

**The Housing Infrastructure Sector in Costa Rica:  
Prospects for Financial Self-Sufficiency**

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**Prepared for  
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## I. SUMMARY

### A. Introduction

In April, 1988, USAID/Costa Rica commissioned a study that, according to its scope of work, "would conduct a diagnostic analysis of problems affecting increased low cost housing production, related to the present lack of water and sewage services in urban and rural areas of the country". Its primary objectives in undertaking this examination were, first, to assess the management and planning capabilities of the housing infrastructure sector and, more importantly, to gauge its financial self-sufficiency and to determine what measures could be taken to increase it.

This study, therefore, begins with an overview of the institutional framework within which infrastructure decisions are made for the country at large. Secondly, it describes Costa Rica's housing infrastructure and its relation to the projected housing demand for the coming years. Following that is a chapter which describes recent investment in the sector and prospective sources of new capital.

In addition, the study identifies the principal international lenders who are expected to finance the major part of a forthcoming capital investment program, and assesses their investment policies. Finally, the study concludes with some observations on these investments and, of primary importance, with several recommendations for considering new cost recovery measures which may help hasten financial self-sufficiency.

B. Background

The 1980's posed three major problems for Costa Rica's housing infrastructure sector. First, it had to increase substantially its technical and managerial capacity, which had fallen to unacceptable levels. Second, it had to carry out its ongoing operational and maintenance responsibilities and, at the same time, expand its water and sewerage services to meet the needs of a growing population and a developing economy. And, thirdly, it had to capture the resources, both local and international, to adequately fund this capital expansion.

Having met a major portion of each of these challenges, the providers of water and sewerage now face an additional task for the 1990's, that of generating even more local revenues. These are necessary both to fund additional capital investment and to service a greater share of the sector's growing hard currency debt. In the 1970s and for most of the 1980's, these foreign debts were the responsibility of the central government, not of the infrastructure agencies themselves. As of 1990, however, this policy is scheduled to change and the sector's projected annual debt service that year will jump to \$10.9 million compared to \$2.2 million and \$3.5 million in 1988 and 1989 respectively.

This need for increased revenue will challenge the sector to provide even better service in order to justify the higher rates which it must inevitably charge. It may also lead the sector to experiment with special fees and assessments as sources of new revenue rather than relying, as in the past, almost exclusively on conventional tariff income.

C, Capital Investment

Although the country's population went from slightly over 2 million in 1975 to over 2.5 million in 1985 (a 25% increase), public expenditure for water and sewerage services during that period decreased by 50%, as a proportion of total government spending. Similarly, in 1980 the two major public water and sewerage providers spent a sum equal to .8% of the GNP. But by 1987, that percentage declined to .4%. These agencies now hope to counteract this trend and are making ambitious plans for increased future capital investments. They plan to invest an average of \$48 million per year over the next five years to meet projected demand, in contrast to an actual expenditure of \$14.6 million per year since 1980. Nearly 60% of this money is scheduled to come from international loans.

D. AID Perspective

AID's purpose in addressing these problems is threefold. First, it is interested in helping Costa Rica to meet its water and sewerage needs for the near future so that AID's assistance in reorganizing the housing finance sector and in helping to increase production not be frustrated for lack of adequate infrastructure.

Second, AID would like to encourage the institutions that provide these services to do so in the most cost-effective manner possible so that infrastructure costs do not unduly raise the ultimate price which low- and moderate-income homeowners must pay for their new homes.

And third, AID is concerned that the Costa Rican infrastructure sector meet an increasingly greater share of the costs of operating, maintaining, refurbishing, and expanding its services so that it may reduce its dependence on international lenders.

As for the first concern, that of a possible short-term infrastructure shortage, there is no evidence that, in the next two to four years, a lack of water or sewerage services will keep housing production from reaching the levels now projected by the GOCR. This is due, in part, to AID's recent infrastructure grant through the Instituto de Fomento y Asesoría Municipal (IFAM), which will have facilitated the approval of over 18,000 building permits throughout the country, by the end of 1988. A successor project to be financed through AID Housing Guaranty funds is now under discussion.

As for the second concern, that of management reform and increased productivity, Acueductos y Alcantarrillados (AyA), with the support of the major international lenders in this sector, is steadily improving its management, technical and planning capacity as are the municipalities which have charge of their own water and sewerage systems.

In the third area, that of financial self-sufficiency, most national authorities recognize the need to lessen dependence on foreign loans over the long term. Nevertheless, there has been limited interest in exploring new sources of local revenue.

E. Recommendations

This study recommends three complimentary courses of action.

First, there are ongoing efforts within AyA and in many municipalities to sharpen management and technical skills, eliminate widespread leakage, improve metering and billing, raise productivity, and make better use of available resources. To the extent that this happens there will be a corresponding drop in the need for outside capital financing. AID should encourage donor agencies to expand this assistance where possible, and should also be responsive to requests for training and technical assistance from those local institutions not now receiving such support.

Secondly, AID, in concert with other lenders, should encourage AyA and IFAM to take an investment based, integrated approach to new infrastructure investment and not simply to expand for expansion's sake. This may require technical assistance in planning effective water and wastewater treatment investments which take into consideration not just population growth, public health concerns, and the need for greater service "coverage", but the infrastructure implications of such factors as economic development, population density, and increasing environmental pollution in urban areas. There are two recent Housing Ministry initiatives in this area. First, the Ministry is in the early stages of designing a pilot project involving both national and municipal officials in an integrated infrastructure planning and

development exercise. Second, it is now in the midst of updating the Greater San José land use plan. AID may want to consider assisting in these two efforts, since municipal and regional authorities in the U.S. have accumulated substantial expertise in both areas.

The third, and most important, group of recommendations calls for AID to encourage improved cost recovery measures at both the municipal and national level. This means that AID should continue its ongoing policy dialogue with the GOCR concerning this matter and should also consider future requests for assistance in experimenting with new tariff as well as non-tariff sources of revenue in order to support the long-term objective of increased self-sufficiency.

This effort could begin with the selective use of participant training for municipal and national officials, and be followed by a high level exchange of technical, financial, and governmental personnel from the U.S. Eventually, a program of this sort could lead to a consensus among local officials that the need for more local financing will not diminish and that the time has come to consider experimenting with special assessments, impact fees and other non-tariff revenue measures. If so, it would have achieved its objective, which would be to give Costa Rica a better understanding of the problems at hand and to suggest some alternatives for solving them.

## II. INSTITUTIONAL FRAMEWORK

The decisions which lead to building water and sewerage systems in Costa Rica originate with several overlapping and sometimes competing governmental agencies. This section indicates how these institutions define their formal roles and, by contrast, how they actually do business and manage to avoid jurisdictional conflicts.

### A. Principal Institutions

The country's housing infrastructure sector is made up primarily of AyA, IFAM, and Costa Rica's 85 municipal jurisdictions.

1. The "Instituto Costarricense de Acueductos y Alcantarillados" (AyA) was created in 1961 to plan, design, build, and maintain the country's water and sewerage systems. In practice, it maintains and operates 38 of the country's 85 municipal systems and has design approval authority over the rest. These 38 systems serve slightly less than half the population.

2. The "Instituto de Fomento y Asesoría Municipal" (IFAM) acts as advisor to the country's municipal governments on all municipal services, and channels to them formula allocations and loan funds for everything from solid waste disposal service to the building of bus terminals. Much of the country's water and sewerage systems has been built with IFAM financing and technical assistance. A total of 47 water and sanitation systems are operated and maintained by individual municipalities with advice from IFAM. These systems serve the remainder of Costa Rica's population.

3. The municipalities make up the third major element in the infrastructure equation. They are free to apply or ignore national infrastructure priorities and usually set low tariff rates for the services that they provide so that local elected officials may avoid the wrath of constituents. Only when the quality of those services becomes intolerable are they forced to approach AyA or IFAM to finance new or refurbished infrastructure. At that point, they face the prospect of charging realistic rates, since both institutions require, as a condition of this aid, future tariffs that begin to cover the real cost of debt service, maintenance and operation, plus an additional 5% to 10% reserve for future construction.

A new Arias administration proposal, which will be presented to the Costa Rican Legislative Assembly later this year, calls for shifting to the municipalities many of those services which are now national responsibilities, with a corresponding shift in tax revenues. At present,

municipalities collect, in local fees, an amount which is equal to approximately 2% of the national budget. In addition, they receive, the equivalent of 3% of the budget from nationally collected taxes and fees specifically earmarked for their support. The administration proposal would add 2.5% of general revenues to this amount in 1990 and another 1.5% every two years until reaching a total of 10% in the year 2000. Thus, municipal revenues would go from the equivalent of 5% of the national budget to 15% in 10 years. No decisions have yet been made on exactly which services the municipalities would assume, but most observers agree that many more municipalities or regional groupings would take charge of their water and sewerage if these revenues were forthcoming.

B. Other Participants

The Servicio Nacional de Electricidad (SNE) has formal approval authority for the country's tariffs. It generally approves direct AyA requests or municipal rate requests which are prepared by AyA or IFAM. AyA indicates that in recent years SNE has gained a greater understanding of AyA's income requirements and tends to approve most rate hike requests, provided increases do not exceed the rise in the cost of living in any given year.

The infrastructure investment decision making process also includes the Ministry of Finance and the Central Bank, which must approve the financing for new projects either through budgeted funds or international loans, and the Ministry of Planning (MIDEPLAN), which not only shares approval authority with the first two entities but also has the formal responsibility for coordinating infrastructure investment within overall national economic development policy.

Typically, AyA will propose a major capital investment and MIDEPLAN's Investment Department will review it in conjunction with its Health Sector Office and its Regional Planning Department. At the height of the annual review cycle, the Investment Department's eight staff members review 50 agency plans in approximately 30 days. In MIDEPLAN's history, there has never been a major revision of an AyA infrastructure investment proposal.

Another interested party is the Housing Ministry which, through the Instituto Nacional de Vivienda y Urbanismo (INVU), is responsible for enforcing the urban development plan for the San Jose Metropolitan area. The "Plan Regional de Desarrollo Urbano, Gran Area Metropolitana" (GAM) was published in 1983 and regulates land use in Costa Rica's Central

Valley, which contains four of Costa Rica's six major cities and nearly half of its 2.8 million inhabitants. The GAM's zoning restrictions have been enforced primarily by INVU's refusal to grant building permits for homes and their related infrastructure in areas designated for agricultural, conservation or other uses.

### C. Priority Setting

AyA has a complex method of setting new construction priorities which amounts to little more than projecting present trends in population growth and attempting to stay ahead of demand for water and sewerage services. It maintains a "worst first" approach to new investment which attempts to expand, refurbish, or replace those systems most in need.

Although future economic growth is considered in this process, AyA's budget is presented to the Congress by the Ministry of Health and it is, therefore, greatly influenced by the Ministry's goal of sustaining present public health standards. AyA's capital investments, then, are influenced more by public health considerations and less by a clear set of economic development goals. Exceptions to this approach include the high AyA priority given in recent years to the government's new duty-free zones in Alajuela, Limón, Cartago, Quepos and Puntarenas.

IFAM's investment planning consists of weighing the often competing demands of the 47 municipalities that depend on it for technical assistance and capital financing. It tends to respond to urgent,

short-term, demands rather than planing and implementing long-term proposals which are part of an overall infrastructure investment policy. Its priorities are based on demonstrated need, municipal government support, likely international financing, and the availability of projects which are already designed and ready for public bids and construction.

As can be seen, there is no central infrastructure planning and financing authority in the country, nor are there agreed-upon priorities for major infrastructure investments. AyA, however, effectively dominates the sector, and major projects not considered worthy of AyA financing are carried out only in those rare cases where IFAM or a given municipality receives a direct international loan or grant.

### III. INFRASTRUCTURE AND HOUSING PRODUCTION

This section addresses the interdependence between housing and infrastructure, and the costs of postponing needed services. It also describes the increasing demand for water and sewerage facilities in light of the projected growth in housing "starts" in the next three years.

#### A. Housing Infrastructure

In addition to the obvious relationship between water, sewerage, and housing, there is a more basic, long-term interdependence that is best expressed by Alfred Van Huyck as follows:

"The economics of infrastructure, like land, is often viewed independently from housing, yet it is in reality a key factor affecting housing investment productivity. In many countries, substantial amounts of housing stock lie dormant because essential infrastructure has not been supplied. The stream of benefits from the housing investment are postponed, carrying costs mount, and productivity is sacrificed. Most urban centers in developing countries have very large infrastructure deficits in existing settlement areas. The effect is to lower the incentive to households to invest in the improvement of their units. In addition, the failure to require infrastructure for new land areas as they are developed will increase the price of such land when it is serviced later, thereby raising the ultimate cost of the housing units." 1/

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1/ Van Huyck, Alfred, "The Economics of Shelter in Development."

Costa Rica clearly illustrates Van Huyck's point concerning chronic infrastructure deficits (see Appendix C), which, in this case, are exacerbated by high rates of population growth. The country's population is scheduled to rise to 3.7 million by the year 2000 compared to 2.6 million in 1985. As seen below, this translates into a projected need for 946,198 units in 2000 — nearly twice the number of units needed only 15 years earlier.

TABLE 1

PROJECTED HOUSING NEEDS

(1985 - 2000)

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<u>Year</u>	<u>Population</u>	<u>Required Units</u>	<u>Occupants Per Unit</u>
1985	2,642,073	569,722	4.64
1990	3,014,596	692,066	4.36
1995	3,374,026	818,740	4.12
2000	3,710,656	946,198	3.92

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Source: Centro Latinoamericano de Demografía (CELADE)

B. Costs of Postponing Infrastructure Investment

The Central Valley Master Plan, Appendix B, spells out in detail the costs of postponing needed services and, specifically, the cost of postponing adequate sewerage systems by relying, instead, on septic tanks for waste disposal.

One cost is that of the septic tank itself and the added land required for its installation. This can add more than 10% to the final sales price of a housing unit and thus force prospective low-income purchasers to either drop out of the market or to accept a smaller, less costly dwelling to compensate for the added cost.

Another cost, borne by the community at large, is the faster utilization of available land. As seen in Appendix B, single-family dwellings which depend on septic tank disposal utilize an average of 25% to 30% more land than those which are part of a central sewerage system.

This more rapid land utilization, in turn, leads to a third cost factor, urban sprawl. When high-density growth is made impossible by an inadequate sewerage system, then roads, water and all other services increase in cost by virtue of having to be supplied over a greater distance and of losing those economies of scale associated with high density construction. In addition, urban sprawl means more land devoted to shelter and infrastructure and less to recreational and related uses.

### C. Housing Production

The growing demand for housing related infrastructure is more clearly seen when one compares the units produced in the recent past with those projected through the end of the decade.

TABLE 2

Housing Production  
(000 units)

<u>Actual</u>										<u>Projection</u>		
<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
17.9	17.9	18.1	15.4	13.5	14.4	17.0	13.0	15.5	22.0	26.0	28.0	30.0

Source: Instituto Nacional de Vivienda y Urbanismo (INVU)  
USAID/Costa Rica

As can be seen above, the country produced an average of 15,900 new units each year in the nine years before the reorganization of the housing finance sector in late 1986. Now, however, the high priority given to housing by the current government and the increased mobilization of resources by the sector is expected to increase annual production by over 66% to a projected 26,500 from 1987 to 1990.

Although these projections may seem ambitious given past performance, they, nevertheless, lag slightly behind the most recent projections of actual demand, which predict a need for nearly 28,000 new units each year.

#### IV. INVESTMENT TRENDS AND SOURCES

This chapter will describe AyA's and IFAM's recent capital investment history as well as their plans for the coming years. As mentioned earlier, even though Costa Rica invested over \$116 million in housing infrastructure between 1980 and 1987 (Table 5A and 5B), its relative investment has declined in the last decade. What continues to increase, however, is its reliance on foreign investment capital.

##### A. Investment Levels

The relative investment in water and sewerage has been steadily diminishing over the last decade. As seen in Tables 3 and 4, infrastructure investment accounted for 2.84% of public expenditures in 1975 and, 10 years later, represented only 1.29%. The same pattern is evident when compared to the gross national product, with water, storm sewer, and sanitary sewerage accounting for .8% of GNP in 1980 and only .4% in 1987. In spite of this decline, AyA and IFAM capital investment projections for the five years beginning in 1988 call for a 330% increase in annual spending compared to actual expenditures in the first eight years of the decade, as seen in Tables 5A and 5B.

This threefold increase translates into a projected annual average investment of \$48 million in each of the next five years, compared to an average of \$14.6 million in actual expenditures in the years 1980-87.

Public Water, Storm and Waste Water  
Investment as a Percentage of Gross National Product  
(C millions)

<u>YEAR</u>	<u>GNP</u>	<u>AyA-IFAM</u> <u>Investment</u>	<u>%</u>
1980	41,405.5	359.1	.8
1981	57,102.7	215.1	.3
1983	129,314.0	321.7	.2
1985	197,919.8	919.9	.4
1987	282,806.0	1,141.2	.4

Source: Central Bank  
Acueductos y Alcantarillados (AyA)  
Instituto de Fomento y Asesoría Municipal (IFAM)

TABLE 4

Public Water and Sewerage Expenditures  
as a Percentage of Total Public Sector Costs  
(C millions)

<u>Year</u>	<u>Total Public</u> <u>Sector Costs</u>	<u>Water and Sewerage</u>	<u>%</u>
1975	7,753.6	220.4	2.84
1980	25,900.1	361.1	1.39
1985	113,758.6	1,417.3	1.29

Source: Vargas, Thelmo, Análisis del Gasto Público en Costa Rica

TABLE 5 A

INFRASTRUCTURE CAPITAL INVESTMENTS  
(\$ Millions)

ACUEDUCTOS Y ALCANTARILLADOS

<u>Actual</u>							
<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
33.9	7.4	4.5	7.1	6.5	14.2	13.9	16.2
<u>Projections</u>							
<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>			
33.5	47.3	36.7	50.9	47.6			

Source: Acueductos y Alcantarillados (A y A)

TABLE 5 B

INFRASTRUCTURE CAPITAL INVESTMENTS  
(\$ Millions)

INSTITUTO DE FOMENTO Y ASESORIA MUNICIPAL

<u>Actual</u>							
<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
.05	.01	—	.6	.7	.2	.06	11.2
<u>Projections</u>							
<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>			
6.9	5.8	5.8	5.8	*			

Source: Instituto de Fomento y Asesoría Municipal (IFAM)

\* Data not available

Table 6 shows that actual expenditures by AyA for potable water systems in the 1980-1987 period accounted for \$94.4 million while sewerage construction totaled \$8.92 million. The \$12.8 million in IFAM-financed infrastructure during this period was split as follows: \$4.3 for water projects, and \$8.5 million for storm drainage. For the next five years, IFAM plans capital investments only in water, while AyA will devote 79% of its projected \$216 million budget to water and 21% to wastewater removal and treatment projects.

In the Central Valley, these investment projections will be greatly influenced by two major technical studies that have been recently commissioned by AyA on wastewater and potable water systems. These studies will be carried out during the next 12 months by a well-known international engineering firm (Tahal Consulting Engineers, Ltd.) and are expected to be the definitive documents for the renovation and expansion of the Central Valleys' water and sewerage systems.

TABLE 6

INFRASTRUCTURE INVESTMENTS BY SERVICE

(\$ Millions)

Acueductos y Alcantarillados

	Actual								Projections				
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
<u>WATER</u>	28.0	6.54	3.84	6.84	6.1	14.2	13.27	15.59	24.5	38.3	27.7	41.9	38.6
<u>SEWERAGE</u>	5.9	.86	.66	.26	-	-	.63	.61	9.0	9.0	9.0	9.0	9.0
<u>TOTAL</u>	33.9	7.40	4.5	7.1	6.1	14.2	13.9	16.2	33.5	47.3	36.7	50.9	47.6

Instituto de Fomento y Asesoría Municipal

	Actual								Projections				
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
<u>WATER</u>	.05	.01	-	.4	.5	.2	.06	3.1	6.74	5.14	5.14	5.14	*
<u>SEWERAGE</u>	-	-	-	-	.2	-	-	-	.16	.66	-	-	-
<u>DRAINAGE</u>	-	-	-	.2	-	-	-	8.1	-	-	.66	.66	-
<u>TOTAL</u>	.05	.01	-	.6	.7	.2	.06	11.2	6.9	5.8	5.8	5.8	-

\* Data not available

Source: Acueductos y Alcantarillados  
Instituto de Fomento y Asesoría Municipal

B. Prospective Sources

As seen in Table 7, AyA's \$216 million capital budget for the 1988-92 period will rely principally (56%) on foreign loans.

TABLE 7  
PROJECTED LOCAL FINANCING (C Millions)  
Acueductos y Alcantarillados  
(1988-92)

Total Projected Needs	Local Financing			Total Local Financing	%
	A y A	GOCR	Asignaciones Familiares		
C 16,206.6	2,208.0	3,440.0	1,499	7,147.0	44
\$ 216.0	29.4	45.8	20	95.3	44

\$1 = C75

Source: Acueductos y Alcantarillados

Of the projected \$95.3 million in local funds, \$45.8 million will be requested by AyA of the GOCR from tax and other revenue sources. An additional source is the "Asignaciones Familiares", which are taxes destined primarily for school lunch and other family-oriented services. Over the years, AyA has received funds from Asignaciones Familiares, primarily for the construction of rural water systems. The \$29.4 million in AyA funds represents the in-kind contribution (in tariff generated funds) which AyA staff will provide for planning, designing, and supervising the projected investments.

This degree of reliance on foreign financing is typical of Costa Rica's public sector. According to MIDEPLAN, public capital investment in 1988 will total C19,716 million of which 45% will be furnished by international lenders. This proportion will rise to 54% in 1989 and, by 1990, 58% of the country's C30,946 million in public capital investment will come from abroad.

## V. INTERNATIONAL ASSISTANCE

In the last decade, the World Bank and IDB have been the major sources of financial assistance for water and sewerage. The IDB financed the second stage of San José's sewer expansion project with a \$13.8 million loan to AyA which was approved in 1976 and fully disbursed in 1983. In 1987, the IDB began disbursing a \$28.3 million loan for water in secondary cities. The World Bank, along with the Commonwealth Development Corporation (CDC), recently financed the most important recent water project in the Central Valley, Orosi. This chapter discusses the activities of these and other international lenders.

### A. World Bank

The World Bank's \$26 million loan to AyA for the Orosi project (water for Greater San José) will be fully disbursed in late 1988, as will a complementary \$13.8 million loan for the same project from the CDC. The Bank is considering a new loan of approximately \$35 million for water and sewerage services in secondary cities outside of Greater San José and will encourage the CDC to participate in this program as well. This credit is already under serious discussion and could be approved as early as 1989.

AyA and the Bank have agreed that \$14 million of new World Bank money may be used for completing San José's water system if no other lender is found for this project. There is, however, no agreement on other proposals, since the

Bank, as of now, rules out investing funds in sewerage projects for Greater San José while AyA seems to favor using them to finance a major portion of the \$70 million sewer and wastewater treatment facilities planned for the Central Valley.

B. InterAmerican Development Bank (IDB)

As mentioned earlier, between 1976 and 1983 the IDB financed a major sewerage project in San José and, since 1987, has disbursed \$2.3 million of a \$28.3 million credit for water in secondary cities. AyA generates local revenues by re-lending this newest loan in local currency to recipient municipalities. These payments will form a revolving fund for new capital projects and will generate approximately ~~Ø~~80 million yearly, beginning in 1990.

In late 1990, when the present loan is at least 50% disbursed, IDB has indicated a willingness to follow up with a loan of up to \$60 million for water and sewerage systems. The IDB's geographical priorities, as well as the mix between water and sewerage projects, will depend primarily on AyA's stated preferences and on the results of the Tahal technical studies mentioned in Section IV A. These studies, due in mid-1989, may well indicate the need for major new sewer and wastewater treatment investment, given the population projections for the San José area, the resultant density implications, and the increasing levels of pollution in its nearby receiving rivers.

The IDB also indicates that it will take careful note of any infrastructure recommendations which the updated master plan for San José may make. The plan is now being prepared under the leadership of the Ministry of Housing and is due for publication in late 1989 or early 1990.

Like the World Bank, the IDB is urging AyA to adopt administrative and financial policies which will move it gradually towards self-sufficiency.

C. Agency for International Development (AID)

The key feature of AID's most recent involvement in the housing field has been its support for and assistance in the creation of the National Housing Bank (BANHVI) since late 1986. This support consists of the equivalent of \$50 million in local currency to be disbursed between 1986 and 1989, along with an ambitious technical assistance program to BANHVI and its client lending institutions. The goal of this financial and technical support is to firmly establish BANHVI as the country's central financial and regulatory agency in the shelter sector. The new bank's mandate calls for it to charter and regulate primary mortgage lenders, discount their mortgages, issue mortgage insurance, market mortgage-backed bonds and, through its parent Ministry (Housing), participate in all aspects of national housing policy. Table 8 gives an overview of AID's financial support to the sector through the end of 1987.

TABLE 8

STATUS OF AID'S INVESTMENTS IN SHELTER SECTOR  
(December, 1987)

<u>Public Sector</u> <u>Institutions</u>	<u>Funding</u>	<u>Percent</u> <u>Disbursed</u>	<u>Units/</u> <u>Permits</u> <u>Projected</u>	<u>Percent</u> <u>Completed</u> <u>or Under</u> <u>Construction</u>
(1) INVU	\$11.4 Million	79%	3,664	(100%)
(2) INVU	\$5.0 Million (¢215,500,000)	108%	1,213	(100%)
(3) INVU/MIDEPLAN	\$1.39 Million (¢75,000,000) \$478,000 (¢26,750,000)	-0-	400	(0%)
(4) IFAM/Municipalities	<u>\$7.0 Million</u>	<u>66%</u>	<u>6,900</u>	<u>(120%)</u>
Subtotal	\$25,267,000	75%	12,177	(108%)
<u>Private Sector</u> <u>Institutions:</u>				
(1) DECAP/SNAP	\$20.0 Million	70%	7,700	(82%)
(2) DECAP/SNAP	\$5.0 Million	100%	1,520	(61%)
(3) COFISA/OVI-OVA	\$5.0 Million (¢215,000,000)	100%	862	(100%)
(4) COFISA/Private Banks	\$5.0 Million	-0-	331	(100%)
(5) CHF/AID	400,000	N/A	336	(4%)
(6) Peace Corps/ FEDECREDITO	\$760,000 (¢41,600,000)	21%	254	(19%)
(7) BANHVI <sup>1/</sup>	\$20.0 Million	100%	12,000	(8%)
Subtotal	<u>\$56,160,000</u>	<u>67%</u>	<u>11,030</u>	<u>(70%)</u>
TOTAL	\$81,427,000	70%	36,210	(86%)

<sup>1/</sup> Projected total: \$50 Million in local currency.

Source: USAID/Costa Rica

AID has sponsored a recent effort in infrastructure investment, which will be completed in late 1988, via a series of grants to eight municipalities totalling \$7 million in local currency. The program, administered by IFAM, allows municipalities to expand their water service for added residential construction in new as well as established neighborhoods. In return for this added infrastructure, the recipient municipalities must take steps to expedite new building permits, which, until now, were not granted because of water production, storage or distribution problems. In addition, each is obligated to seek SNE approval for system-wide tariff increases which reflect the true cost of maintenance and operation for the entire municipality. To date, five of them have already done so. By the end of 1988, this program is expected to have generated over 18,000 new building permits.

D. Central American Bank for Economic Integration (CABEI)

CABEI is considering two loans: one, to AyA for \$14 million, would help build storage and distribution facilities for the increased water production of the Orosi project. The second, for \$15 million, would be channeled through IFAM for water systems in secondary cities. Like the AID grant mentioned earlier, this loan would finance infrastructure to support low-cost housing solutions in municipalities throughout Costa Rica. These \$15 million are part of a recently approved AID Housing Investment Guaranty loan to CABEI.

E. German Development Bank (KFW)

A proposed loan to AyA for \$6 million from the KFW would concentrate solely on rural water and sanitation projects.

F. Other Donors

There are indications that Finland, Denmark, Sweden, and Italy have funds available for water and sewer projects. Of these possibilities, a water and sewer grant to Heredia from the Government of Italy seems most likely. There are no firm figures available on any of these prospects.

TABLE 9

EXTERNAL FINANCING FOR PRIORITY INFRASTRUCTURE PROJECTS

Acueductos y Alcantarillados

(\$ Millions)

<u>Project</u>	<u>Proposed Lender</u>	<u>Amount</u>	<u>Under Discussion</u>	<u>Obligated</u>
Orosi (water)	World Bank-CDC	39.8	—	39.8
Secondary Cities (water)	IDB	28.3	—	28.3
Secondary Cities (sewer)	IDB	35	35	—
Urban Centers (water)	IDB	25	25	—
Storage and Distribution (water)	CABEI	14	14	—
Rural Program (water and sanitation)	KFW	6	6	—
Urban Centers	World Bank-CDC	<u>35</u>	<u>35</u>	<u>—</u>
	TOTAL	183.1	115	68.1
<u>Instituto de Fomento y Asesoría Municipal</u>				
IFAM-CABEI (water)	CABEI	15	15	—

Source: Acueductos y Alcantarillados (AyA)  
Instituto de Fomento y Asesoría Municipal (IFAM)

In summary, the GOCR is counting on various sources of external financing to carry out its infrastructure projects and the table above indicates the status of the priority loans now under discussion. As of now, however, only \$68.1 million of an expected \$183.1 million have been obtained by AyA, while IFAM has not yet received formal approval of its \$15 million CABEI loan.

## VI. CONCLUSIONS AND RECOMMENDATIONS

### A. Conclusions

It seems clear that Costa Rica's housing infrastructure sector in general, and AyA in particular, is facing problems in three major areas. First there are short-term questions on how to spend scarce capital investment dollars in the next three to five years. These involve planning and priority setting mechanisms, and will be dealt with in the first groups of recommendations below (1-3).

Secondly, there are the challenges of lowering costs and increasing efficiency in the provision of water and sanitation service. These are addressed in recommendation 4.

Thirdly, AYA must face the issue of financial self-sufficiency, including the limitations of counting solely on periodic raises in conventional tariff rates in order to increase revenue. There is, in other words, a need to examine new types of cost recovery schemes. This is addressed in recommendations 5 to 11.

### B. Recommendations

1. Future infrastructure investment should give more weight to the country's economic development goals. The priority investment criteria used by MIDEPLAN in its yearly budget and policy reviews give minimum emphasis to economic growth potential and

maximum weight to public health considerations. A more balanced approach seems warranted.

2. The Ministry of Housing is designing a pilot project which would bring an "integrated infrastructure" approach to a new or expanding housing development. The Ministry's project would gather data on all infrastructure variables (water, sewer, roads, schools, clinics, etc.) and compare the marginal costs for the various sites under consideration.

USAID should consider supporting this initiative with selective training and technical assistance, especially if it is undertaken at the local level. Such a project could help convince the public and private municipal leadership of the cost and social benefits of more carefully planned infrastructure and housing investment.

3. AyA has, in the past, favored the construction of one centralized wastewater treatment plant for the entire Central Valley, except Cartago. Because of its projected \$30 million cost, this plant may be several years away. A network of smaller plants, privately built and maintained (but subject to AyA supervision) should be considered as a viable, short-term, stop-gap solution to the problem of increasing contamination of the Central Valley's water supply. AyA should be encouraged to request that the firm now doing the technical study of the Greater San Jose sewerage system thoroughly explore this option (See Appendix B).

4. As explained by World Bank officials, a prospective \$35 million loan for water and sewer services has, as its goals: 1) to assist AyA in becoming an efficient and financially self-sufficient water supply and sewerage utility capable of providing leadership to the sector in planning, project execution and training; 2) to improve, through AyA and municipally run systems, access to water and sewerage services for Costa Rica's urban population, particularly the poor and 3) to implement a tariff structure for urban water supply services based on marginal cost criteria. In addition, the Bank will raise the issue of whether AyA should assume greater responsibility for the operation and maintenance of municipal systems or, instead, should encourage selected municipalities to operate their own systems, either alone or in concert with neighboring towns. The World Bank also intends, as part of any new technical assistance program, to set operational and administrative targets (unaccounted for water, number of illegal connections, collection-to-billing ratios, etc.) and to seek ways of reducing operating costs and of "privatizing" some services such as engineering design and construction supervision. These cost control and management objectives are a continuation of those now being pursued under the current Orosi loan, with technical assistance supplied by the Bank.

AID should support all of these goals and request that the Bank expand its management assistance program where necessary. If asked, AID should also help IFAM to provide similar technical assistance to those municipalities which may not be reached by the AyA/World Bank program.

5. Special fees (hook-ups, urbanization approvals, etc.) should be raised to cover the cost of the services involved and to contribute to urgently needed capital improvements. For example, urbanization plans for a middle income lot of 200 m<sup>2</sup> with a proposed house of 95 m<sup>2</sup> are reviewed for a total fee of C800 or about \$11. Hook up fees to these units range from C5,700 to C6,300 or an average of C6,000 (\$80). AyA readily admits that these charges are far below the real cost of providing these services (see Appendix D).
  
6. IFAM and AyA should undertake a study to determine the marginal, off-site cost of expanding water and sewer service to several high-growth communities in selected urban areas, in order to better decide whether special impact fees to new users are practical or necessary.

AyA has good records on the cost of providing a given service to a specific neighborhood, but no feel for what each new customer represents in additional public expenditure. The special assessments and impact fees outlined in Appendix A depend, in the long run, on a public perception of fairness which, in turn, requires sound data on the marginal costs of providing infrastructure, i.e. the cost of incremental growth. This data will also help local authorities to make more rational, cost effective, designations of new growth areas.

7. National and local water and sewerage authorities should cooperate to raise tariffs to more closely reflect the real costs of operations, maintenance, debt service, and future construction. Several attempts

have been made in the Costa Rican Legislative Assembly to mandate minimal rates for all municipalities and thus avoid the low, unrealistic, "political" rates that local elected leaders feel they must continue to charge. These and similar efforts should continue.

In addition, the current GOCR policy of keeping tariff increases at or below the rise in the cost of living should also be reconsidered, if the infrastructure sector is to keep up with its real costs.

8. The Heredia Water and Sewer Authority now charges developers a flat fee of C8,000 per lot to help pay for off-site infrastructure improvements built in support of new housing developments. This should be refined to serve as a model "development impact fee" for other municipalities (see Appendix A).
9. AyA and IFAM colon infrastructure credits to municipalities should carry, in the future, a mandatory interest rate adjustment clause. This will avoid the problems posed by the present fixed interest rate loans and, over time, will allow these national institutions to charge rates which more closely approach the real cost of the international long-term loans which are the source of most of these credits.
10. AyA should consider relying more on non-tariff income to move the institution toward self-sufficiency. Although AyA officials admit that present tariff income covers only routine operations and maintenance, they, nevertheless, feel that only gradual increases in tariffs, coupled with greater productivity, can generate the additional funds to pay a greater share of the real cost of interna-

tional loans and, in addition, create a reserve fund for future capital investments. But since political reality currently dictates that tariff increases not exceed the rise in the cost of living in any given year, it is most likely that tariff increases will, in the foreseeable future, barely cover continued rises in operation and maintenance costs (see Appendix D).

It, therefore, seems advisable that non-tariff options be examined as possible additional sources of income (Appendix A).

VII. APPENDICES

APPENDIX A

NON-TARIFF SOURCES OF REVENUE

Special fees, taxes, and assessments have gained currency in the last two decades in the United States because of the inability of local governments to keep up with the rising cost of urban growth. These special fees, passed on to the homeowner either directly or through the developer, help pay for a portion of the infrastructure cost heretofore absorbed by higher tariffs charged the entire system. In effect, old users used to subsidize the new. The changing trend toward charging new users a greater share of what were once considered "free", publicly financed, services has taken hold in many developing nations, as well.

In most cases the public investment in question is for "off site" infrastructure, i.e. production, storage or distribution facilities required to bring water, for example, to the boundary of the new subdivision. "On-site" infrastructure within the subdivision is, by contrast, the developer's responsibility, with the corresponding costs included in the sales price. After occupancy, this privately financed infrastructure is passed on to the local government, which then assumes ownership and maintenance responsibility.

The on-site/off-site distinction blurs when speaking of developing countries, where squatter settlements spring up in areas with little or no infrastructure. Local governments are often obligated by political forces and public health considerations to bring water, drainage, streets and other services not only to the site boundaries, but to the site itself -- all at public expense, and at no cost to the user. In many instances they do so at premium cost, since many squatter settlements "leap frog" existing communities and are not adjacent to, or even near, existing water, sewer lines, roads, and other facilities. The options outlined below are, therefore, couched in terms of revenues which can help offset all public infrastructure costs rather than solely off-site costs.

The following list of possible new revenues is by no means exhaustive. Some options, as noted, are already in use in parts of Costa Rica and in other countries in Central America. They are proposed in order to focus, as several observers have suggested, not just on the chronic shortage of funds, but on the inadequacies of the mechanisms that supply them.

A. Development Impact Fees

Impact fees are described by Stevenson Weitz as "requirements that developers help fund facilities the need for which is only indirectly and partially attributable to their projects."<sup>1/</sup> He lists, as examples, fees to help fund the expansion of water and sewerage treatment facilities, to build schools and fire stations, and to increase highway capacity at locations well removed from the development in question.

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<sup>1/</sup> Weitz, Stevenson, "Impact Fees: There Is No Free Lunch".

San Jose, California, for example, grew 37% during the 1970's (compared to 25% for San José, Costa Rica between 1975 and 1985) and has more experience with impact fees than any other U.S. city. Nevertheless, observers warn that this and several other U.S. cities have had to learn some difficult political, administrative, and financial lessons as they put these fees into practice.

The first lesson is that the revenues generated by most impact fees do not approach the true costs of serving new developments and that they must be seen, at best, as a way to mitigate, not eliminate, the growing local government infrastructure obligation associated with urban growth.

Secondly, these observers point out, the fees must be fair and flexible. Fair, in the sense that new homebuyers must pay only the portion of new investments which solely benefit them and that a corresponding portion is paid by the local government for the part of the facility which will be used by the public at large or which would have been built anyhow, regardless of new growth. (Streets and bridges are good examples.) Flexible, in that a given fee must be lowered or forgiven when it interferes with meeting other government goals. In one U.S. city, for example, the local government's desire to encourage low-cost housing led to reducing or waiving impact fees for certain developments.

In spite of these strictures, fair and flexible impact fees may have a place in meeting Costa Rica's growing infrastructure bill. In Heredia, the local water, light, and sewer authority has already begun charging a flat  $\text{C}\$8,000$  to every individual or developer that submits urbanization plans for municipal approval, in order to help cover associated off-site infrastructure costs.

Should this practice spread to other municipalities this flat charge would, no doubt, have to be replaced with a fee structure that reflected the true marginal costs involved. There is also a possibility of a legal challenge to this municipality's right to charge a new "tax-like" fee. This, too, may slow the eventual spread of this practice to other towns. Nevertheless, it is one that has an established public policy base in other countries and which may be worth exploring in other Costa Rican municipalities.

B. Infrastructure Bank

The "infrastructure bank" concept was proposed in the early 1980's in the United States. According to the proposal, individual states would convert federal grants into loans by lending to local governments from revolving accounts set up for each utility (sewer, water, roads, etc.). These revolving accounts would be established by mixing state bonds and other revenue with federal grants. The idea's proponents felt that, in the end, local governments would choose a dependable source of loan financing over a potentially attractive, but unpredictable, federal grant.

In Costa Rica there is at least one prospective European grant for financing Heredia's water system and several others in the discussion stage for other towns. A GOCR policy that would mix grants and loans for infrastructure would considerably reduce the interest rate to the majority of municipal borrowers, and, at the same time, create a permanent revolving fund for water, sewer and other infrastructure.

To initiate this kind of "infrastructure bank" policy, however, would require a major effort by the central government, since regional interests play such a decisive role in overall national policy. It would be politically difficult to convince Heredia, for example, that it should sacrifice a multimillion dollar grant for the good of the country at large.

C. Deferred Special Assessments

In two cities in Honduras, AID and IDB have cooperated with the municipal authorities in a special assessment program ("contribución por mejoras") which allows low-income homeowners in "spontaneous" or squatter settlements to help pay for infrastructure over an eight- to 12-year period.

The program is primarily for on-site infrastructure that, in non-squatter areas, would have been built at the developer's expense and passed on to the homeowner as part of the total sales price. As mentioned earlier, most on-site services in squatter areas are, however, installed at public expense. The "contribución" program attempts to reverse this tendency by passing a portion of the costs on to the homeowner, but in a fashion which even low-income families can afford.

A typical individual loan to cover this deferred special assessment for water service in Tegucigalpa is \$400 at 14% to be paid over 12 years. This translates into monthly payments of \$5.74 per borrower which, when added to a typical water bill of \$3.50, adds up to slightly over \$9. For a typical low-income family earning \$90 per month, this represents 10% of their monthly income.

In the case of water or sewer service, the actual amount charged the homeowner is either the added appraised land value attributable to the improvement, or his "pro rata" share of the actual construction cost, whichever is less. For streets or bridges which clearly benefit nearby residents as well as the target community, the homeowner is assessed only a portion of the total cost.

A 1986 study of this program pointed out the need to improve collections and to consider charging beneficiaries less than the full costs of improvements because of the "significant external benefits which these projects generate"<sup>2/</sup>. Nevertheless, the program is seen as an effective way to mitigate heretofore exclusive reliance on public funds when streets, water, sewer or other improvements are brought to squatter settlements.

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<sup>2/</sup> Peterson, George E., The Provision of Local Infrastructure Services  
in Honduras.

In Costa Rica, officials may want to consider such a policy to help offset the growing infrastructure costs of squatter settlements. In one of several recent examples, AyA was forced to rechannel ¢122 million (approximately \$1.5 million) in previously committed funds to provide 3,200 water and sewer connections to "Los Guidos", a squatter settlement in Greater San José of more than 15,000 people. Most housing and social services officials expect this trend to continue in the coming years.

APPENDIX B

CENTRAL VALLEY MASTER PLAN

In 1983, the major public infrastructure agencies, under the leadership of the public housing authority (INVU) published an extensive master plan for the Greater San José Metropolitan Area. Since then, the plan, known as the GAM (Gran Area Metropolitana), has had limited influence on land use within the industrial and residential core, since there has been no coordinated governmental followup to guide growth through tax policy, infrastructure investments, and other incentives. It has, nevertheless, effectively restricted construction in areas designated for agricultural, recreational and similar uses, since INVU has consistently refused to grant building permits in these protected zones.

The area described by the GAM is made up of 196,715 hectares in the Central Valley, including San José proper, the cities of Heredia, Cartago and Alajuela, and the smaller satellite towns in the area. Greater San José, thus defined, takes up less than 4% of the nation's territory, but is home to 50% of its people.

Within these 196,715 ha. there is an area of 44,200 ha. which was inhabited by slightly more than a million people in 1979 and which is designated for further residential and industrial use by the plan. Further, there is a high priority growth segment of 22,350 ha. within the above area which, according to the plan could easily accommodate a density of 300 persons per hectare

compared to the 72/ha. density in the entire 44,200 ha. area in 1979. This translates into a total of 6,705,000 inhabitants at the 300/ha. level, or 3,352,500 for this 22,350 ha. area if it reaches only half its projected density or 150/ha.

These projections far surpass the projected 2 million population of Greater San José by the year 2000 and lead the GAM to conclude that, given present growth patterns, the area can easily accommodate 2,985,100 by that time. Every government housing, planning, and infrastructure authority consulted for the present study agrees that there is no major land or infrastructure shortage which would inhibit the construction of sufficient units to accommodate this population, especially in light of the increased water production of the Orosi project.

Nevertheless, the plan points out that the gradual movement toward higher densities will put an increasingly greater strain on all infrastructure, especially the sewerage systems in the area. The plan states that obsolete systems in Cartago and Heredia should be replaced or refurbished and that the inadequate coverage of the San José and Alajuela systems should be extended. Most importantly, however, the plan warns of increasing contamination of the area's rivers if waste water treatment systems are not put in place. Except for small, obsolete and ineffective plants in Heredia, Alajuela and Cartago, there is no major waste water treatment in Greater San José.

There are several small private plants servicing less than 300 units in new areas such as Ciudad Cariari, but AyA has, in the past, favored the building of a central treatment plant in the western valley. The GAM indicates that smaller treatment plants should also be considered. INVU officials now go further and recommend that AyA encourage privately financed and maintained small-scale waste water treatment plants. These would be subject to AyA approval and periodic inspection, they indicate, and could be designed to be compatible with a central treatment system, which, because of its cost (projections range from \$20 to \$40 million) may be a long way off.

Of additional concern are the costs of postponing investments in water-borne sewerage systems. Most planners and developers indicate that between 25% and 30% more land is generally required for single unit dwellings that use septic tanks as opposed to public sewerage systems. In addition, the cost of the extra land plus the purchase and installation of the tank can raise the cost of a typical low cost home in San José by more than 11%, thus eliminating 3% of potential low-income buyers.

The table below is based on two typical low-cost units sold in 1987, one with sewerage connections and one depending on septic tank installation. As can be seen, the unit utilizing the septic tank costs 11.5% more and utilizes 38.7% more land. The price differential is typical for this type of unit, but the additional land utilization is slightly higher than average.

TABLE 10

COSTS FOR COMPARABLE LOW INCOME UNITS

(Colonias, 1987)

<u>1/ Sewerage System</u>	<u>Total Sales Price</u>	<u>Lot Size</u>	<u>Land Cost</u>	<u>Unit Size</u>	<u>House Construction Cost</u>	<u>Septic Tank Cost</u>	<u>Affordability<sup>3/</sup></u>
On-Site septic tank	368,000	129 M <sup>2</sup>	158,000	32 M <sup>2</sup>	210,000	22,500 (Included in construction cost)	28.56
Off-Site public sewerage	330,000	93 M <sup>2</sup>	143,000	30 M <sup>2</sup>	187,000	None <sup>2/</sup> (Sewer connection)	25.48

Source: Oficina de Vivienda Industrial, (OVI)  
 Corporacion Costarricense de Financiamiento Industria S. A.,  
 (COFISA)

1/ AyA requires on-site installation of sewerage facilities for eventual hook-up to the proposed public system, regardless of current use of septic tank. On-site water and sewer facilities average 5% of total sales price for each unit.

2/ Exact off-site costs not available. One rough measure of the off-site costs associated with an individual unit is the value of fixed assets per connection. In 1987 (for AyA) this amounted to \$271 and \$143, respectively, for water and sewer, or a total of \$414 for a home receiving both services. AyA hook-up fees to partially cover off-site costs average C2,000 (\$27) per unit.

3/ Prospective buyers served (percentile).

A related factor is that the area that the GAM designates for future growth and greater density (west of San José) is made up of the type of non-porous land least suited to septic tank use. This means that the area must either make a major investment in sewerage facilities or accept less density than planned and thus, use up available land much more quickly. This, in turn, leads to the increased costs associated with urban sprawl in which the price of all infrastructure escalates simply because it must serve a broader geographic area.

The current administration's housing concerns led it to establish, in April, 1988, a new GAM commission (this time under the Ministry of Housing) to update the plan by late 1989 and to give it the enforcement power it lacks. This initiative has drawn the praise of the private sector and has led both the Association of Home Builders and the Contractors' Association to request seats on the commission. A more cautious view is taken by other observers who view this updating exercise as an attempt to chip away at existing zoning restrictions. They fear that a new GAM will allow residential and industrial construction in areas now reserved for agriculture, forestry, park-land and other uses. Not only would this upset the ecological character of the Central Valley, but it also could lead to "leap-frog" development, which would require furnishing infrastructure to non-contiguous areas at much greater marginal cost.

APPENDIX C

AGING INFRASTRUCTURE

In urban areas, the increased housing demand and the need for related infrastructure takes on pressing proportions, given ever higher population densities and the resultant stress on existing, often obsolete, water and sewerage facilities. Local health and infrastructure officials have repeatedly warned of the need to refurbish Costa Rica's principal water and sewerage systems, since most of them are over 50 years old and since most estimates indicate that a typical system has a useful life of approximately 40 years. These warnings seem well founded given the following examples:

- San José's original sewerage system was constructed between 1920 and 1925 and no major expansion or renewal was undertaken until 1964. This upgrading was less than half completed in a two-stage process which ended 19 years later. The final stage, which includes a badly needed waste water treatment system, is awaiting the completion of technical studies which will be available in mid 1989 and a commitment from an international lender for all or part of the estimated \$70 million needed to finance it.

Although a recent study by the University of Costa Rica indicates that the present system is adequate to meet the overall needs projected by the GAM through the year 2000, it warns that the southern and western growth

projected by the plan may be slowed for lack of adequate sewerage in areas like San Isidro de Coronado, Guadalupe, Tres Ríos, Sabana Sur, Bello Horizonte and parts of Escazú.

- According to the GAM, Heredia has a 38-year-old Inhoff waste water treatment tank which, because of the growth of the area, can no longer adequately function as designed.
- Alajuela's sewer system was built 53 years ago and its 50-year-old waste water treatment facility, like that in Heredia, is practically non-functional.
- Cartago's sewer system was built after the 1910 earthquake and has undergone no major refurbishing since that time. The GAM technicians who have assessed the system conclude that there is no significant portion that can now be refurbished and that an entirely new system must be built. The waste water treatment plant built 70 years ago has been completely ineffective, they indicate, for at least the last 20 years. Cartago has the worst of the sewer systems in Greater San José.

APPENDIX D

COST RECOVERY AND DEBT SERVICE

A. Current and Potential Liabilities

AyA is in the fortunate position of having the GOCR assume the major responsibility for its current hard currency loans and of having to amortize only colon obligations with the Treasury, the Social Security Agency and other public entities. The projected debt service on these obligations is estimated at \$2.2 million (¢161.8 million) in 1988 and \$3.6 million (¢269.9 million) in 1989 (Table 11). However, in 1990, according to AyA's present agreements with the GOCR, it will have to assume the full costs of the \$39.8 million Orosi credit -- which will bring its total debt service to \$10.8 million (¢806.9 million). In addition, it will assume all or part (depending on the GOCR's policy at the time) of the debt service associated with the \$115 million in new foreign credits which it plans to secure by 1992 (See Table 9).

TABLE 11

Acueductos y Alcantarrillados

Estimated Debt Service 1988-92

(¢ Millions)

	1988	1989	1990	1991	1992
Principal	80.9	120.1	460.5	479.8	483.8
Interest	80.9	149.8	346.4	303.9	261.5
TOTAL	161.8	269.9	806.9	783.7	745.3

Source: Acueductos y Alcantarrillados

B. Revenues

These potential debt service obligations must be seen in the light of the institution's recent revenue history. In the last five years, AyA has come ever closer to meeting the World Bank's Orsi loan requirement that it generate net revenues (excluding interest payments) of 4.5% (See Table 12). This steady improvement has been accomplished by a combination of higher tariffs and increased productivity, especially since 1985, when the GOCR replaced AyA's senior management and appointed a special commission to administer the agency. This steady improvement, however, may soon level off, since the current government has adopted a policy, which may well be followed by its successor, that does not allow for water and sewerage tariff rate increases to exceed the rise in the cost of living in any given year. Whatever the political benefits of this policy, it means that increased AyA revenues probably will not be able to keep up with inflation in the near future. The relationship between these two factors in 1987 (11% rate increase, 15% inflation rate) is likely to hold steady in the near future, given political pressures to keep all utility rates down. This 4% gap could conceivably be bridged in any given year by cost-saving programs, personnel cuts, and other productivity measures, but there is no indication that this could happen year after year, no matter how well structured these reforms were or how energetically they were carried out.

TABLE 12

Acueductos y Alcantarrillados

Rate of Return on Fixed Assets

(¢ Millions)

	1983	1984	1985	1986	1987
Fixed Assets	2930.41	2992.07	3606.745	4308.315	4964.97
Revenues	585.08	610.04	1049.67	1096.77	1411.83
Expenditures	671.63	797.17	852.90	986.91	1270.90
Net Operational Revenue	-86.55	-187.13	196.77	109.86	140.93
Rate of Return (Excluding Interest Payments)	-2.95%	-6.25%	5.46%	2.55%	2.84%
Interest Payments	15.64	17.80	33.33	52.26	51.15

Source: Acueductos y Alcantarrillados

Another factor mitigating against true self-sufficiency is the devaluation of the colon against the dollar, which averaged 9.5% per year in the period between 1983 and 1986, and reached 12.5% in 1987. Should this trend continue, AyA would have to increase its revenues continually, not only to stabilize its colon purchasing power in the local market, as pointed out above, but to meet the ever rising colon costs of the dollar debt which it must begin to amortize in 1990.

In conclusion, unless the GOCR changes its present policy, the decreasing real value of annual tariff adjustments, the steady decline of the colon, and the potential debt burden of new international loans, indicate that AyA must begin to seriously consider increasing its revenues, reducing its planned borrowings, or both.

APPENDIX E

COVERAGE AND RATES

The table below is based on actual (1985) and projected (1990) water and sanitation services provided Costa Rica's consumers. Its service coverage, in both urban and rural zones, is broader than that found in any other Central American country.

The 1985 figures show that 98% of the urban population has domestic connections, while the remaining 2% are within easy access (200 meters). The corresponding rural figures are 95% and 5%.

As for sewerage, 37.5% of the urban population have sewerage connections to off-site systems while the remainder (62.5%) depend on on-site septic tanks and latrines. In the rural area, 88% use septic tanks or latrines while the remaining 12% have no waste elimination system.

TABLE 13

WATER AND SANITATION COVERAGE  
(1985 actual; 1990 Projection)

	<u>POPULATION</u> (millions)		<u>WATER</u>						<u>SANITATION</u>	
	<u>1985</u>	<u>1990</u>	<u>Home</u> <u>Connections</u>		<u>Access Within</u> <u>200 meters</u>		<u>Total</u>		<u>1985</u>	<u>1990</u>
			<u>1985</u>	<u>1990</u>	<u>1985</u>	<u>1990</u>	<u>1985</u>	<u>1990</u>		
URBAN	1.478	1.681	1.448 (98%)	1.647 (98%)	.030 (2%)	.034 (2%)	1.478 (100%)	1.681 (100%)	1.478 (100%)	*1.681 (100%)
RURAL	0.985	1.120	0.768 (95%)	0.904 (95%)	.04 (5%)	.048 (5%)	.808 (82%)	.952 (85%)	.867 (88%)	1.120 (100%)
TOTAL	2.463	2.801	2.217 (96%)	2.551 (97%)	.074 (3%)	.082 (3%)	2.286 (93%)	2.635 (94%)	2.345 (95%)	2.801 (100%)

Source: Acueductos y Alcantarillados

\* Septic tanks and latrines 62.5%  
Sewer connections 37.5%

During the 1985-90 period, AyA projections call for a major increase in rural sanitation coverage from 88% to 100%. All other indicators, however, remain the same, with the major effort devoted to simply keeping pace with the 14% population increase expected during this period (figures recently published by CELADE indicate that the 2.8 million population projected in above for 1990 was actually reached in mid-1988).

As can be seen below, AyA tariff rate policy calls for those who use the most water to subsidize those, presumably low-income households, who use less.

TABLE 14

SAN JOSE WATER RATES

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Use Levels in M <sup>3</sup>	Incremental charge per M <sup>3</sup> within each level (Colones)	Percentage of metered clients paying each rate
0 - 15	6.67	28.97
16 - 25	12.25	31.49
26 - 40	30.50	22.48
41 - 60	31.50	9.67
61 - 80	48.00	3.18
81 - 100	48.00	1.35
101 - 120	65.00	.75
More than 120	65.00	2.11

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Note:

1. Half of water production is unaccounted for because of leakage, illicit connections and inadequate metering.
2. Sewerage rates are based on water usage i.e., 25% of water billings.

Source: Acueductos y Alcantarillados

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