional bases.
11. PAHO has a limited training program which needs to be expanded on a regional and national basis if an expanded program is implemented.
12. The PAHO staff is not adequate for providing assistance in administration, management, supply and procurement.
13. A regional team of fiscal and tax experts assisted by CAP representatives should study existing legislation and public administration practices to determine optimum utilization of national funds for the community water supply program.

14. A study should be made of coordinating on a regional basis the teaching of engineering and semi-professional subjects and the dissemination of technical and other information for the programs.
15. Peace Corps volunteers, provided they are adequately trained, could assist in collecting field data, topographic surveys, drafting preliminary plans, construction work, warehousing and supply.
16. Food for Peace could be distributed with the assistance of Peace Corps volunteers to villagers building their own water systems (Food for Labor).
17. There is agreement with the basic concepts of the PAHO plan for rural water supply programs and its early implementation is urged.
18. A.I.D. and PAHO should catalyze the community program by assisting the countries prepare feasibility studies for obtaining external finance; create a regional sanitary institute for research, development, planning, management and training; improve national training at professional and middle manpower levels; and coordinate the work of the various entities in this field.

II. Background

Until 1959 water supply projects were done sporadically in this CAP area by many government institutions, and with the assistance of bilateral, multi-lateral and private non-profit organizations.

The government institutions were the Ministries of Health, the Institute of Municipal Development in Nicaragua, the National Bank for Municipal Development in Guatemala, the Ministries of Public Works and the major municipalities. The Cooperative Servicios and the bilateral agencies working with the Ministries of Health built water systems for medium sized communities (average 2,000 - 5,000 people). In Honduras alone over 100 such systems were built during the life of the Servicio.

The Pan American Sanitary Bureau (now PAHO) through its integrated health programs with the Ministries of Health and UNICEF stimulated sanitation projects which included small water systems. These systems ranged from the village well with a hand pump and public bath and laundry facilities to a more complete type with distribution pipes to public faucets and house connections.

UNICEF by means of tripartite agreements with PAHO and the Ministries of Health furnished supplies such as hand pumps, small motor driven pumps and well drilling equipment. Occasionally non-profit organizations such as CARE participated in the water supply and sanitation programs providing limited amounts of pipe and plumbing supplies for public laundries and bathhouses.

Financing was on an intermittent project-by-project basis. The national government and the larger municipalities provided the major sources

of funds. The Servicios utilized U.S. grant and national funds in varying proportions to carry out these projects. UNICEF and private organizations made their contributions in the form of materials and supplies. Two countries, Honduras and Panama, received Smathers Loans totalling \$5,000,000 in 1959 to build water and sewer systems serving an estimated 150,000 people.

Within country training was at the level of general purpose sanitary inspector personnel while fellowships were granted for graduate training of sanitary engineers. Most of the sanitary engineers were trained for the purpose of assisting in general health programs being conducted in the country. In a few countries vocational schools were established to teach mechanical, electrical and similar trades.

In 1959 as a result of a World Health Organization resolution, emphasis was placed on a global water supply program. Seminars in planning, design, financing and administration were sponsored by A.I.D. and PAHO for national personnel concerned with water supply and sewage disposal problems. Special training, such as the A.I.D. assisted courses in the development of underground water resources, water system design and water works operation and management were developed and are being established in selected countries in Latin America for continued local and regional training.

III. Water Supply Developments

1. Institutions.

In the attempts to begin the nationwide attacks on the water supply and sewerage problems to attain the goals of the Act of Bogota and the Alliance for Progress, it was realized that external financial assistance was necessary. Such assistance could be obtained, provided that institutions existed with adequate organization and powers.

In most of the CAP countries legislation was studied to establish institutions for the purpose of planning, financing, constructing and administering water supply programs on a national scale. As of February 1964 (see Figure 1), four national water authorities were created. Guatemala and Nicaragua, however, preferred to use existing organizations, such as the Instituto de Fomento Municipal (INFOM), Servicios Municipales, Ministry of Health, Ministry of Public Works, Ministry of Development and the municipal governments.

These institutions are concentrating on urban water supplies and the Ministries are continuing their limited programs on rural water systems.

2. Loans

Every country in CAP has obtained at least one loan for water systems and the projects are actively underway. The sources of financing are A.I.D., Export-Import Bank, Inter-American Development Bank and the World Bank.

From November 1961 to February 1964 loans totalling \$32,800,000 have been made. The national governments will contribute \$13,400,000 making the total value of these projects \$46,200,000. It is estimated that over 1,600,000 people will be benefitted. Figures 2 and 3 show the allocation of funds by sources and countries.

These loans have been made to large communities with the exception of loans to Honduras (\$1,050,000) and El Salvador (\$2,700,000). The Honduras loan is from A.I.D. to the National Water Authority to construct 25 small water systems with community participation. After construction, these systems will be operated by village committees and rates will be charged. These rates will be adequate to pay the operation and maintenance and repay the Water Authority. No consulting firm will be used because of the number and small size of the systems. Prior to this in 1959, Smathers Loans were made to Honduras (\$2,000,000 for systems in 37 small communities) and Panama (\$3,185,000 for the City of Panama and its suburbs).

3. UNICEF Assistance

UNICEF is participating in a water supply project in El Salvador. Funds in the amount of \$96,000 were allocated in 1962 to be utilized in 1963-1964 to provide sanitation, potable water and excreta disposal facilities for 30 communities with a total population of 24,300 people.

Sanitation units will be provided in the ratio of 1 unit per 200 people. Each unit will include baths, clothing washing facilities, latrines, animal watering troughs, a well and storage tank. In addition, 3,300 latrines for individual homes would be provided.

UNICEF assistance is in the form of equipment and supplies for 125 of these units -- well drilling equipment and accessories, vehicles, latrine supplies and stipends and materials for training sanitary inspectors.

The Government of El Salvador budgeted \$113,600 for water, \$18,120 for latrines and \$2,000 for training. The total program is \$229,720. Such projects require participation of the national government and the technical approval of WHO. In the past UNICEF has participated in similar integrated projects in Guatemala, Honduras, El Salvador and Panama.

4. Personnel

There are a total of 8 international sanitary engineer consultants presently working in CAP and providing advisory services for the water supply programs and general sanitation.

PAHO has 7 sanitary engineers assigned to the CAP countries and one zone engineer. Of these, three are assigned specifically to water supply programs in the countries of Costa Rica, El Salvador and Nicaragua. The other 4 are members of teams working in integrated health programs in each of these countries. These programs include basic sanitation (water supply).

A.I.D. has one sanitary engineer in Costa Rica working with the national water authority. His major duty is to monitor the A.I.D. water supply loan and he is not responsible for the stimulation of planning and projects for a national water supply program.

In addition to this, A.I.D. has provided funds to PAHO for the development of the community water supply program. These funds were utilized for personnel, short-term consultants, training and seminars. Figures 4 and 5 show the various projects.

IV. Evaluation of Program

1. Urban Water Supply

All of the CAP countries now have institutions or agencies which have legal responsibilities for urban water supply systems and are working on urban projects. In general the national technical competence is satisfactory but administrative competence needs to be improved. If the program should expand, it will be necessary to strengthen these institutes with additional engineering and technical personnel as well as administrative and management personnel. Expanded training programs will be necessary especially in the fields of administration and management.

External advisory services should be provided and utilized, particularly on specific problem areas through IDB, PAHO and A.I.D.

The projects now financed by loans appear to be progressing reasonably well although this conclusion is based solely upon reports. Work has begun on almost all the projects for which disbursements have been made, and some are quite advanced. These projects present special problems arising from the process of public bidding and in receiving equipment and materials which in many cases must be imported. Evaluation of the achievements in this field, above all in terms of number of persons benefitted, is a problem when the work has not been completed. There is not always a close correlation between disbursements, the amount of work completed on the project and the people benefitted.

The principal weakness is the lack of adequate administrative competence. Lending institutions should be cognizant of the need for training administrative and management personnel who can meet the program requirements.

It is therefore recommended that the organizations concerned with urban water supply programs (IDB, A.I.D., PAHO, World Bank and others) develop a program designed to meet training requirements for national and local water supply personnel.

2. Rural Water Supply

Prior to the Act of Bogota, the world-wide community water supply program was giving priority to the largest cities to benefit the maximum number

of people in the shortest time. Since then the rural water supply program has made poor progress. Only two rural water loans have been made totalling \$3,750,000 for 61 water and sewer projects in Honduras and El Salvador.

Few countries have been developing a national plan that includes such a program whether it be through the National Water Authority or one of the Ministries. This planning requires assistance. Basic field work and training of personnel will have to be done as well as strengthening of the selected institutions.

Experience has been developed in rural work in the past 20 years. In the cases where systems were built with grant funds and little community participation was required, the results have been unsatisfactory. The systems were not maintained and deteriorated quickly. When the communities participated, the results were satisfactory. It has been demonstrated that simple systems are required and overdesign must be guarded against.

While some national surveys have been made, no national plans for a community water supply program have been completed. This has been due in part to the lack of economic resources to permit planning -- funds have been made available sporadically (mostly by national governments) in varying amounts for specific projects depending on political pressures.

Such programs on a national scale will require large numbers of field personnel at a tradesman level -- construction crews, operators, inspectors, foremen, warehousemen, collectors, accountants, etc. -- and bases of operation. Consequently, consideration has been given to doing it through the Ministries of Health with their health centers, health posts and field personnel that are usually located throughout the country and work closely with the communities.

V. PAHO Proposal for Rural Water Supply Program

At recent meetings of the Ministers of Health and at the IA-ECOSOC meetings in Costa Rica and Sao Paulo, resolutions were adopted to give emphasis to the rural water supply program in accordance with the aims of the Alliance for Progress. PAHO was requested to take the leadership in the development of a continent-wide program of rural water supplies.

Later meetings with officials of the World Bank, IDB and A.I.D. were convened by PAHO. During the meetings of February 25-29, 1964, PAHO proposed a prototype operation in CAP. This would be for two years, provide water for 400,000 people and cost \$6,000,000. Half of the financing would come from external sources and the rest from the country and communities. Internal revolving funds would be established by the communities and governments. Financing would be from IDB and technical assistance from PAHO.

PAHO because of its engineers in the field and existing regional organizations could provide most of the engineering assistance required.

However, PAHO needs additional staff, particularly of the business manager type, to provide assistance in administration, fiscal management, supply and procurement, warehousing and similar functions.

VI. Recommendations

It is felt that the urban water supply program has passed the beginning stage and entered the continuing development and self-sustaining stage. Its further progress can be improved by training of management, administrative and semi-technical personnel.

The rural water supply program needs an initial push ("seed capital") to get underway. It will also require training in the disciplines of management, administration, supply, operations and community development.

To accelerate the rural water supply program a positive approach is required. One method is to create within each country a joint planning and assistance office, financed, equipped and staffed by A.I.D., PAHO and the country institution responsible for water supply program in the country. This office could be established by a memorandum of understanding between A.I.D., PAHO and the national government.

The objective of this office would be to plan the national water supply program. In addition, this office would prepare a basic number of projects and a loan application to secure external financing for a national rural water supply program. Limited funds are needed to do this.

Simultaneously, training on a regional basis would be established. Such training would be for supervisory personnel in the administrative and general services fields. These supervisors in turn would establish local training programs as needed. The regional training programs would be developed in accordance with the progress of the programs.

A certain amount of operating funds from outside sources should be provided for this joint planning office. When the national government, as in the case of many multi-lateral agreements, is required to furnish local transportation, mail franchises and local communications, the results are not always satisfactory. The writer, who has been an advisor with the government providing supporting services, has lacked office space, supplies, furniture and oftentimes been unable to mail letters for lack of postage; unable to travel because of lack of fuel; and when travelling, doing so under dangerous conditions because of poor vehicle maintenance. This can be remedied with time; but when it is desirable to implement a program rapidly and develop an adequate organization, this method is very slow.

The major problem lies in administration and management. One means of solving this is to provide a business manager advisor as assistant to the country engineer advisor. The function of the business manager will be to assist the national agency to develop administrative standards and procedures, facilitate

procurement and supply, and the various problems related to programs operating on a national scale. Men who have been trained in this field are available in the area and could be employed as third country employees. Examples of such men are Emil Falk in Honduras, De Leon in Guatemala and Aliaga in Panama.

Regional assistance in fiscal management and technical competence will also be necessary. This can be done from a regional training center. Simultaneously, assistance of consultants to develop the local manufacture of materials for use in the water works field may be provided. The regional personnel will work directly with the country engineers for planning, implementation and evaluation of the country programs. The regional training center will have a permanent staff with twofold functions -- training and consulting. The staff will give regional courses and participate in national courses.

The regional staff would, therefore, include consultants in engineering, administration, equipment maintenance, surveying and drafting, files and records, accounting, purchase and supply, audio-visual aids, publications and groundwater development (well drilling).

Plan for Rapid Implementation

Phase I Creation of Joint Planning Office

Memorandum of Understanding

Inventory of existing projects and data

Advisors - engineers and business manager

Organization of Regional Training Office

Training of key personnel

Phase II Loan Application and Planning

Planning internal financing scheme

Preparation of basic number of projects

Collection of data for future projects

Presentation of loan application

Training field and office personnel in technical and administrative fields

Phase III Implementation

Purchase of equipment and supplies

Regional standards

Community agreements

Construction of systems

Training of operation and management personnel

Phase IV Operation and Maintenance

Billing and collecting

Repair and extension

National revolving fund

Phase V Evaluation

Adequacy of training of personnel

Condition of systems

Extension of systems

Growth of revolving fund

Alternate Plan for Implementation

Under this scheme a special team of consulting engineers and planners would visit each country and utilizing existing plans and data draft a loan application and prepare guidelines for the required administration to execute and manage the program. A memorandum of understanding with PAHO would establish their cooperation.

Where sufficient data is not available, these teams would have funds sufficient to hire local people and prepare preliminary designs and a loan application. In some countries counterpart funds (PL 480) might be available for these local expenses. Financing for this team would be an A.I.D. grant on a regional basis.

For continued advisory services, PAHO personnel would be utilized as available. The training would be done at a regional and local level through PAHO.

F I G U R E 1

Institutions Responsible for Water Supply
and Sewerage FacilitiesFrom September 1960 (Act of Bogota) to December 1962COSTA RICAServicio Nacional de Acueductos y Alcantarillado (SNAA)
(Established September 1961)Division de Ingenierio Sanitaria (Ministry of Public Health)
MunicipalitiesEL SALVADOR

Administracion Nacional de Acueductos y Alcantarrillados (ANDA)

Division de Ingenieria Sanitaria (Ministry of Public Health)

GUATEMALA

Comite Nacional Agua Potable (1960)

Departamento de Aguas y Drenajes (Ministry of Public Works)

Departamento de Ingenieria Sanitaria (Ministry of Public Health)

Instituto de Fomento Municipal (INFOM)

Municipalities

HONDURASServicio Autonomo Nacional de Acueductos y Alcantarillado
(SANNA created May 1961)Division de Saneamiento Ambiental (Ministry of Public Health
and Social Welfare)

Municipalities

NICARAGUADepartamento Nacional de Servicios Municipales (Ministry of
Development)

Empresa Aguadora de Managua

Ministerio de Salubridad

PANAMAInstituto Nacional de Acueductos y Alcantarillados de Panama
(IDAAN created December 1961)Departamento de Salud Publica (Ministry of Health, Labor
and Welfare)

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FIGURE 2

Funds by Sources for Water and Sewer Systems
in Central America

(November 1961 to February 1964)

	IDB	IBRD	AID	Ex-Im	External Total	Cooperat- ing Country	Total	Estimated Number of People to be Benefitted
(Funds in Millions of Dollars by Sources)								
Costa Rica	0.10		4.0	4.5	8.6	2.35	10.95	231,000
El Salvador	4.82				4.82	1.69	6.51	650,000
Guatemala	3.703				3.703	1.65	5.353	220,000
Honduras	2.15		1.05		3.2	.85	4.05	138,000
Nicaragua	.185	3.0	.60		3.785	2.0	5.785	115,000
Panama	2.762		6.0		8.762	4.8	13.562	285,000
	\$13.720	3.0	11.65	4.5	32.870	13.34	\$46.210	1,641,000

Average: \$28 per person

Smathers Loans 1959

Honduras \$2 million

Panama 3.185

\$5.185 million

Description of Projects in Figure 2

COSTA RICA

San Jose Metropolitan Water System - A.I.D. Emergency Water Supply Loan to increase supply until new Rio Blanco Project is built. It consists of the construction of storage tanks, the development of springs, repairs and changes in the distribution system and an access road for the Rio Blanco Project. Up to \$1.4 million.

San Jose Metropolitan Water System - A.I.D. loan to develop a new water supply from the Rio Blanco. It consists of 20 kilometers of pipeline, a 12 MGD treatment plant, 40,920 meters of distribution mains, 6 storage tanks, 20,000 house meters and the improvement and extension of distribution systems and supplies. \$3.5 million - A.I.D. and \$4.5 million - Ex-Im Bank. Total cost - \$10.3 million.

San Jose Metropolitan Water System - A.I.D. loan to pay local costs of \$0.5 million.

Total cost estimated at \$10.8 million.

Liberia, Puntarenas, Limon - Funds (\$1.0 million) from the SPTF of IDB have been loaned to finance water supply studies for these cities. Total cost is \$.60 million.

EL SALVADOR

IDB loans to finance expansion and improvement of the sewerage systems for five cities -- San Salvador, Santa Ana, San Miguel, Santa Tecla and Sonsonate -- were made in the amounts of \$.84 million and \$1.26 million (total \$2.1 million) to serve approximately 370,000 people.

IDB loan of \$2.7 million to finance expansion and improvement of potable water and sewerage systems in 34 smaller communities. These communities have practically no facilities. To benefit 412,000 people.

IDB provided technical assistance funds up to \$.02/^{million} to provide advisory services to ANDA on organization and administration.

GUATEMALA

IDB loan of \$3.5 million for 51 water systems and 31 sewerage projects. The sewer projects will benefit 120,000 people and the water supply, 82,000 people.

IDB loan of \$0.175 million for water supply extension and improvements in Puerto Barrios with a total population of 20,000 to increase water supply more than three times.

IDB provided up to \$.014 million as non-reimbursable technical assistance for advisory services in rates, planning legislation and coordination of agencies responsible for water supply programs.

HONDURAS

Tegucigalpa Water Supply - IDB has approved a loan of \$2.15 million for extension and improvement. Total cost \$3.0 million.

Twenty-four (24) Small Water Systems - A.I.D. has approved a loan for \$1.05 million to construct water supplies in previously unserved communities with a total population of 40,000. Total cost is \$1.25 million.

Smathers Loan in 1959 of \$2 million was used to construct water supply and sewer systems in 37 communities.

NICARAGUA

Managua Sewer Studies - IDB loan of \$.185 million to finance studies to improve and extend the Managua sewer system.

Managua Water Supply - IDA loan of \$3.0 million to improve and extend the water supply system to serve 75,000 people not now served. Total cost of this project is \$5.0 million.

Matagalpa - A.I.D. loan of \$.60 for the water treatment plant and water meters to improve the water supply system and to provide additional sanitary and storm sewers as well as paving of flood control ways.

PANAMA

IDB loan of \$2.762 million for water supply and sewerage for seven (7) communities. The total cost will be \$4.0 million.

This will provide water to 11,000 people not served and improve service for 68,000 additional people. The Panamanian government expects to provide water to 26 other communities with its own resources.

A.I.D. loan of \$6 million for Panama City water and sewers. The total cost is \$9.7 million. The project will increase the quantity of water and improve water and sewer service to 300,000 people.

Smathers Loan in 1959 for \$3.815 million was used for extending the water supply to the Panama City suburbs.

PERCENT OF CONTRIBUTION OF FUNDS FROM LOANS
AND COUNTRIES TO COMMUNITY WATER SUPPLY
PROGRAM IN CENTRAL AMERICA AND PANAMA

NOVEMBER 1961 - FEBRUARY 1964

Total: \$46.2 million

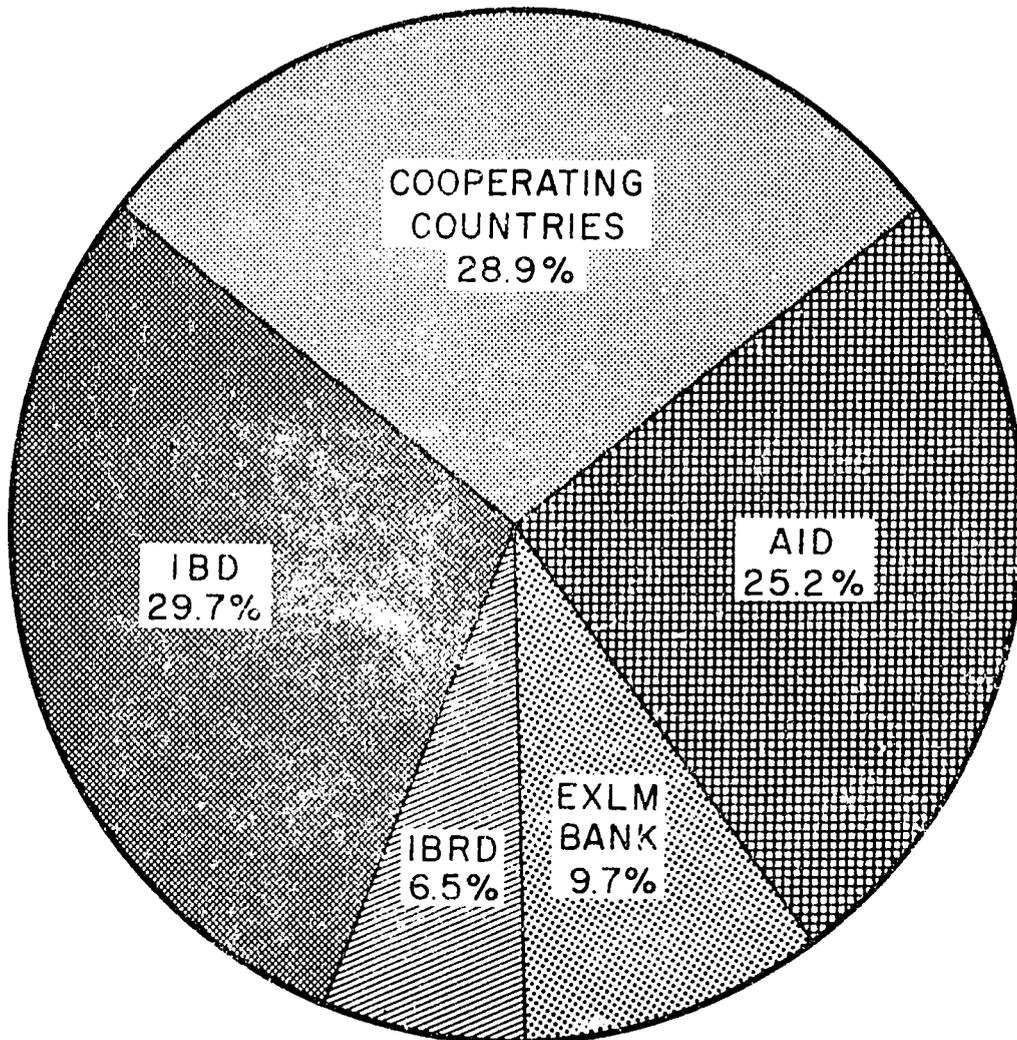


FIGURE 4

Community Water Supply
Central America and Panama - February 1964

Sanitary Engineer Personnel

	Number of Sanitary Engineers		
	AID Water Supply	PAHO	
		Water Supply	Integrated Health (a)
COSTA RICA	1	1	--
EL SALVADOR	-	1	1
GUATEMALA	-	-	1
HONDURAS	-	-	1
NICARAGUA	-	1	-
PANAMA	-	-	1
TOTAL	1	3	4

(a) Estimated to devote more than 50% of time to water supply

PAHO Utilization of U.S. Funds
in Latin America

U. S. Grant		\$300,000
PAHO Funds		150,000
	<u>FY 1964</u>	<u>FY 1965</u>
Engineers	19	19
Participants	35	35

FIGURE 5

PAHO PROGRAMS IN LATIN AMERICA

Nomenclature	Program	Fiscal years		
		1963	1964	1965
AMRO 17	Waterworks Operators Course (held in Central America)	\$ 7,968	\$ 8,400	\$ 8,400
AMRO 187*	Water Supplies (Staff and short-term consultants)	16,000	16,000	35,600
AMRO 187	Water Supplies (Staff and short-term consultants)	69,940	122,700	123,520
AMRO 234	Sewage Disposal and Water Pollution Control (Short-term consultants and Manual)	12,000	11,200	14,400
AMRO 237	Symposium on Management (Short-term consultant, participants)	32,000	-----	-----
AMRO 242	Seminar on Water Supply Design (Short-term consultant, participants)	-----	43,120	43,120
AMRO 270	Courses on Planning Water Supply Systems (Short-term consultant, participants)	58,243	60,000	60,000
AMRO 357	Production of Materials for Water Supply Systems (Short-term consultant, participants)	-----	6,400	6,400
		<u>\$196,151</u>	<u>\$267,820</u>	<u>\$291,440</u>

* Regular PAHO Funds

F I G U R E 5
(Cont'd)

PAHO COMMUNITY WATER SUPPLY PROGRAM
IN CENTRAL AMERICA AND PANAMA

(Engineer Advisors, Consultants and Training)

	<u>FY 1963</u>	<u>FY 1964*</u>	<u>FY 1965*</u>
CCSTA RICA	\$13,643	\$18,690	\$20,310
EL SALVADOR	17,179	18,690	20,310
GUATEMALA**	4,000	8,200	8,200
HONDURAS**	6,400	9,800	9,800
NICARAGUA	16,521***	21,140	21,490
PANAMA	<u>3,200</u>	<u>15,980</u>	<u>18,690</u>
TOTALS	\$60,943	\$92,500	\$98,800

* Each country program includes \$3,400 for participant training

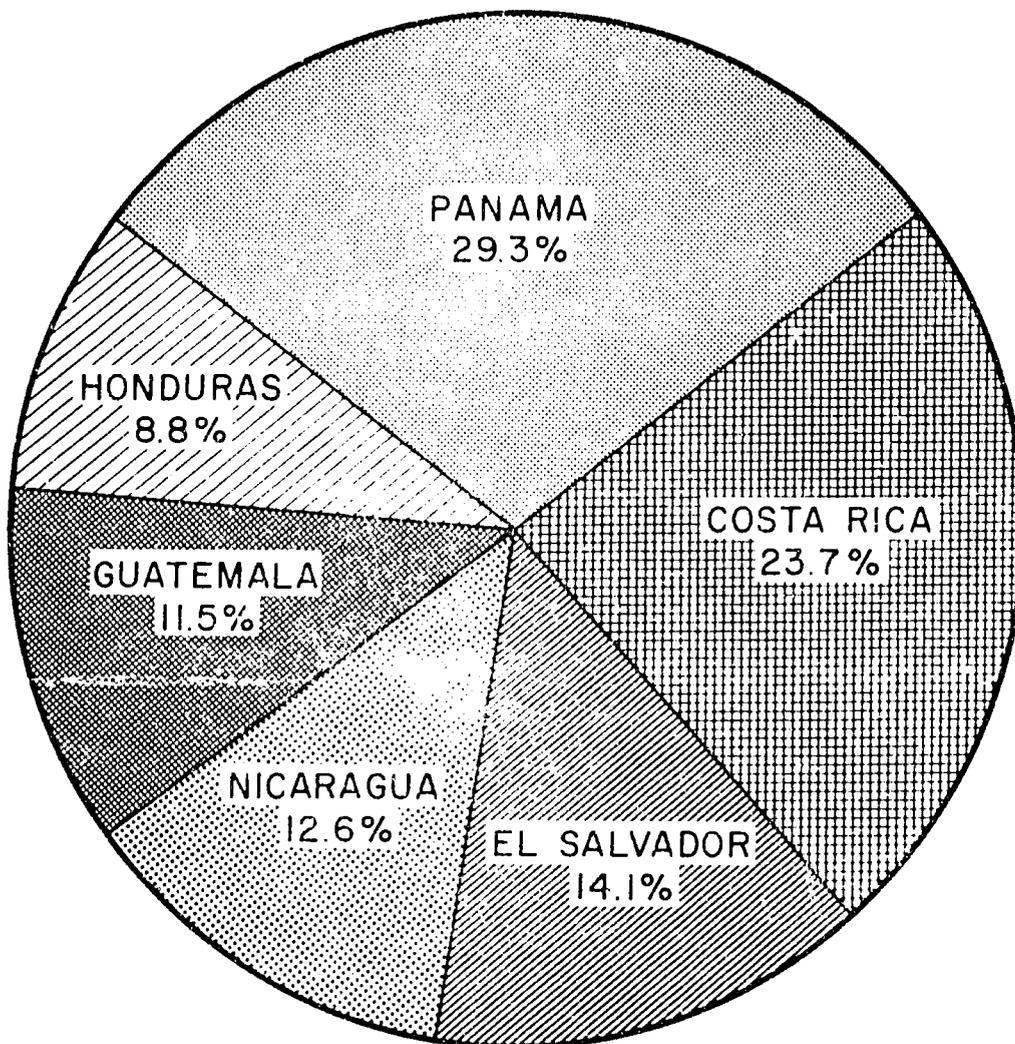
** No resident advisors

*** \$593 for supplies

PERCENT OF FUNDS FROM LOANS AND COUNTRIES
FOR COMMUNITY WATER SUPPLY PROGRAM BY
COUNTRIES IN CENTRAL AMERICA AND PANAMA

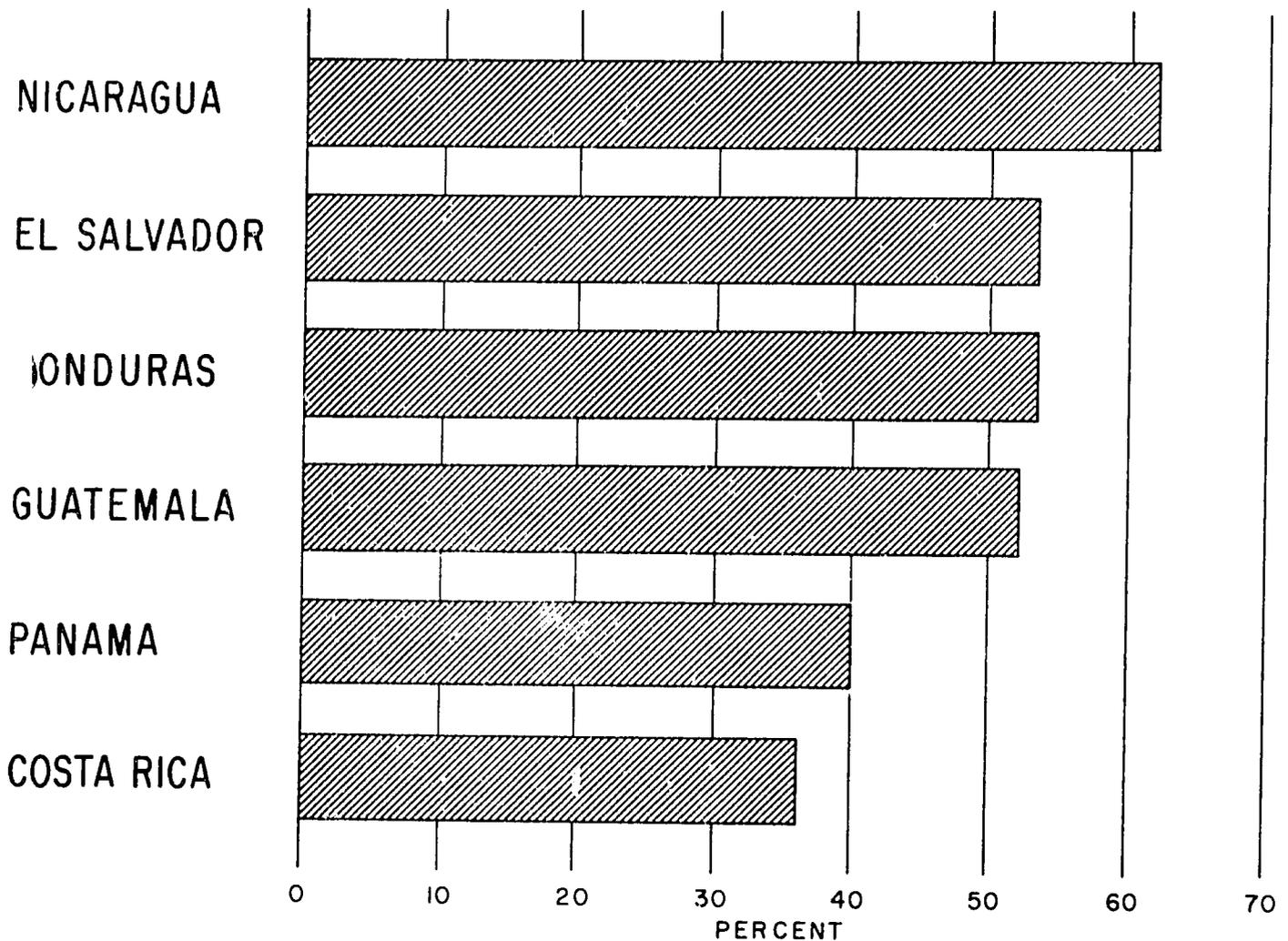
NOVEMBER 1961 - FEBRUARY 1964

Total: \$46.2 million



PERCENTAGE OF POPULATION NOT SERVED BY
SEWERAGE OR SYSTEMS OF WASTE WATER DISPOSAL
IN URBAN OR RURAL AREAS OF CENTRAL AMERICA
AND PANAMA

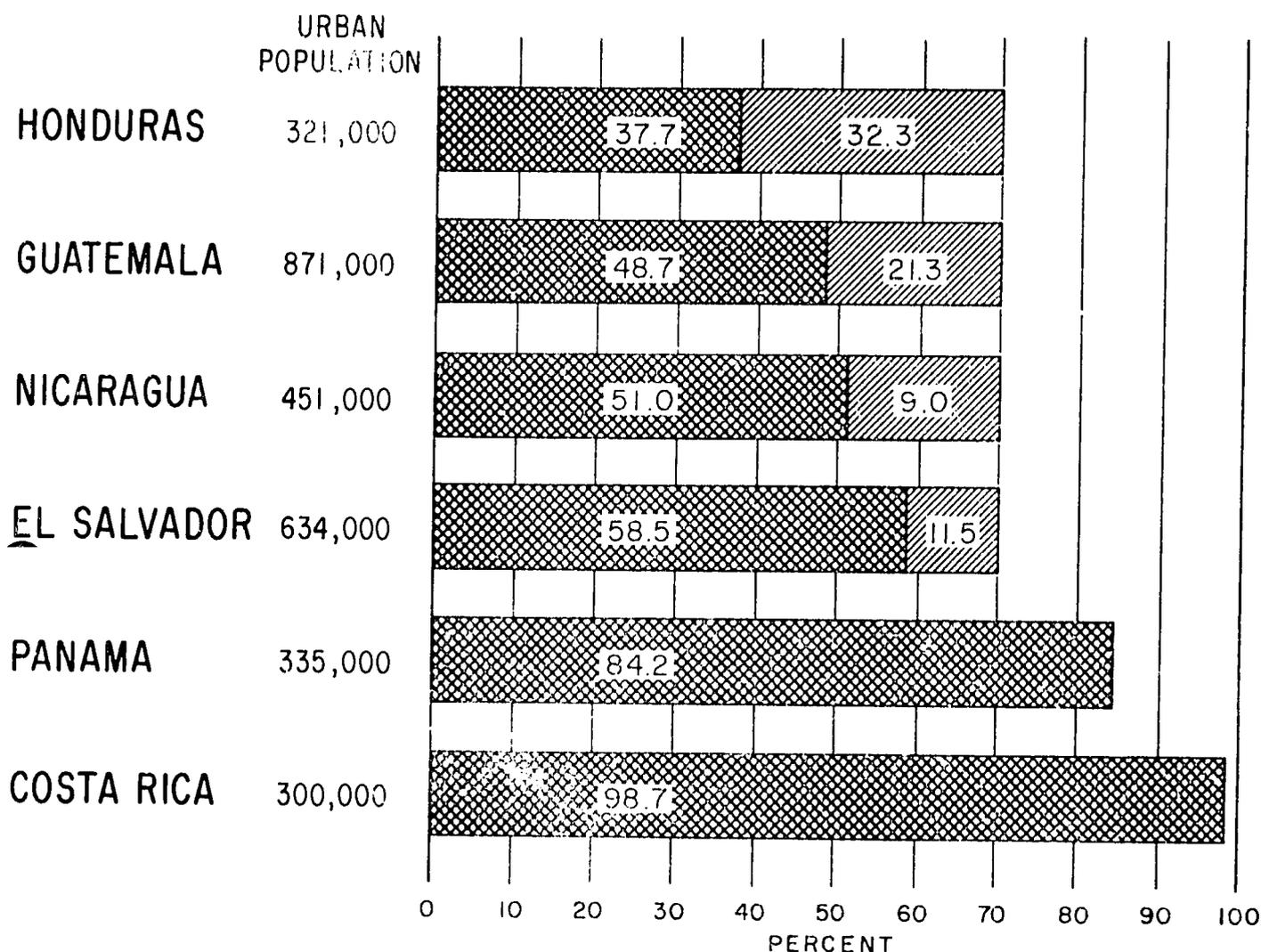
1958



Note: Data from Quarterly Report of Director
PAHO 1958-1961

POPULATION SERVED BY COMMUNITY WATER SUPPLY SYSTEMS IN CENTRAL AMERICA AND PANAMA

1958



 (1) Percent of population served by water supply in cities of 2,000 inhabitants or more, in Central America and Panama in 1958.

 Additional percent of population required to be served to attain Goal of Alliance for Progress.

Note:

(1) Based on data from Ingenieria Sanitaria, (AIDIS), p 282, April 1960, Vol. 13, No. 4.