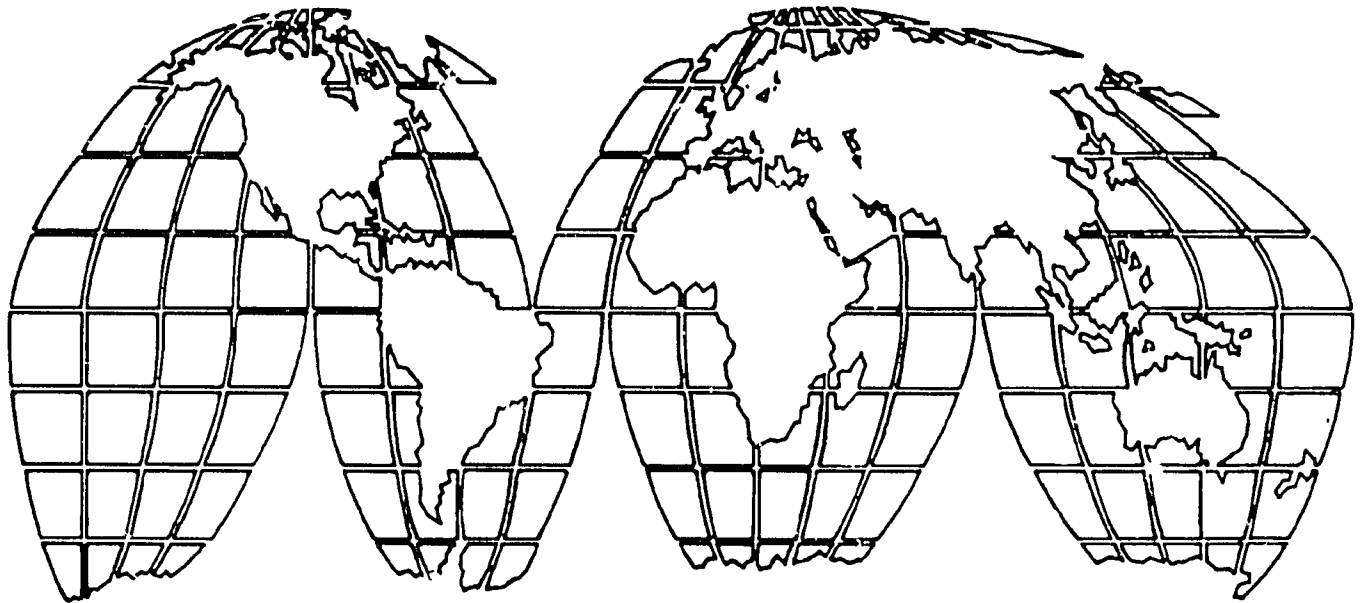

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**Sustainability of U.S.-Supported Health,
Population, and Nutrition Programs in Guatemala:
A Review of Water Supply and Sanitation Projects
(1955-1987)**



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WATER SUPPLY AND SANITATION PROJECTS

WORKING PAPER NO. 137

by

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The views and interpretations expressed in this report are those of the author and should not be attributed to the Agency for International Development.

TABLE OF CONTENTS

	<u>Page</u>
1. Overview	1
1.1 Background	1
1.2 Current Institutional Organization of the Water Supply and Sanitation Sector	2
2. Prior Conditions and Project Inputs	4
3. Sustainability	4
4. Contextual Factors	7
4.1 Natural Disasters	7
4.2 Political Environment	7
4.3 U.S.-Government of Guatemala Relations	7
4.4 Sociocultural Context	8
4.5 Economic Context	8
4.6 Private Sector	8
4.7 Implementing Organization	9
4.8 Other Donors	9
4.9 National Commitment to Project Goals	10
5. Project Characteristics	10
5.1 Project Negotiation Process	10
5.2 Institutional Organization and Management	10
5.2.1 Vertical Versus Horizontal Design	11
5.2.2 Managerial Leadership	11
5.2.3 Administrative Systems and Training	12
5.3 Financing	12
5.3.1 National Absorption of Project Costs	12
5.3.2 Foreign Exchange Requirements	13
5.3.3 Trade-Offs Among Government Priorities	13
5.3.4 Cost Recovery	14
5.3.5 Cost-Effectiveness	14
5.4 Project Content Aspects	14
5.4.1 Project Design	14
5.4.2 Training	15
5.4.3 Supplies and Logistics	15
5.4.4 Technical Assistance	15
5.4.5 Appropriate Technology	15
5.5 Community Participation	16
5.6 Project Effectiveness	16
6. Summary and Conclusions	16

- 1 -

1. OVERVIEW

1.1 Background

U.S. Government support for water system and sanitation projects in Guatemala was initiated in 1943 by the Inter-American Cooperative Service for Public Health (SCISP). With the exception of a brief period (1951-1954) during the Arbenz Government when assistance was suspended, U.S. support for the sector has been continuous. The United States has supported various government agencies, the University of San Carlos, and private voluntary organizations (PVOs).

The United States has not been alone in this support. During the early 1960s, the Inter-American Development Bank (IDB) began funding water and sanitation programs and soon came to dominate foreign support for the sector. UNICEF, the Canadian International Development Agency (CIDA), Central American Bank for Economic Integration (CABEI), and other international agencies have also made significant contributions.

In urban areas, significant progress was achieved during the 1960s by the combined efforts of the National Institute for Municipal Development (INFOM), IDB, and the Agency for International Development (A.I.D.). By 1971, 89 percent of the urban population had water supply (household connections or public standposts) and 42 percent had sewer connections (IDB 1986). However, the rural areas were lagging far behind. Only 13 percent of the rural population had water or sanitation facilities. (It is important to note that the statistics on coverage do not reflect the adequacy of the facilities or the quality of the service.)

To address water supply and sanitation problems in rural areas, the Agency for Implementing Rural Water Systems (UNEPAR) was created in the early 1970s. Funded by IDB and CIDA, this unit operated within the Ministry of Health and initially took over responsibility for rural water supplies and sanitation from the Department of Environmental Sanitation (DSA). After the earthquake, when UNEPAR became semiautonomous within the Ministry, DSA received renewed life with A.I.D., UNICEF, and CABEI funding.

During the late 1970s and early 1980s, funds for earthquake recovery and building new water supply and sanitation systems began to pour into Guatemala. A.I.D. switched to the rural sector for new water supply and sanitation projects and provided grants to CARE and Agua Del Pueblo (ADP)--two nongovernmental organizations that developed significant water supply and sanitation programs. A.I.D. also funded the DSA's Community Based Health and Nutrition project in 1981. UNICEF continued to fund DSA operations, and IDB, CABEI, and CIDA provided support

for UNEPAR, INFOM, and Municipal Water Company (EMPAGUA) projects.

1.2 Current Institutional Organization of the Water Supply and Sanitation Sector

Urban water and sanitation institutions in Guatemala are well developed. EMPAGUA has responsibility for Guatemala City, and INFOM provides loans and technical assistance to the 329 cabeceras municipales--urban areas that vary in size from fewer than 500 to almost 730,000 persons.

In rural areas, the Environmental Sanitation Department (DSM), which replaced DSA, has responsibility for communities with fewer than 500 persons, and UNEPAR has responsibility for the larger communities. UNEPAR projects, which, with IDB funding, are by far the largest rural programs, are characterized by fast project execution (they are done under contract) but involve little community participation and provide little health education.

DSM operates within the Ministry of Health and currently receives grant assistance from UNICEF and A.I.D. Its major project work load is the A.I.D. Community-Based Health and Nutrition project. The project has a slower implementation rate than the UNEPAR projects, but it has higher levels of community participation. DSM is also responsible for the latrine programs in rural areas.

To promote better organization of the sector, the Permanent Coordinating Committee for Potable Water and Sanitation (COPECAS) was formed in the early 1980s. COPECAS, which meets monthly, has responsibility for coordinating water supply and sanitation programs in both urban and rural areas. Technical assistance to COPECAS is provided by the Pan American Health Organization (PAHO).

Despite large investments in urban areas, high population growth rates and urban migration have resulted in declining levels of coverage since 1980 (from 88.9 to 70.6 percent for water and from 44.4 to 41.2 percent for sanitation). Rural areas have fared somewhat better since 1980, with coverage increasing from 18.6 to 26.5 percent for water and from 20.9 to 28.6 percent for sanitation (WASH 1987). However, these levels of coverage are still extremely low, even by Central American standards. Approximately 2,000 water systems have been built in the rural areas of Guatemala since the 1940s.

Table 1. U.S.-Supported Water and Sanitation Projects in Guatemala, 1952-1988

Year	Project Name	Project Number	Grant or Loan	Implementing Agency	U.S. Funding (\$)
<u>SCISP ERA^a</u>					
1955-1966	SCISP	20-50-900	Grant	SCISP	2,650,000
1957-1966	Administration of SCISP	20-50-906	Grant	SCISP	494,000
<u>Water Supply, Sanitation, and Housing Projects</u>					
1952-1954	Health and Sanitation	520-0029	Grant	SCISP	171,000
1957-1961	Environmental Sanitation	520-0085	Grant	SCISP	1,654,000
1957-1964	Environmental Sanitation	520-0132	Grant	SCISP, Ministry of Health	406,000
1957-1966	Environmental Sanitation	20-50-909	Grant	SCISP, Ministry of Health	870,000
1958-1960	Rural Housing and Water Supply Rural Development Program	20-99-091	Grant	Agrarian Affairs	613,000
<u>ERIS</u>					
1966-1971	ERIS		Grant	University of North Carolina	300,000
<u>INFOM Projects</u>					
1972-	Water Supply and Sewerage for Small Municipalities	520-017	Grant	INFOM	2,100,000
1978-1981	Earthquake Recovery	520-027 (0236)	Loan	INFOM	2,700,000 ^b
<u>PVO Projects</u>					
1975-1977	Village Water System and Latrines	520-0231	Grant	CARE	267,000
1977	Rural Potable Water and Latrine	520-0244	Grant	ADP	24,000
1984-1986	Rural Potable Water and Sanitation I	520-0298	Grant	ADP	500,000
1985-1988	Rural Potable Water and Sanitation II	520-0335	Grant	ADP	1,000,000
1985-1988	Water, Women and Health	520-0336	Grant	CARE	1,000,000
<u>DSM Projects</u>					
1981-1988	Community-Based Health and Nutrition	520-0251	Loan	DSM	9,500,000

^aSCISP projects began in 1942, but no project information is available for projects before 1955.

^bPart of a total \$8,000,000 Earthquake Recovery Loan.

Note: ADP is Aqua del Pueblo, a PVO.

1
2
3

2. PRIOR CONDITIONS AND PROJECT INPUTS

U.S. Government contributions to water and sanitation systems can be divided into six project types (see Table 1). During the first period of substantial assistance, the SCISP era (1955-1966), support was provided primarily for institutional development and for urban water supply and sanitation projects.

During the same period, another series of water supply, sanitation, and housing projects implemented by SCISP and the Ministry of Health focused on providing water and sanitation services in small rural communities of 200 to 1,500 people.

During the later 1960s, A.I.D.'s only contribution to the water and sanitation sector was a technical assistance project to help establish the Regional Sanitation Engineering School (ERIS) at the University of San Carlos.

During the 1970s, A.I.D.'s efforts focused on urban water and sanitation projects implemented by INFOM. Between 1972 and 1981, approximately 40 municipal water systems were constructed, and many existing systems damaged by the 1976 earthquake were repaired. Also during the 1970s, A.I.D. began to turn to PVOs to implement its water and sanitation projects in rural areas. Five projects provided funding support to two PVOs (Agua del Pueblo and CARE). Three of these projects have been completed, and two are ongoing.

The major water and sanitation project of the 1980s is a subcomponent of the \$10.8 million Community-Based Health and Nutrition project, which is being implemented by DSM. The original project contained a primary health care service component; however, problems during the early 1980s inhibited implementation of this project component. In 1983, the project was amended to focus entirely on water and sanitation activities, with considerably improved implementation.

3. SUSTAINABILITY

Available information is inadequate for quantifying the benefits that have accrued to project recipients. It is likely, however, that water supply and sanitation projects have contributed to the general decline in overall mortality rates (especially in children).

Two types of project outputs can be sustained in this sector. The water and sanitation systems that were put in place during the project (immediate outputs), which can continue to function if they are maintained. Institutions that construct new water and sanitation systems after the A.I.D. project ends

(Replicable outputs) can be considered to be sustained even if the funding comes from international rather than national sources--as long as project personnel, facilities, and administrative systems continue.

The urban water and sanitation systems that were built under SCISP have been maintained and expanded. The institution created by SCISP was absorbed into the Ministry of Health in 1962, and continued to construct new water and sanitation systems.

No information is available on the eventual outcomes of the A.I.D.-supported programs directed to small rural communities during the late 1950s and 1960s. Since the projects involved little community participation, little or no organizational training of the community, and no cost recovery (factors that have been crucial to the maintenance of water and sanitation systems in most countries), it is not likely that they have been fully sustained.

The INFOM municipal water system projects have proved to be effective and sustainable. The earthquake reconstruction was achieved, the approximately 40 new systems built under the project continue to operate, and INFOM continues to operate with follow-on IDB loans.

The three PVO water and sanitation projects that have been completed were all successfully implemented, and the immediate outputs appear to have been maintained, although no solid information is available. Both CARE and Agua del Pueblo continue to receive A.I.D. funding. Without A.I.D. support, CARE and Agua del Pueblo would likely continue their water and sanitation programs, but at a much slower implementation rate. The two ongoing PVO projects are similar to the completed projects.

The Community-Based Health and Nutrition project is an ongoing project that originally had implementation problems but was redesigned to improve its effectiveness. Some of the project components have been implemented and continue to function after 1 to 3 years of operation.

Over 20 years after its founding, the National Sanitary Engineering School (ERIS) continues to graduate about 20 students a year (higher than its historical average). About half of its students are from Guatemala. The school is supported by scholarship grants from PAHO and other international sources. Funding for the operation of the school comes from the Government of Guatemala.

In conclusion, it appears that most of the A.I.D.-supported water and sanitation projects were fairly well sustained (see Table 2). In most cases, systems that were put in place under the projects have been maintained to at least minimal standards.

Institutions that construct new water and sanitation systems have been able to continue after the end of A.I.D. projects because other international donors continue to provide major funding.

Table 2. U.S.-Supported Water Supply and Sanitation Projects in Guatemala: Sustained Outputs and Benefits

Project Category	Were Outputs/Benefits Sustained?			
	Outputs			
	Maintenance	Replication	Benefits	
	Water Supply	Sanitation		
SCISP Era (1955-1963)	Yes	Yes	Yes	Unclear
Water Supply, Sanitation and Housing Projects (1950s and 1960s)	Unclear	No	Yes	Unclear
ERIS (1966-1971)	Yes	Yes	-	Yes
INFOM Projects (1970s)	Yes	Yes	Yes	Unclear
PVO Projects (1970s and 1980s)	Yes	No	Yes	Unclear
DSM Projects (1980s)	Yes	No	Yes	Unclear

Although in general the study found water and sanitation projects to have been sustained, the degree of their success has varied. Urban projects of the SCISP era and the INFOM and recent rural PVO projects were more often maintained and replicated than were rural projects of SCISP and DSA. Rural sanitation project components (latrines) were generally much less effective during the life of the project and were less likely to have been sustained than were water systems projects. Rural projects that did not emphasize education and community participation, such as the small communities projects of the 1950s and 1960s, were also less likely to have been sustained since the maintenance of these programs depends on the communities.

It is also important to note that the sustainability of future rural water systems may require much greater efforts in maintenance. The current gravity-based systems are relatively easy and cheap to maintain, but most future systems will have to be more complex, requiring pumps that need constant maintenance. Therefore, more resources will be necessary in the future for the sustainability of immediate project outputs.

4. CONTEXTUAL FACTORS

4.1 Natural Disasters

Reconstruction of water supply and sanitation systems by the 1976 earthquake diverted resources from the ongoing water supply and sanitation projects of INFOM and the Ministry of Health. Damaged systems were restored to their former operating levels, but at a cost of delayed implementation of new projects. There is no indication, however, that the long-term sustainability of either rural or urban water supply and sanitation systems was affected.

4.2 Political Environment

Water supply and sanitation projects seem to have enjoyed some independence from the many changes in government in Guatemala. Growth in this sector continued throughout different types of political regimes and appears to have been unaffected by other political pressures. This independence can be attributed to the high degree of reliance on municipalities or rural communities rather than on the Ministry of Health for maintenance of water systems and latrines constructed during the projects. As for replication, the high degree of national commitment and the continuing availability of funds from external sources have led to an increase in water supply and sanitation activities despite political changes.

4.3 U.S.-Government of Guatemala Relations

Changes in bilateral support seem to have had more influence on the start-up of new programs than on sustainability. For instance, the largest A.I.D. program efforts--SCISP, the PVO projects starting in 1984, and the expansion of the DSM project in 1984--all came during periods of favorable U.S.-Guatemalan relations, whereas SCISP activities stopped during an unfavorable period (1951-1954).

In terms of overall A.I.D. policy, support for water supply and sanitation projects has increased during the 1980s in Guatemala while declining in most areas of the world. This increased support is too recent for an evaluation of its impact on sustainability.

4.4 Sociocultural Context

The strong, traditional organization of indian communities is a key factor in the sustainability of water supply projects in rural areas. Even with minimal training, these communities have generally been able to maintain the systems and collect fees for their repair.

However, strong sociocultural traditions have had a negative impact on the sustainability of the latrine projects. Indian communities are reluctant to build and use latrines, and strong health education programs are needed to (interviews with Ing. Calderon, Dr. Cerezo, Ing. Garcia Valle, and CARE, and Aguadel Pueblo officials).

Sociocultural factors do not appear to have had much influence on the sustainability of water supply and sanitation projects in urban areas.

4.5 Economic Context

The weakness of the Guatemalan economy has made it difficult for the agencies responsible for A.I.D.-assisted investments to provide the necessary funds for operations and maintenance or replication without external support. The large amount of external assistance has cushioned the sector from the effects of changes in the domestic economy.

It appears that minimal levels of operation and maintenance can be achieved even during economic downturns because of the low-cost technologies employed in both the urban and rural systems. Systems in both sectors would probably be more sensitive to economic downturns if they relied on the more complicated and costly pump-based systems.

4.6 Private Sector

Private voluntary organizations (PVOs) have implemented a number of A.I.D. projects. The existence of several effective PVOs provided A.I.D. with an acceptable option to the use of public sector implementing institutions. However, there are no studies comparing the relative effectiveness of public versus private sector implementation of water and sanitation services. The public sector has by far the most important water and sanitation organizations and, as in the case of current CARE projects, implements some projects for PVOs.

4.7 Implementing Organization

INFOM and DSM, the two major implementing institutions that A.I.D. has assisted, have very different organizational characteristics. Over the years, INFOM has developed adequate technical capabilities and a stable organizational structure and is recognized as a separate agency with clearly defined institutional goals, policies, and project routines. A.I.D.'s investments with this agency have been particularly well sustained.

With DSM, the situation is different. DSM suffered a loss of trained personnel to UNEPAR during the 1970s and has experienced the institutional instability associated with that decline in role and resources. It is not as well organized and administered and does not have the national economic resources that are available to the urban-based institutions.

Both INFOM and DSM, however, have centralized vertical hierarchies and are relatively independent of the rest of the health sector. This lack of integration is common in water supply and sanitation agencies in most countries and suggests that vertical and centralized institutions may be more effective implementors of this technology. UNEPAR, which is somewhat decentralized may be an exception to this conclusion.

4.8 Other Donors

The presence of two large and influential donors (A.I.D. and IDB) and several smaller ones has contributed to fragmentation of the rural water supply and sanitation systems. As a result, coordination is poor, standards of design and cost-recovery practices vary widely, and project effectiveness is impaired. Despite the formation of COPECAS--the national coordinating agency for water supply and sanitation services--little has been done to ensure that more cost-effective designs and consistent cost recovery practices are developed. The implications of this fragmentation are more severe for the future (as projects become more complex) than they are for sustaining past and current investments.

For the SCISP and INFOM projects, donor involvement has had a more positive effect. Almost continuous IDB financing for INFOM has provided the necessary sequencing to enable INFOM to sustain its own projects and those of the original SCISP program.

It is worthwhile to point out that political interests and international support for the International Water Supply and

Sanitation Decade have ensured that funds have been and likely will continue to be available.

4.9 National Commitment to Project Goals

Water supply and sanitation projects have had strong national commitment in the past and continue to be one of the highest Government priorities. Undoubtedly, this factor has shaped the context of and provided support for the whole sector. However, there is considerably greater interest in providing services for urban areas than for rural areas, and the greater sustainability of urban projects may reflect this emphasis.

5. PROJECT CHARACTERISTICS

5.1 Project Negotiation Process

Although little information is available on the older projects, it appears that for all types of water supply and sanitation projects, the negotiation process was based on mutual respect and involved the participation of Guatemalan counterparts. Only with the project implemented by CARE was there some friction over how the project was to be implemented (Giron). Ministry of Health personnel reported that the USAID Mission insisted that community participation and health education efforts on this project (elements of sustainability) be subordinated to the need to implement projects quickly in areas of civil unrest. However, the impact of this conflict on the project's sustainability is unclear.

5.2 Institutional Organization and Management

The SCISP era projects, the water supply, sanitation, and housing projects of the 1950s and the 1960s, and the ERIS project all included long-term advisers to help develop the capabilities of project counterparts. Subsequent projects have not had significant institutional development components. Several Guatemalan informants remarked that A.I.D.'s failure to address institution building, to work closely with Guatemalan counterparts, and to participate in sector coordination (COPECAS) contributed to crucial weaknesses in the water and sanitation sector.

5.2.1 Vertical Versus Horizontal Design

Water and sanitation projects tend to be vertically organized because their implementing institutions tend to be autonomous from other health sector activities, even when they are subunits within the Ministry of Health. However, there is a difference between projects that are well integrated into a vertical organization and those that retain a separate existence even within the water and sanitation institutions.

The more successfully sustained U.S.-supported projects were integrated into the INFOM structure and into established PVOs, whereas the less successfully sustained rural projects appear to have contributed to institutional fragmentation, even within subunits of the Ministry of Health. Within UNEPAR and DSM, each project is run as a separate program, and there is little integration with other water and sanitation projects. The relatively unsuccessful small communities projects of the 1950s and 1960s also appear to have been poorly integrated into Guatemalan institutions.

It seems fair to conclude that integration, even in a relatively vertically organized sector such as water and sanitation, is important for sustainability.

5.2.2 Managerial Leadership

Projects during the SCISP era were noted for their managerial leadership and good administration. Both factors contributed to the effectiveness of the projects and to their ability to influence and motivate other institutions--especially those that would sustain the project components. The INFOM projects also had good leadership and administration, which allowed INFOM to take over and sustain the A.I.D. investments in the urban regions.

The DSM water and sanitation projects were plagued by poor management and inadequate administrative capabilities. These weaknesses may have contributed to a lessening of sustainability of these projects relative to those implemented by other institutions. However, Agua del Pueblo also had some initial management problems that do not appear to have affected the sustainability of its projects.

Overall, management and administrative capability were important sustainability factors for the urban-based SCISP and INFOM projects, which required these institutions to maintain the systems; these factors may be less important for the PVO and DSM

projects because most of the burden to sustain those projects is on the communities.

ERIS deserves mention because of the impact of its management and administration on the success of the school, particularly during its early years. However, political infighting at the school led to a decline in the quality of leadership and administration. Recently, both the management and administration of the school have improved, and the institution is regaining its former image as a valuable asset (Solares).

5.2.3 Administrative Systems and Training

Good training programs were the hallmark of the SCISP era and probably contributed to the sustainability of SCISP projects. The ERIS project was also highly dependent on good training. The majority of Guatemalans trained through SCISP and ERIS have returned to or stayed in Guatemala (Solares, Cordon, Quesada, Olivero). Moreover, because of the continuous growth of the water and sanitation services over the years there has been sufficient capacity to absorb trained professionals and workers.

The INFOM, PVO, and DSM projects have all had some administrative training assistance, but commentators note that training has been insufficient to markedly improve the organizations' effectiveness or the sustainability of their activities. This has been less serious for INFOM, which has received training from other sources. But for the PVO and DSM projects, the lack of adequate administrative training seriously affected the absorptive capacities and capabilities of the institutions. Again, because of the high level of external financing and community maintenance of rural water and sanitation systems, this lack of training will have more impact on the sustainability of future, rather than existing projects.

5.3 Financing

Continuous financing of investment and particularly of operational costs is one of the key sustainability factors in all waters and sanitation projects except ERIS.

5.3.1 National Absorption of Project Costs

Few water and sanitation projects have required that national counterpart funds be used to cover more than personnel costs in the implementing agencies, which are only a small

fraction of the costs of putting in new systems. The large amount of external funding seems to be having a particularly pronounced effect on DSM, whose portion of the Ministry of Health budget has declined. Water and sanitation institutions that were created or supported by A.I.D. projects seem to have been sustained regardless of the national absorption of funding, in part because follow-on funding from other donors has made such absorption unnecessary.

In urban-based projects of INFOM, however, the municipalities appear to be able and willing to provide for maintenance costs that are essential for sustainability. Some rural communities, especially those in which recent projects emphasize education and community participation, are also successfully assuming maintenance costs.

5.3.2 Foreign Exchange Requirements

Foreign exchange requirements have not been a problem for maintaining water and sanitation systems. Municipalities have been able to obtain materials and supplies (e.g., pumps, treatment equipment), while projects in rural areas have been able to minimize the need for foreign exchange by using locally manufactured parts and readily available imports.

Foreign exchange requirements for new systems (e.g., for the purchase of pipe and other construction material), however, may be prohibitive for national accounts. However, since these costs are usually covered by international donors, there is no evidence for evaluating whether the foreign exchange burden would otherwise have affected sustainability.

5.3.3 Trade-Offs Among Government Priorities

Since water and sanitation projects are heavily supported by external financing, there is no indication that Ministry of Health support for these projects has reduced the funding available for other Ministry of Health programs. In fact, the opposite seems to have happened in DSM, whose 0.5 percent share of the Ministry of Health budget is inadequate for operations and maintenance of its systems at acceptable levels. Reportedly, DSM is competing for Ministry of Health funds with curative services and child survival activities.

5.3.4 Cost Recovery

Widespread cost recovery (with some water metering), together with national budget support and tax rebates to municipalities, has enabled urban water supply and sanitation systems to achieve sustainability. In rural areas, the use of low-maintenance (gravity) systems coupled with a high (compared to other Central American countries) cost-recovery rates has permitted communities to achieve at least a minimal level of sustainability.

5.3.5 Cost-Effectiveness

Projects of the SCISP era were noted for their efficiency and the absence of corruption (Solares, Cordon). Since that time, many A.I.D. projects have been inefficient--partly because of poor administration and partly because of low implementation capacity. A.I.D. projects are perceived to be high-cost projects because of the lack of attention to efficient use of available resources (Giron).

5.4 Project Content Aspects

5.4.1 Project Design

Poor project design and lack of clarity of goals seem to have been a fatal flaw in only one of the projects--the Community-Based Health and Nutrition project with DSM. In that project, the strategies for integrating water supply and sanitation services with other health activities were unworkable, and the project had to be redesigned.

Most of the rural water supply and sanitation projects have been seriously deficient in health education; some have also failed to provide for community participation. Although DSA has some education programs and the rural health technicians from the Ministry of Health provide some education in health and community organization, the effectiveness of these activities varies considerably from project to project. Only Agua del Pueblo projects appear to have consistently provided education in health and community organization. Because health education and community organizing have been insufficient, the expected level of benefits from the projects has probably not been achieved, and some of the project components have probably not been sustained (Solares, Garcia Valle). This is certainly the case with most of the rural latrine programs.

5.4.2 Training

Except for SCISP projects, training is reported to have been largely deficient. Training of beneficiaries through education programs appears crucial to the sustainability of rural water systems and is particularly important for latrine projects. Projects that provide for this training--for example, Agua del Pueblo--are more sustainable than those that do not.

5.4.3 Supplies and Logistics

The SCISP and DSM projects strengthened logistics systems and improved counterpart capabilities for effective project implementation. The DSM Community-Based Health and Nutrition project is particularly noteworthy since it established a good, regional project center in Totonicapan, which is likely to continue as a decentralized DSM operation once the project terminates.

5.4.4 Technical Assistance

Technical assistance was extremely helpful during the SCISP period. Although there was only one U.S. adviser (and nine Guatemalan staff members) at any one time, short-term technical assistance was also provided and engineers returning from training in the United States also contributed to the overall provision of technical assistance and training. However, Guatemalan counterparts were not specifically trained to take over projects, the abrupt end to SCISP projects in 1963 created some dislocation.

The ERIS project was in essence a technical assistance project and was also geared to training counterparts to take over the management of the program after the project ended.

Technical assistance and training were reported to have been weak in the A.I.D. projects of the 1970s and 1980s. There is no indication for the water and sanitation projects that A.I.D. imposed technical assistance or that Guatemalans considered the technical assistance to be unacceptable.

5.4.5 Appropriate Technology

The use of appropriate technology (gravity systems) in both the urban and rural water supply projects has been a key element

in their sustainability. Coupled with cost recovery and local availability of materials, appropriate technology has enabled municipalities and rural communities to be largely self-sufficient. In the rural sanitation projects, however, neither the simple dry-pit latrine nor the compost latrine has been acceptable to much of the indigenous population, and the search for an appropriate technology should continue in order to improve the sustainability of rural sanitation projects.

5.5 Community Participation

Community participation has not been a factor in the sustainability of the urban water and sanitation programs, but it has been very important in rural areas, where the communities have taken responsibility for maintaining the water systems. However, community participation, as reflected in efforts of implementing institutions to promote rural water and sanitation projects through community organizations and health education efforts, has been either inadequate or completely lacking in rural programs. Only some of the Agua Del Pueblo and CARE projects have had a major project focus on this area. Thus, community participation, where it has been self-generated, has been a key element enabling rural communities to achieve a minimal level of sustainability in water systems. External efforts at generating community participation and in health education, particularly with respect to latrine projects, has been far less successful.

5.6 Project Effectiveness

Almost all the water and sanitation projects were viewed by informants as having successfully achieved their goals and objectives. While this perception may not be fully confirmed by actual health benefits achieved, it is clear that compared with other types of health projects, water and sanitation projects have a good reputation for effectiveness.

6. SUMMARY AND CONCLUSIONS

Overall, A.I.D.'s investments in water systems in both urban and rural areas and sanitation systems in urban areas have been sustained, although those in urban areas seem to have been more successfully sustained than those in rural areas. The rural sanitation (latrine) programs have been the least sustainable.

The urban water supply and sanitation projects owe their success to both contextual factors and project characteristics. Among contextual factors, a high level of national commitment to project goals; the sequencing of donors assistance, which provided a steady flow of funds; and the quality of the implementing institution, INFOM, which also provides assistance to the municipalities that built systems under SCISP, have influenced the sustainability of urban projects. The key project characteristics important to project sustainability have been financing (including cost recovery), institutional organizations and management, and project effectiveness. The essence of the urban situation is that the municipalities have been able to operate their systems because they receive good technical assistance and financing from INFOM, with IDB support.

In the rural sector, the most important contextual factors that have favorably influenced project sustainability are high national commitment and sociocultural influences (strong, indigenous community organization). Project characteristics that have been the most important to project sustainability are financing and the use of appropriate technology. The use of gravity systems, with their minimal maintenance requirements, permits the decentralization of the operations and enables communities to maintain their system without central Government support. However, since future systems will have to be more complex, Government support for system maintenance is likely to become more important.

Although rural water supply and sanitation projects are affected by the same factors, these factors can operate in opposite ways. For instance, sociocultural factors have strengthened community capacity to maintain water systems but have worked against the acceptance of latrines. Moreover, while projects have applied an appropriate technology for water systems, they have not yet produced a latrine design that is widely accepted in rural areas.

Finally, it is worth noting that during the course of this study, a number of Guatemalans pointed to the lack of A.I.D. involvement in sector coordination and institutional development as a critical shortcoming.