

B.2.5 Housing Conditions in Leon

a. Housing Development

Housing programs (e.g., resettlement, construction of new units) are implemented by the Local Information System of Housing and Human Settlements (SILVAH) in cooperation with private and government entities. The accomplishments of the municipal government are evidenced in the expansion of settlement areas and the building of new dwelling units for low-income government employees.

b. Living Conditions

Poverty and unemployment have become serious concerns of both the central and local governments. Governmental agencies are currently engaged in livelihood programs to counter-act impoverished conditions caused by lack of jobs.

The 1980's ended with Nicaragua facing critically impoverished conditions and a demographic structure and distribution that greatly affected the country's socioeconomic conditions. The civil war significantly influenced national economic growth as it impelled the rapid and accentuated decline in social indicators that led to the decay of productive and social infrastructure. Today, the standard of living in Nicaragua is still one of the worst in Latin America, a condition that is mainly attributed to unemployment or underemployment.

According to the magazine, "El Observador Economico" (The Economic Observer), published by the International Foundation for Global Economic Challenge (FIDEG), 53% of households in cities located in the Pacific region (including Leon, Managua and Granada) in 1995 were considered to be impoverished.

Poverty and other problems related to the living conditions of the people in the areas of study areas are specifically identified below:

- Low income, unemployment or underemployment of the breadwinner.
- About 61% of the households in the three cities headed by widows or single women are below the poverty line.
- Migration of breadwinners to other urban areas in search of better employment opportunities. However, the employment rate in these areas is worse than that of rural areas. The alarming rate of rural to urban migration further exacerbates housing conditions.
- Poor education or illiteracy.
- High percentage of school dropouts among extremely impoverished households.
- Insanitary conditions. Poverty has serious repercussions on public health, especially in children; various diseases were observed to have a high incidence rate in Leon in 1995.
- Apathy and dependence on outside assistance.

The Economic Observer also states Granada to have the highest ratio of impoverished households (57.4%), followed by Leon with 55.4% and Managua with 47.1%.

In relation to housing, a vast number of Nicaraguans still reside in unacceptable and substandard housing conditions, such as those in spontaneous settlements and

progressive urban settlements scattered around the peripheries and suburbs of the three cities in the study.

c. Housing

c.1 General

According to INEC, housing units in 1995 totaled 145,192: 57,606 in Leon Department, 60,780 in Chinandega Department, and 26,806 in Granada Department.

Among the municipalities, Leon has the highest number of housing units with 28,066, followed by Chinandega with 20,324, and Granada with 16,731. As for the urban areas, Leon has also the highest number of urban housing units (21,906), followed by Chinandega (16,935) and Granada (12,651).

Table B-29: Number of Housing Units in Leon Department

Municipality	1971			1995			Growth Rates		
	Total	Urban	Rural	Total	Urban	Rural	71/95 (T)	71/95 (U)	71/95 (R)
1. Leon	14,796	6,165	8,631	28,066	21,906	6,160	2.70	5.42	-1.40
2. Achuapa	963	722	241	2,129	429	1,700	3.36	-2.15	8.48
3. El Jicaral	300	234	66	1,652	104	1,548	7.37	-3.32	14.05
4. Larreynaga	2,369	1,389	980	4,855	849	4,006	3.03	-2.03	-
5. Nagarote	2,192	1,063	1,129	5,425	3,596	1,829	3.85	5.21	2.03
6. La Paz Centro	1,994	1,040	954	4,631	2,951	1,680	3.57	4.44	2.39
7. Quezalguaque	300	250	50	1,294	178	1,116	6.28	-1.41	13.81
8. El Sauce	1,515	1,008	507	4,346	1,314	3,032	4.49	1.11	7.74
9. San Nicolas *	278	252	26	-	-	-	-	-	-
10. S.R.del Penon	476	386	90	1,453	368	1,085	4.76	-0.20	10.93
11. Telica	1,126	787	339	3,755	1,057	2,698	5.15	1.24	9.03
Total	26,309	13,296	13,013	57,606	32,752	24,854	3.32	3.83	2.73

Source: Population Census Data, 1995 (INEC)

c.2 Housing Conditions in the Urban Area of Leon Municipality

According to INEC, the urban area of Leon has about 21,906 housing units as of 1995, with an average of 5.7 persons/household. The table below shows the distribution of the housing units by dividing the city into 3 zones. "Other" comprises an urban expansion area.

Table B-30: Number of Housing Units in the Urban Area of Leon Municipality

Zone	Area (ha)	1995 Population	Housing	Density (INEC) (p/hhld)
Zone 1	415.1	26,391	4,630	5.7
Zone 2	477.9	51,049	8,956	5.7
Zone 3	425.6	42,648	7,482	5.7
Other	590.4	3,777	838	4.5
Total	1,909.0	123,865	21,906	5.7

Source: Total population (1995), INEC
Population by zones, estimated by the Study Team

Each zone is subdivided into barrios, repartos, colonias, residential areas, progressive urban areas, and spontaneous settlements.

B.2.6 Urban Structure

a. General Situation

The city of Leon is the second largest city in western Nicaragua. It is 91 km from Managua and covers approximately 19.09 km² (about 24 km² to be considered for future expansion by 2010). The city has an elevation of 109 m above sea level and a population of 123,865 inhabitants. It was founded in 1524 by Hernández de Córdoba between two depressions: Chiquito River to the south and Pochote River to the north. For an extensive period of time Leon was the center of administrative, political, military, cultural and religious activities in Nicaragua. The municipality of Leon is primarily agricultural.

b. Brief History of Leon City

The city of Leon was originally established close to the native settlement of Sutiava, after the destruction of Old Leon in 1610. Old Leon was then located near Lake Managua. As the city and the settlement area continued to develop over the centuries, they merged and became known as the city of Leon. The city is made up of colonial buildings, monuments and historic sites. The architecture of the city is best represented by its churches. As far as colonial architecture and conservation of traditional practices are concerned, Leon may be considered as Granada's twin city.

In the 20th century, the city area gradually changed. It became more densely populated and compact with the establishment of heterogeneous and spontaneous settlements or poorly constructed individual buildings.

c. City Development Plan

The municipal government of Leon prepares plans for urban development and the improvement of the city's various public systems. With the aim to establish urban integration, the municipal government has been working on urban development programs since 1990, laying down objectives for the present and future integrated development of the city.

Preliminary studies such as "Territorial Planning of Leon" and "Urban Development Planning", were conducted by the municipal government in cooperation with INETER (December 1993).

Based on these studies, the municipal government of Leon formulated the "Structural Master Plan" in January 1996 in cooperation (technical assistance and finance) with the municipality of Utrecht (Holland) for the development of urban and rural areas in Leon, and for the strategic implementation of development proposals.

The Structural Master Plan is made up of two parts:

- Master Plan Main Report 1995-2010
- List of Strategic Projects 1995-2000

The main report describes the long term objectives of physical and economic development strategies and plans (1995-2010). The list of strategic projects consists of projects for the implementation of plans to achieve the objectives of the main report (1995-2000).

The municipal government is responsible for the formulation of the main report, but the implementation of the strategic projects involves several institutions.

The main objectives of the existing master plan are:

- To disperse population growth.
- To increase production and employment opportunities.
- To construct new housing for the increasing population to prevent overcrowding and further establishment of slums.
- To improve the distribution of service facilities (government, health, education, culture), commercial activities, banks, recreation areas, transportation and communication, to meet the present and future needs of the population.
- To rationally manage water resources, soil and forests, ecosystem conservation and development programs.
- To sustainably utilize groundwater resources, to meet future demands.

d. Current Land Use

The land use map covering the entire city area was prepared based on the information provided by the municipal government of Leon. The total land area was estimated at 1,909 ha, and the current land use conditions in the area are summarized in Table B-31. The current common land use is shown in Figure B-4.

Table B-31: Current Land Use Conditions in Urban Area of Leon

Land Use	Area Coverage (ha)	Area Coverage (%)
Housing	927.9	48.6
Mixed Area (housing/commercial/service)	254.4	13.3
Commercial/Service	65.0	3.4
Public/Social Institutions	123.9	6.5
Industrial Area	83.3	4.4
Green Area		
Forest	30.8	1.6
Sport recreation	53.3	2.8
Cemetery	28.0	1.5
Technical Installation	40.1	2.1
Vacant Area	302.3	15.8
Total	1,909.0	100.0

Source : Municipal Government of Leon (1996)

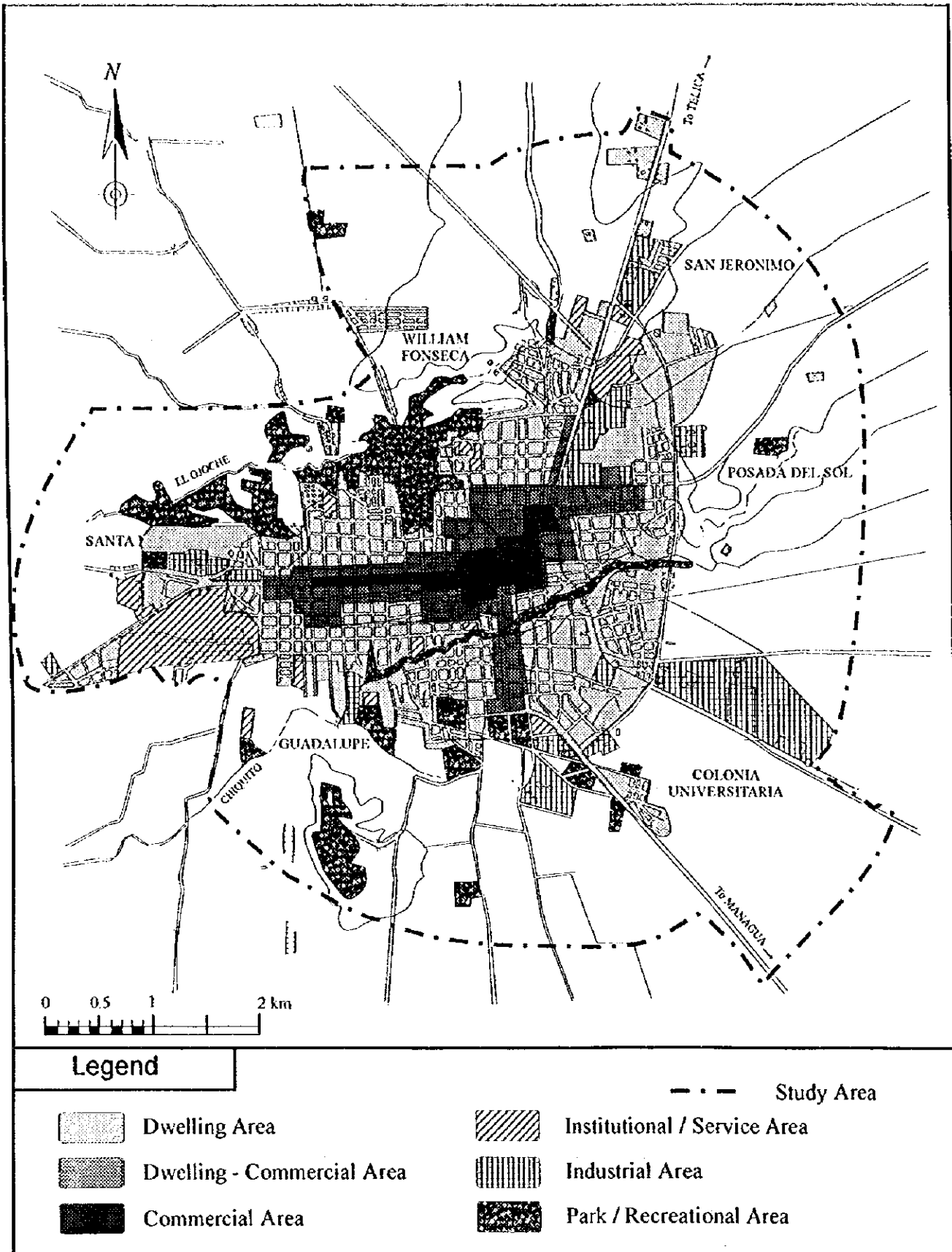


Figure B-4: Current Land Use in the Urban Area of Leon

e. Industry

The industrial sector plays a vital role in the development of the regional and national economy.

The city of Leon has 305 industrial establishments: food processing factories (55%), textile and leather factories (24.9%), factories for the manufacture of wooden products (5.4%), chemical factories (9.2%), and others (5%). These establishments are mostly concentrated in the northeast zone, along the highway to Chinandega. Some of the important establishments are sporadically located along the city periphery by-pass. Leather factories are usually located along the Chiquito River, while other small industries are dispersed within the urban area of Leon.

The layout of these establishments is in conflict with other current land use in the area. Fourteen of the establishments (tanneries and pesticide factories) are located in proximity to residential areas, endangering public health as they pollute the air and other natural resources nearby.

There are about 168 commercial establishments in the city, most of which are located in the central area (source: Chamber of Commerce, Leon, 1992).

f. Infrastructure

f.1 Road Transport

Road transportation is the main means of transportation in the city. There are 70 public transportation units in the city: small trucks (54%), minibuses (24%) and buses (22%). There is also a local taxi company with 214 units.

There are two small airfields in the city: Fanor Urroz in the southwest sector within the city boundary, and the other in the northwest sector outside the city periphery. These airfields are used by planes that fumigate surrounding agricultural zones.

The airfield within the city endangers the security of the people residing nearby. Regardless of attempts to eliminate or reduce the risks, such as restricting landing and take-off operations to the west of the runway, the facility still poses a threat to the safety of the people residing in Reparto Carlos Nuñez and southern Sutiava. In addition, pesticides stored at the airfield also contribute to air pollution in the surrounding area.

f.2 Road Network

f.2.1 General

The development of a road network is important for the establishment of future growth trends, the development of city infrastructure, and the improvement of the urban sanitation environment in the three principal cities. Future highway construction projects are likely corridors for water supply, sewerage systems and solid waste collection lines. The pattern in highway development is generally an excellent guideline to predict future trends in the settlement of people in need of a water supply and wastewater system, and for urban environmental improvement.

f.2.2 Road Network in the City of Leon

Roads in the city are arranged in a grid formation, radiating from the central area towards the outlying districts. Totaling 226.4 km, they are paved either in asphalt, stone

blocks, rubble stones or macadam, or are unpaved. Roads in Leon are mostly paved with stone blocks or asphalt.

The maintenance of the roads within the municipality, including footpaths and sidewalks, is the responsibility of the municipal government of Leon.

Table B-32: Road Condition by Surface Type in Leon Municipality

Road Condition	Paved		Stone Blocks		Unpaved		Others	Total	
	km	%	km	%	km	%	km	km	%
Good	47.1	20.8	22.8	10.1	25.1	11.1	0.4	95.4	42.1
Average	5.4	2.4	5.8	2.6	75.7	33.4	1.1	88.0	38.9
Poor	0.5	0.2	21.0	9.3	21.0	9.5		43.0	19.0
Total	53.0	23.4	49.6	21.9	122.3	54.0	1.5	226.4	100.0

Source : Municipal Government of Leon (1993)

The present road network of 226.4 km, of which 54.7% are classified as "unpaved", has become inadequate to meet the traffic demands of the expanding urbanized area. The network is characterized by a partially developed primary road system, lack of order and well developed secondary arterial and distribution roads, often outdated pavements, conflicting road system and lack of drainage, traffic lights and parking facilities.

Therefore, in order to solve these problems, the municipal government of Leon proposes to improve the accessibility of the urbanized area, defining roads by importance based on a large block structure and creating cycling routes. Also, considering the urban growth and traffic congestion in the future, new projects are planned for the outskirts of the urbanized area.

These major projects formulated in the Structural Master Plan are the following:

Table B-33: Proposed and Planned Road Projects

Status	Road Project	Approx. Length (Km)
Planned	Improvement and reinforcement of primary roads	9.30
	Improvement and reinforcement of distribution roads	65.20
	Reserve area for road	6.50
	Future by-pass	8.00
Proposed	Road proposed for the study	9.00

At present, these projects are still under investigation and have no definite implementation plans.

The proposed and planned road network of the urbanized area provided by the municipal government of Leon is shown in Figure B-16.

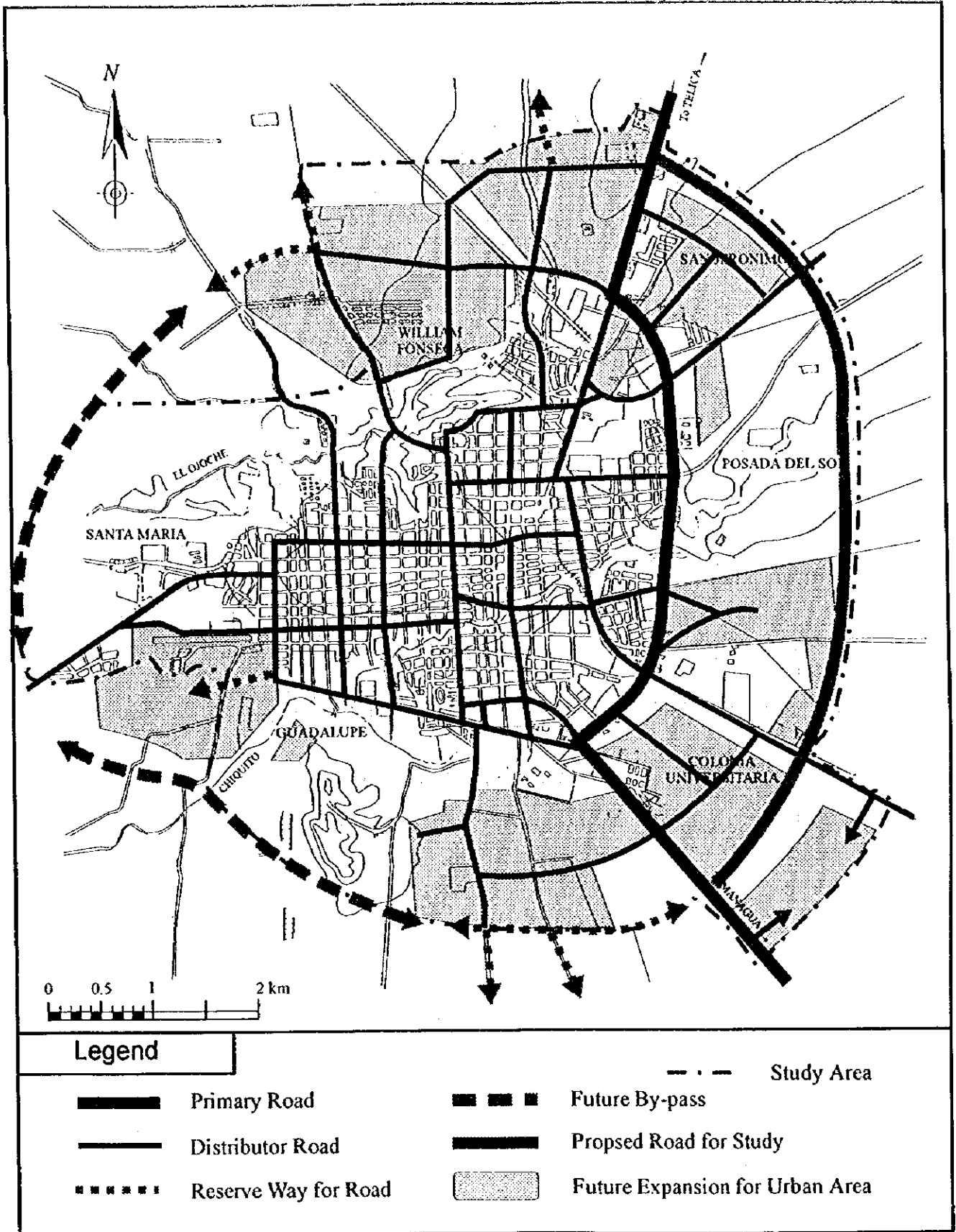


Figure B-16: Planned Road Network in Leon

f.3 Power Supply and Telecommunication

The power supply in Nicaragua is provided by the Nicaraguan Institute of Energy (INE) and is distributed by the Nicaraguan Electric Company (ENEL). ENEL services cover the entire country, making it a major INE distributor.

According to the Ministry of Welfare (MAS), 43% of the households are connected to the national grid which makes the supply of electricity possible. In the municipalities, 58% of the population have electricity. Six of the municipal governments in the department of Leon are executing system expansion works, which will later be donated to INE.

According to the Local Information System on Housing and Human Settlements (SILVAH), only 50.2% of the urban area receive electricity. Of this figure, about 75% of the households were estimated to have electrical meters, while 2.3% were assumed to have illegal power connections. Rural households mostly use candles for lighting.

Telephone services in the city are managed by the Nicaraguan Institute of Post and Telecommunications (TELCOR). TELCOR has 3,936 subscribers in the urban area, which corresponds to 12.1% of the number of households in the municipality.

B.2.7 Economic Conditions

a. Regional Economy

There is no study on Gross Regional Domestic Product (GRDP) in Nicaragua. The basic data needed to estimate GRDP such as industrial production and commercial sales and services according to regions are too dated to estimate the current GRDP.

INAA reported the profile of socio-economics of Leon in "Department of Leon" as follows:

- Basic activities of Leon are commerce and services in the urban areas.
- Economically active population (EAP) in 1994 was 47.1% of the population, which is about 71,340 people.
- The sources of income of the employed are 67.3% from services, 22.1% from commerce, 5.9% from agriculture and 4.6% from industries.

The EAP figure indicated in the INAA report was about 1.6 times of the above survey by MITRAB.

On the other hand, INSSBI reported the social security contributions and the number of employers according to economic activity by region every year. Although the reference in Table B-22 points out that the coverage of INSSBI data is low, there are no other time series data concerning economic activity by region. Therefore the changes in number of employers and employees with social security contributions are presented in Table B-34 and Table B-35.

Table B-34: Number of Employers in 1991, 1993 and 1995

	1991		1993		1995	
		%		%		%
Total of Leon	695	100.0	616	100.0	596	100.0
Primary Sector	195	28.1	155	25.2	53	8.9
Agriculture	195	28.1	155	25.2	53	8.9
Secondary Sector	147	21.2	115	18.7	123	20.6
Manufacturing	137	19.7	105	17.0	102	17.1
Construction	7	1.0	7	1.1	14	2.3
Mining	3	0.4	3	0.5	7	1.2
Tertiary Sector	353	50.8	346	56.2	420	70.5
Commercial, restaurant & hotel	146	21.0	154	25.0	167	28.0
Transport & Communication	21	3.0	18	2.9	23	3.9
Electricity, gas & water supply	2	0.3	5	0.8	5	0.8
Finance, security, property & service for enterprises	23	3.3	23	3.7	36	6.0
Social, community services	121	17.4	127	20.6	184	30.9
Non-specific activities	40	5.8	19	3.1	5	0.8
Total in Nicaragua	8,132		7,759		7,733	
Percentage of Leon		8.5		7.9		7.7

Source : Anuario Estadístico 1991, 1993, 1995, INSSBI

Table B-35: Social Security Contributions in 1991, 1993 and 1995

	1991		1993		1995	
		%		%		%
Total	13,221	100.0	9,392	100.0	13,080	100.0
Primary Sector	2,519	19.1	1,387	14.8	959	7.3
Agriculture	2,519	19.1	1,387	14.8	959	7.3
Secondary Sector	2,307	17.4	1,786	19.0	2,059	15.7
Manufacturing	1,607	12.2	1,305	13.9	1,246	9.5
Construction	641	4.8	410	4.4	358	2.7
Mining	59	0.4	71	0.8	455	3.5
Tertiary Sector	8,395	63.5	6,219	66.2	10,062	76.9
Commercial, restaurant & hotel	1,064	8.0	850	9.1	814	6.2
Transport & Communication	422	3.2	328	3.5	308	2.4
Electricity, gas & water supply	34	0.3	67	0.7	547	4.2
Finance, security, property & service for enterprises	729	5.5	352	3.7	215	1.6
Social, community services	5,226	39.5	4,029	42.9	8,113	62.0
Non-specific activities	920	7.0	593	6.3	65	0.5
Total in Nicaragua	228,930		207,490		208,125	
Percentage of Leon		5.8		4.5		6.3

Source : Anuario Estadístico 1991, 1993, 1995, INSSBI

These tables point out the characteristics of Leon's economy as follows:

- The total number of employers has decreased year by year, and the figures for 1995 was 86 percent of 1991. In particular, the number in agriculture has drastically decreased, and figures for 1995 was only 27 percent of that in 1991.

The number in the secondary sector had decreased in 1993, but had increased in 1995 to be 86 percent of 1991. The number operating in the tertiary sector in 1995 was 1.2 times that of 1991 after a slight decrease in 1993.

- Social security contributions have decreased sharply in 1993, but after 1993 the number has increased to 84 percent of 1991's figures.
- In particular, mining, electricity, gas and water supply activities and social, community service activities have increased.

a.2 Estimation of GRDP

In this study, GRDP is estimated by calculating the share of each economic activity in Leon to the whole country. The income of each economic activity is calculated by the average salary multiplied by the amount of social security contribution.

GRDP in t year is calculated as follows:

$$GRDP_t = \sum GDPI_i \times \frac{NSCLI \times ASLi}{NSCWi \times ASWi}$$

NSCLI = Social Security Contribution for a given activity in Leon

ASLi = Average Salary for a given activity in Leon

NSCWi = Social Security Contribution for a given activity nationwide

ASLi = Average Salary for a given activity nationwide

The calculation results are shown in Table B-36.

Table B-36: GRDP in Leon region in 1991 and 1995

Unit : C\$ million in 1980

	1991		1995	
		%		%
Total	1,282.1	100.0	726.8	100.0
Primary Sector	253.5	19.8	204.0	28.1
Secondary Sector				
Manufacturing	176.7	13.8	148.6	20.5
Construction	32.6	2.5	45.6	6.3
Mining	2.8	0.2	41.3	5.7
Tertiary Sector				
Commerce	112.6	8.8	67.4	9.3
Government	106.5	8.3	125.2	17.2
Transport & Communication	42.0	3.3	20.3	2.8
Bank, Security & others	23.2	1.8	18.4	2.5
Electric, Gas & Water Supply	3.0	0.2	11.7	1.6
Property & Dwelling	29.8	2.3	24.1	3.3
Other Services	499.3	38.9	20.2	2.8
Population			336,894	
GRDP/capita			2,157.3	

Source : Calculated by JICA Study Team based on;
Anuario Estadístico 1995, INSSBI
Informe Anual 1995, BCN
Compendio Estadístico 1987-1991, INEC

The GRDP in 1995 was 57 percent of 1991 because of drastic decline in other service activities. Major activities such as agriculture, manufacturing and commerce decreased in 1995. GRDP in current price calculated in the same way is C\$512 million

GRDP per capita in 1995 was C\$2,157 in constant price (1980), which is 48 percent of GDP per capita (C\$4,481).

a.3 Fishery

For the fishery data, there are two classification areas: the Pacific and the Atlantic Ocean. There are no detailed data by region in Nicaragua except the delivery amount to processing factories at fishing ports. In this study, it is assumed that this amount represents the catch of the region. The catch in the region by fishing port is shown in Table B-37.

Table B-37: Fish Catch in the Region

Fishing ports	Unit : Libras		
	1994	1995	1996*
Poneloya		63,426	54,725
Miramar	654	39,631	47,658
Salinas Grande	12,878	59,699	61,912
Leon Total	13,532	162,756	164,295
Pacific Ocean Total	3,961,456	5,764,307	3,526,556
Share of Leon(%)	0.34	2.82	4.66

Note : * until September of 1996

Source : Boletín Estadístico Pesquero 1994, 1995, MEDE-Pesca

a.4 Tourism

"Tourism Inquiry 1995" surveyed by the Ministry of Tourism (MITUR) reported that the number of foreign tourists visiting Leon in 1994 was 41,933, equivalent to 17.6 percent of the foreign tourists visiting Nicaragua (237,652).

The number of people staying in the six major hotels was 1,884 from abroad and 1,473 from Nicaragua. The major reasons for their visit were 65.3 percent for leisure, 34.1 percent for business and 0.6 percent for others. The number of customers using hotels in 1995 rapidly increased to 2,463 from abroad and 1,962 from Nicaragua.

b. Tax System and Utilities Charging System

b.1 Local Tax System

Although there is little difference between Managua and other local authorities, Decree No.455 stipulates the Municipal Tributary Plan.

In the Plan, there are three categories of taxes as follows:

- Municipal imposed tax
- Municipal taxes
- Special contributions

Municipal imposed taxes consist of three items: registration and license, income tax and other imposed taxes. The municipal taxes consist of two items: service tax and utility tax. Waste and cleansing tax is categorized as a service tax.

Income tax is the principal tax as is mentioned later. Every natural or juridical person has to pay tax equivalent to two percent of their monthly income. Concerning the rate of two percent, the discussion to reduce it to one percent in January of 1997 to promote investments is passing through the Nicaraguan parliament at present.

The property tax and the vehicle license tax, which was charged as a national government tax and gave a 10 percent return to municipalities, has been changed so that all municipalities can use 100 percent of the taxes they have respectively collected. The local tax system is under a transitional phase.

b.2 Utilities Charging System

Public utilities provided on a network scheme are only electricity, telephone, water supply and sewerage, and drainage. Water supply and sewerage fees are collected by INAA. Water tariff is composed of two items: flat rate and a proportional fee based on consumption volume. A discussion was held to change the tariff in conformity with income level and regional characteristics.

The average fee collected in Leon is shown below.

Table B-38: Average Fee by User

	Unit : C\$/m ³	
	1995	1996
Residential house	1.96	2.13
Commerce	6.35	8.28
Industry	2.86	4.49
Government	6.97	8.13
Public utility	1.16	1.23
Multi-families	1.16	1.31

Source : INAA/General Accounting Department

Sewerage collection fees are jointly billed with the water supply fee where sewage services are provided. A rate of 30 percent is added to the water supply fee, but it will rise up to 30 percent of the total if the costs for sewerage services increase.

Fee collection is generally done by fee collectors, although payment at INAA offices is also possible. The electricity charges are collected by INE, and TELCOM collects telephone bills.

c. Financial Condition

The preliminary revenue estimates in 1994, 1995 and 1996 and the actual revenue in 1994 and 1995 with some indicators are shown in Table B-39.

Concerning expenditure, the primary budget of the last three years and actual expenditure are shown in Table B-40.

Table B-39: Municipal Budget for the last Three Years (Revenues)

Unit : C\$1,000

	1994		1995		1996
	Budget	Actual	Budget	Actual	Budget
Municipal Budget (MB)	63,418	37,003	44,610	32,213	40,472
Tax Incomes (Tsl)	19,108	14,256	17,497	15,621	17,076
Municipal imposed taxes (MiT)	14,630	10,240	9,359	9,261	12,162
on sales & services (SsT)	9,221	7,473	8,442	8,262	8,647
other imposed taxes	1,001	1,048	917	999	3,515
Transfer from National taxes (TNT)*			3,139	1,975	2,220
on vehicles*	1,686	586	1,040	987	917
on real estate*	2,722	1,133	2,098	988	1,303
Municipal taxes (MT)	4,478	3,794	5,000	4,268	4,759
for municipal services (MST)	4,348	3,552	4,448	3,718	4,270
waste & cleansing (WT)	1,722	1,288	2,040	1,341	1,571
municipal market (MKT)	1,366	947	1,050	942	1,113
municipal abattoirs (AT)	211	205	212	236	241
for other services	1,049	1,112	1,146	1,199	1,345
other municipal taxes	130	242	552	550	489
Heritage incomes (Hi)	2,477	910	3,156	1,098	4,101
const. mat. sales	194	197	742	151	369
services	72	8	1,293	115	70
vehicles & mach rental	1,498	320	869	407	3,419
other heritage incomes	713	385	252	425	243
Donations (D)	38,581	19,690	15,993	12,868	14,116
Foreign (FD)		19,690	14,643	12,652	14,116
National			1,350	216	
Miscellaneous	38,581				
Recoveries (R)	3,252	1,869	7,964	1,919	3,554
Uncollected revenue (UR)		1,529	7,615	1,200	3,495
Other recoveries	3,252	340	349	719	59
Other revenues	0	278	0	707	1,625
Tsl/MB	0.30	0.39	0.39	0.48	0.42
Hi/MB	0.04	0.02	0.07	0.03	0.10
FD/MB	0.00	0.53	0.33	0.39	0.35
R/MB	0.05	0.05	0.18	0.06	0.09
MiT/Tsl	0.77	0.72	0.53	0.59	0.71
MT/Tsl	0.23	0.27	0.29	0.27	0.28
R/Tsl	0.17	0.13	0.46	0.12	0.21
SsT/Tsl	0.48	0.52	0.48	0.53	0.51
WT/MT	0.38	0.34	0.41	0.31	0.33
MKT/MT	0.31	0.25	0.21	0.22	0.23

Note : * Transfer from National taxes on vehicles and real estate is included in Municipal imposed taxes in 1994 budget.

Source : Financial Department of Leon Municipality

Table B-40: Municipal Budget for the last Three Years (Expenditure)

Unit : C\$1,000

	1994		1995		1996
	Budget	Actual	Budget	Actual	Budget
Municipal Budget (MB)	63,418	37,267	44,610	34,206	40,472
Personnel (PE)	8,305	8,267	9,536	9,012	10,928
Permanent Personnel (PpE)	5,288	6,011	6,422	6,090	8,160
for waste & cleansing (WE1)	1,408	1,493	1,637	1,565	2,265
for markets (MKE1)	406	476	446	420	533
for abattoirs (AE1)	100	111	145	104	127
for street maintenance		179	338	404	642
for other services	3,374	3,752	3,856	3,597	4,593
other personnel expenditure	3,017	2,256	3,114	2,922	2,768
Services, Materials, Products for Municipal Services (SMP)	2,360	940	1,483	887	1,639
waste & cleansing (WE2)	482	295	620	389	575
vehicles maintenance	76	34	90	92	93
fuel & lubricant	232	169	384	154	274
other expenditure	174	92	146	143	208
markets (MKE2)	775	208	334	70	504
slaughterhouses (AE2)	151	29	152	74	152
street maintenance	337	126	0	0	0
for other services	615	282	377	354	408
Investments (Iv)	44,200	22,784	22,121	19,247	19,722
new works	35,990	18,426	14,672	14,749	2,707
public works	10,788	453	9,104	4,095	1,748
for pipes & drainage	0	263	0	180	0
for other public works	10,788	190	9,104	3,915	1,748
others	25,202	17,973	5,568	10,654	959
on going works and others	8,210	4,358	7,449	4,498	17,015
public works	2,884	2,147	3,225	1,735	10,240
other going works	5,326	2,211	4,224	2,763	6,775
Other expenditure	8,553	5,276	11,470	5,060	8,183
WRC=WE1+WE2	1,890	1,788	2,257	1,954	2,840
MkRC=MKE1+MKE2	1,181	684	780	490	1,037
ARC=AE1+AE2	251	140	297	178	279
WT*	1,722	1,722	1,722	1,722	1,722
MkT*	1,366	1,366	1,366	1,366	1,366
AT*	211	211	211	211	211
PE/MB	0.13	0.22	0.21	0.26	0.27
SMP/MB	0.04	0.03	0.03	0.03	0.04
Iv/MB	0.70	0.61	0.50	0.56	0.49
WT/WRC	0.91	0.96	0.76	0.88	0.61
MkT/MkRC	1.16	2.00	1.75	2.79	1.32
AT/ARC	0.84	1.51	0.71	1.19	0.76

Note : * Municipal taxes shown in the previous table.

Source : Financial Department of Leon Municipality

These tables summarize the characteristics of Leon as follows:

- The actual figures are much smaller than the preliminary budget; the actual revenue was 58% of the preliminary budget in 1994, while it improved in 1995 to

be 72%. The actual revenue in 1995 was C\$32 million, equivalent to 6.3 percent of the estimated GRDP mentioned earlier.

- The main revenue is from municipal imposed taxes, which corresponded to 48 percent in 1995. In 1994, the tax corresponded to 39 percent following Donations.
- Transfer from national taxes on vehicles improved in 1995, but the property tax reached less than half the preliminary budget in the same year.
- Concerning municipal taxes, the actual revenue was 85 percent of the preliminary budget in both 1994 and 1995. The waste and cleansing tax declined from 75 percent in 1994 to 69 percent in 1995.
- Concerning expenditure, the share of personnel expenditure rose from 22 percent in 1994 to 26 percent in 1995 in real terms. The reason for this is that personnel expenditure increased 1.09 times of 1994, while the total expenditure decreased in the same period.
- On the other hand, the share of investment fell from 61 percent to 56 percent in real terms. The reason is probably due to the decline in tax revenue and foreign aids.
- The waste and cleansing tax covered 72% of the relevant costs (WRC=WE1+WE2) in 1994, but declined to 69 percent in 1995. The market tax covers the relevant costs (MkRC) in both years.

d. SWM Costs and Fee Collection

The SWM costs in 1995 was C\$2,807,000 including part time employee costs and depreciation costs added to the relevant costs (WRC). The main expense is personnel cost, which was C\$2,349,000 including social security, overtime wages and other payment, and corresponded to about 84 percent of the SWM costs. The second major cost is for fuel & lubricants, which was C\$154,500 (5.5%), followed by vehicle maintenance & repair which was C\$92,000 (3.3%).

In Leon Municipality, the expenses for collection, road cleansing and sanitary disposal services are accounted separately, and unit cost of each service is calculated. The breakdown of SWM cost is shown in the following table.

Table B-41: Breakdown of SWM costs in 1995

		Unit : C\$1,000
Services		Costs
Collection	Residential area	1,700.8
	Market	365.6
Road cleansing		587.6
Sanitary disposal		152.7

The tariff of the waste and cleansing tax is set as follows:

- C\$28/month/house for central Leon and high income residential areas

- C\$10/month/house for other residential areas
- C\$15/month/shop for commercial establishments
- C\$150/month for supermarkets
- C\$55/month for schools

For markets, the market tax (C\$2/day ~ C\$20/day) includes waste collection services, therefore a separate waste and cleansing tax is not charged.

B.2.8 Relevant Studies and Projects

Data and information regarding studies and projects realized in Leon, which are related with this Study, were obtained from the counterpart. Table B-42 lists those studies and projects.

Table B-42: Relevant Projects in the City of Leon

Classification of projects	Name (or Outline) of project	Date of project	Organization	Project location	Study, design or construction	Cost of the project
Potable Water	Net Rehabilitation and Storage tank repair	1996	ACDI (CANADA)	LEON	Construction (rehabilit.) of net and storage tank	C\$ 17,600,000
Wastewater	Rehabilitation of oxidation lagoons and pump station	1996	BID - INAA.	LEON	Construction (rehabilit.) of the lagoon and pump station	C\$ 8,500,000
Wastewater	Sewer construction	Jan/95	FISE ALCALDIA.	LEON	Construction of sewer net	C\$ 1,087,022
Wastewater	Improvement of wastewater treatment system	1996	JAPAN	LEON	Design and construction	US\$ 25,000
Wastewater	Sewer construction	1996 (being implemented)	Municipality-Zaragoza	LEON	Construction of sewer	US\$ 25,000
Wastewater	Experimental lagoon water treatment plant	1996 (being implemented)	UTRECHT (Holland)	LEON	Experimental plant (treatment of lagoon water)	US\$ 30,160
Wastewater	Sewer for Reparto H y M	1996 (being implemented)	INIFOM-Municipality	LEON	Construction of sewer	C\$ 23,985
Wastewater	Rio Chiquito	1996	UTRECHT (Holland)	LEON	tannery wastewater treatment (chrome)	US\$ 180,041
Wastewater	Rio Chiquito	1996	Austria	LEON	Project of integral sanitation	US\$ 345,000
Stormwater	Drainage and road system	Aug/94	Municipality-FISE	LEON	Construction of drainage system and road improvement	C\$ 315,513
Stormwater	Construction of pluvial drainage	May/95	Municipality-FISE	LEON	Construction and improvement of pluvial drainage	C\$ 1,559,471
Stormwater	Stormwater drainage and road system improvement	Jan/96	Municipality-FISE	LEON/ Barrio Enrique Lorente	Construction (improvement of drainage and road)	C\$ 512,085
SWM	SWM in 41 municipalities	Oct/95	JICA	Granada	Study	*
SWM	Organic fertilizer elaboration	Sept/95 Phases 1-2-3	UTRECHT (Holland)-Prode-Mujer	LEON	Project of appropriate management for	US\$ 2,166,150
SWM	Compost and market waste recycling	1996 (being implemented)	UTRECHT (Holland)-Prode-Mujer	LEON	project of SW treatment for compost	US\$ 34,601
Sanitation	Reparto Providencia	1996	Hamburg	LEON	Construction of septic tanks	US\$ 35,000

Classification of projects	Name (or Outline) of project	Date of project	Organization	Project location	Study, design or construction	Cost of the project
Sanitation	Latrine use in the city	1996 (being implemented)	Spain (Zaragoza)	LEON	Construction of latrines.	US\$ 337,000
Environment sanitation	Health and environment in Rio Chiquito	1996 (being implemented)	OXFORD	LEON	Prevention of Rio Chiquito contamination	US\$ 2,500.00
Environment	Urban environment improvement in Rio Chiquito sector	1996 (being implemented)	Spain (Zaragoza)	LEON	improvement of environment	US\$ 260,000
Environment	Reforestation in Subtiava community	1996 (being implemented)	Spain (Zaragoza)	LEON	Reforestation in the community	US\$ 129,696
Environment	Reforestation (environment)	1996	Hamburg.	LEON	Reforestation along rivers	US\$ 11,000
Multiple	Municipal slaughter-house improvement	1996 (being implemented)	Catalonian Fund	LEON	Modification of pluvial drainage area and sewer	US\$ 145,793

Note : * Total cost of study for 41 municipalities is US\$ 235,088.

B.3 Chinandega

B.3.1 Definition of the Study Area

At the meeting of the discussion on the inception report (IC/R) for the Study, the Nicaraguan side requested to expand the boundary of the Study Area from that shown in the IC/R. Although the boundary of the Study Area of the IC/R was defined as the present (1995) urban area (see Figure B-17) in the S/W (scope of work) for the Study, agreed upon between INIFOM and the JICA Preparatory Study Team in November 1995, the Team agreed that the expansion will be the urban limit in the target year 2010, on condition that the Nicaraguan side clarify and provide information necessary for projecting the improvement plan of USE, such as proposed boundary, projected population, etc. in the target year 2010.

Based on the above-mentioned discussion, counterparts from Chinandega Municipality presented a map showing the boundary of the urban area of Chinandega City in 2010. Consequently the Study Area for the city of Chinandega covering 16.10 km², was defined as the projected urban area in 2010 as shown in Figure B-18.

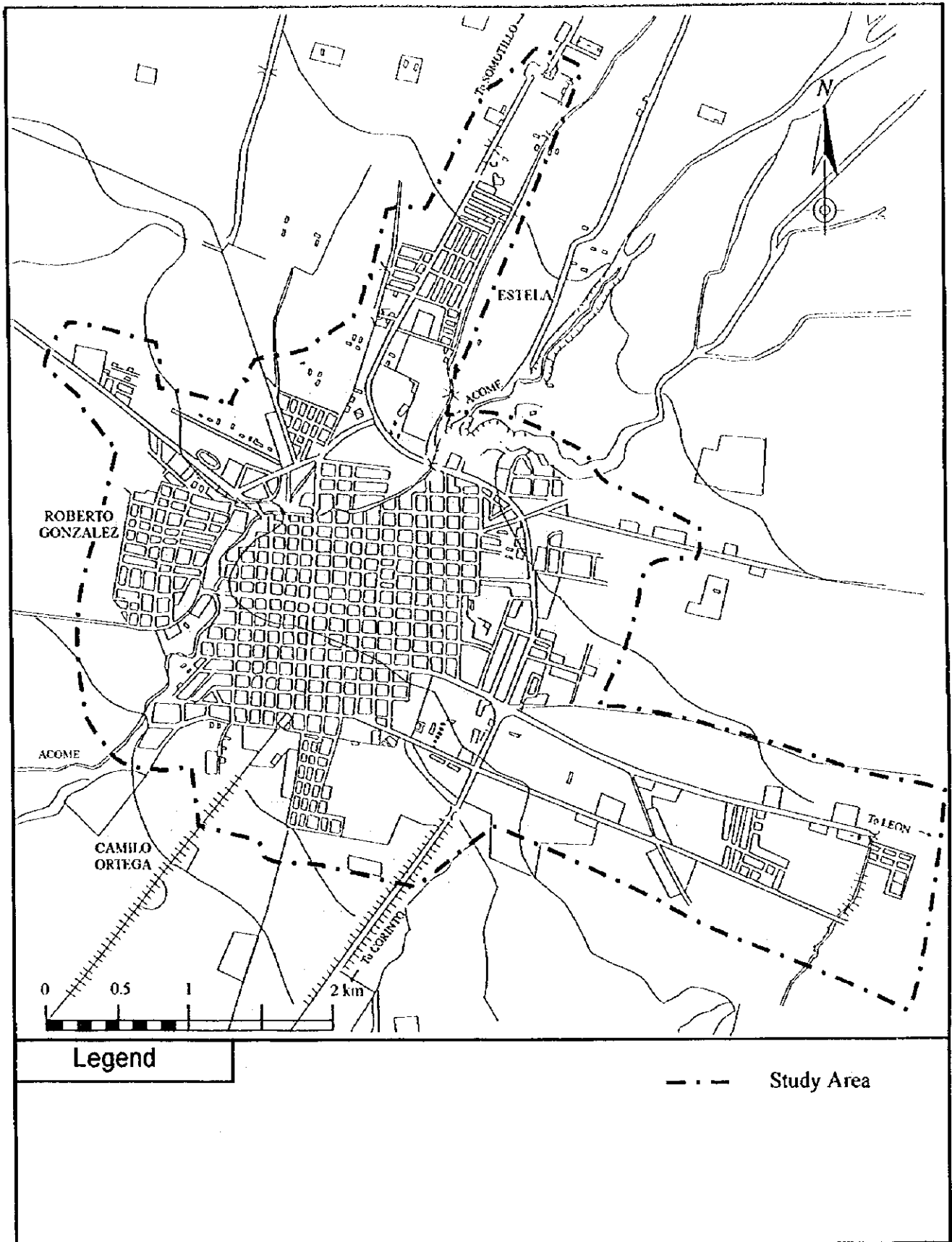


Figure B-18: Study Area in Chinandega

B.3.2 Natural Conditions

a. Location and Area

The city of Chinandega is located on the northern part of the Pacific coastal plain, extending from the gently sloping foot of the Los Maribios mountain range.

The urbanized area is nearly 800ha, lying between 12°37' to 12°40' latitude and 87°06' to 87°09' longitude, with an elevation ranging from 40m in the southwest to 100m in the northeast.

b. Climate and Hydrology

b.1 Precipitation

According to the 28-year precipitation record from 1966 to 1993 taken at the station near the center of Chinandega City, the average annual precipitation is 1,920mm, the lowest recorded was 1,085mm in 1972 and a maximum of 2,506mm in 1982. Usually, more than 90% of the total rainfall amount occurs in the rainy season between May and October, and there is hardly any rain in the dry season between November and April. Especially, for 3 months in the middle of the dry season, i.e., from January to March, a zero-rainfall record was observed in 14 of the 28 years. The average monthly precipitation is highest in September (415mm) followed by June (350mm) and October (330mm). The maximum monthly rainfall in 28 years was 1,686mm in May of 1982. Fluctuation in annual rainfall is presented in Figure B-19, and the average monthly rainfall is in Figure B-20, which is accompanied by the minimum and maximum monthly precipitation in the years 1966-1992. Monthly precipitation is given in Table B-43.

b.2 Temperature, Humidity and Evaporation

Table B-44: gives various meteorological data observed at the station in Chinandega City in 1992.

Mean maximum temperature is comparatively high in the period between January-April, exceeding 33 °C, which corresponds to the end of the dry season, while in the period between May-December, mean maximum temperature varies from 32.3 °C (September) to 37.5 °C (March). Mean minimum temperature varies from 18.8 °C (January) to 24.1 °C (April); the lowest temperature recorded in 1992 was 14.5 °C in January.

Mean relative humidity varies from 56% in May to 83% in October. The period of relatively high humidity (June-November), which follow a month after the rainy season, averages 79.3%, while the other 6 months (December-May) average 62.7%.

The monthly evaporation, which may be nearly in proportion to the potential evaporation, ranges from 111.8mm (November) to 244.8mm (March), totaling 1,958.3mm in 1992. The period with comparatively high humidity and low temperature (June-November) averages 131.2mm, and the other 6 months (December-May) averages 195.3mm.

b.3 Hydrology

The major river system in the city of Chinandega is Acome River which originates northeast of the city and flows in a south-westerly direction. After flowing through the city area, Acome turns westward to join Atoya River at a point 9 km west from the city

center. Acome River is an intermittent river; its flow is remarkably reduced in the dry season, and occasionally no flow is observed at the end of the season.

Since the surface material around the city is composed mainly of highly permeable recent volcanic falls like volcanic ash, volcanic sand and scoria, the surface runoff easily joins the underground stream, and in many cases, the majority of underflow disappear by deeper infiltration. Other minor river systems are also intermittent.

The flow of the stream is observed only during rain and for one hour, in many cases within several minutes, following the end of rainfall.

c. Geology and Hydrogeology

c.1 Geological Structure and Composition

The geological structure and composition of the Chinandega City area are similar to that of Leon, in that it is situated near the western edge of the Nicaraguan Depression, having the formations of Tamarindo as a basement, Las Sierras and the recent deposits of volcanic falls or flows in ascending order.

The differences between Chinandega and Leon area are as follows:

- No basement rocks outcrop around Chinandega area, being extensively overlain by Quaternary deposits. In other words, the Tamarindo Formation becomes deeper toward the north.
- The Quaternary deposits at Chinandega are presumably thicker than those at Leon, due to the larger scale volcanic activity of San Cristobal and its neighboring volcanoes than those of the southern volcanoes of Los Maribios. With regard to geological composition, the Quaternary deposits in this area are mostly made up of highly permeable materials like volcanic sand, scoria and pumice than in the southern area.

The geological structure of Chinandega area is schematically given in Figure B-21.

c.2 Hydrogeology

Similar to Leon, Chinandega City area has an abundance of groundwater resource. Since most of the area is covered by highly permeable soil, rainwater immediately infiltrates the ground reducing surface water runoff and also water loss by evapotranspiration. The reason why there are no perennial rivers in this area is due to the wide distribution of highly permeable surface material, a condition particularly convenient for groundwater recharge. On the other hand, it suggests susceptibility of groundwater resources to contamination and a small scale self purifying capacity of rivers.

Too much permeable surface soil allows rapid sinking of agricultural chemicals or insecticides down to the aquifer from where groundwater is pumped up for drinking water supply purposes.

Too small a flow of river water cannot attain sufficient self-purification resulting in the recharge of dirty water into the ground. Thus, groundwater contamination may be accelerated.

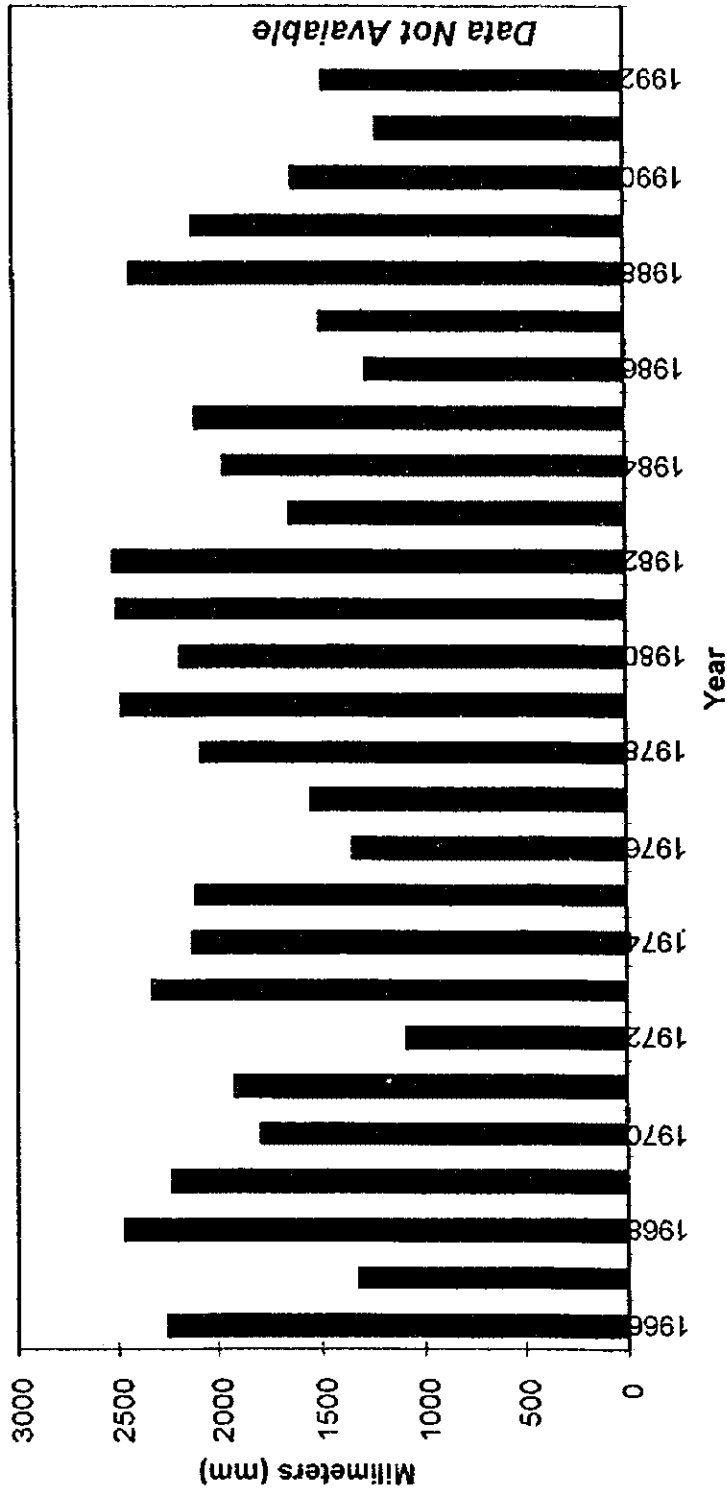


Figure B-19: Fluctuations in Annual Precipitation in Chinandega

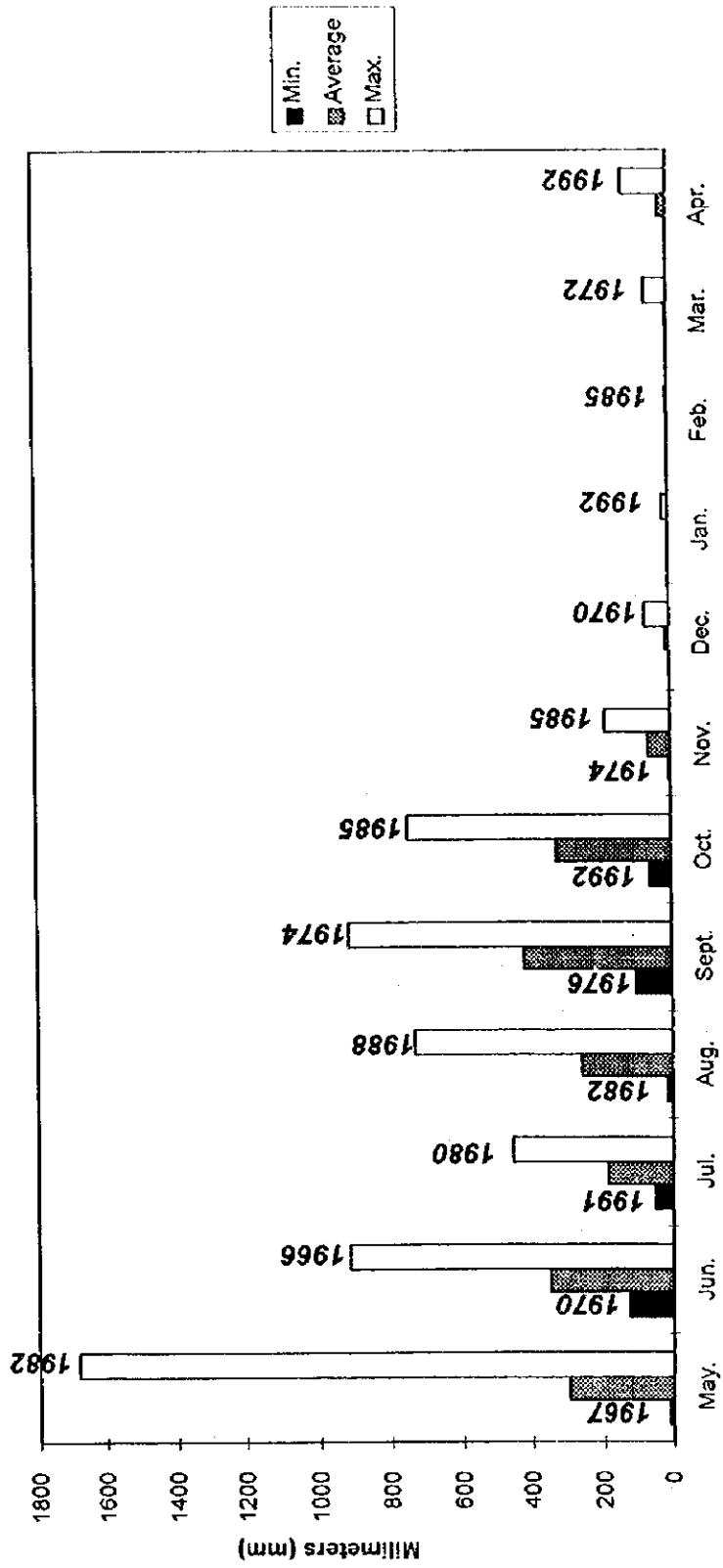


Figure B-20: Monthly Average Precipitation in Chinandega (27 Years from 1966 to 1993)

Table B-43: Monthly Precipitation in Chinandega (1996 - 1993)

Code	Station	Elevation	Latitude	Longitude	Type								
64018	CHINANDEGA	60	123800	870800	Principal Hydrometeorology								
Unit : (mm)													
Year	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
1966	502	920	323	139	138	163	38	11	0	0	0	20	2254
1967	13	411	126	139	307	260	37	1	0	0	0	24	1318
1968	371	603	138	195	405	635	92	7	4	0	13	8	2471
1969	227	335	187	346	395	525	103	4	0	0	0	109	2232
1970	317	128	248	376	305	255	92	68	2	0	0	0	1791
1971	201	176	134	265	627	386	125	1	0	0	0	0	1914
1972	351	162	93	79	134	127	48	19	0	0	64	8	1085
1973	298	376	164	424	523	530	14	2	0	0	0	2	2332
1974	163	422	128	213	919	269	6	0	1	0	0	2	2123
1975	248	161	198	322	497	532	138	0	0	0	0	4	2100
1976	23	512	175	165	106	259	96	0	0	0	0	0	1337
1977	391	298	97	188	219	170	123	9	0	0	32	22	1549
1978	340	270	299	268	484	269	29	33	0	0	0	82	2074
1979	63	458	178	325	842	571	32	2	0	0	0	0	2472
1980	251	239	456	350	485	318	57	7	0	0	5	10	2178
1981	570	513	195	379	264	541	7	8	7	2	0	0	2487
1982	1686	129	94	16	359	164	10	2	0	0	23	24	2506
1983	121	380	151	200	359	319	83	12	1	0	4	10	1639
1984	157	382	260	296	643	149	10	0	0	0	0	54	1951
1985	129	187	242	314	274	751	187	1	0	6	6	0	2098

Year	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
1986	396	199	60	183	244	163	16	2	0	0	0	0	1262
1987	38	350	264	157	383	258	31	6	0	0	6	1	1494
1988	216	382	285	730	374	382	50	1	0	0	0	0	2420
1989	120	474	208	301	630	212	61	46	0	0	0	52	2104
1990	261	193	166	156	393	282	139	9	0	0	0	29	1627
1991	188	291	55	199	131	250	82	10	0	3	0	0	1207
1992	137	272	192	173	463	62	27	1	17	0	0	125	1468
1993	459	483	58	227	790	238	9	0	-1	-1	-1	-1	
Average	294	347	185	254	418	323	62	9	1	0	6	22	1907
Standard Deviation	309	172	91	135	213	173	49	16	3	1	14	34	446
Min.	13	128	55	16	106	62	6	0	0	0	0	0	1085
Max.	1686	920	456	730	919	751	187	68	17	6	64	125	2506
75 % (*)	247	291	155	213	350	271	52	8	1	0	5	18	1611
95 % (*)	169	235	67	127	341	204	8	0	0	0	0	1	1150

Source : INETER (*) Probability Distribution : (Normal and Weibull), elaborated by ITS-LOTTI/LAMSA -1 =No Data

Table B-44: Various Meteorological Data in 1992, Chinandega

MONTH	TEMPERATURE			RELATIVE HUMIDITY (%)	VAPOR TENSION (mm)	RECIPITATION (mm)	EVAP.(ml)(mm)		FINE WEATHER HOURS	AVERAGE CLOUDY		WIND (m/sec.)				
	ABSOLUT E.MIN.	ABSOLUT E.MAX.	MIN.				MAX.	AVERAGE		1/3 OF SKY COVERED	MIN.	MAX.	AVERAGE	DIRECTION		
JAN.	14.5	33.6	18.8	35.4	26.7	63	15.9	0.0	218.3	170.6	262.7	1	1.9	4.2	2.7	SW
FEB.	15.7	33.6	20.0	35.7	27.5	64	16.8	2.8	189.3	161.0	237.9	1	2.0	3.9	2.6	SW
MAR.	18.5	35.0	21.6	37.5	29.4	56	16.1	0.0	305.1	244.8	271.1	1	2.1	4.7	3.3	SW
APR.	21.9	34.4	24.1	37.3	30.3	61	18.5	0.0	262.3	220.2	199.8	2	2.0	4.3	2.8	SW
MAY.	20.9	32.4	23.6	35.9	29.7	67	19.8	136.9	201.3	191.1	149.5	2	2.0	3.7	2.5	SW
JUN.	22.3	29.8	23.7	33.7	27.9	81	22.6	271.5	87.6	130.5	165.9	2	1.7	2.8	1.8	SW
JUL.	20.5	31.0	22.4	33.4	27.2	77	20.4	191.5	116.9	145.5	149.8	3	1.8	3.5	2.1	SW
AUG.	20.0	31.9	22.2	34.3	27.2	76	20.0	172.8	127.7	154.2	188.3	2	1.7	3.2	1.9	SW
SEP.	20.4	25.0	22.1	32.3	26.2	83	20.9	463.0	81.7	122.0	188.7	3	1.7	3.3	1.9	SW
OCT.	20.2	31.1	22.0	32.7	83	81	21.1	62.1	90.5	122.9	199.5	2	1.3	2.5	1.4	SW
NOV.	19.8	31.7	21.5	33.6	27.0	78	20.4	27.1	98.4	111.8	173.8	2	1.2	2.1	1.2	SW
DEC.	16.0	31.9	20.4	34.7	27.1	(65)	16.7	0.8	239.7	183.7	214.8	2	1.9	4.0	2.5	N
TOTAL								1328.5	2018.8	1958.3	2401.8	25				
ABSOLUTE	14.5	35.07														
AVERAGE	19.2	31.8	21.9	34.7	32.4	71	19.1	110.7	168.2	163.2	200.2	2	1.8	3.5	2.2	SW

Rainy season

Source : INETER

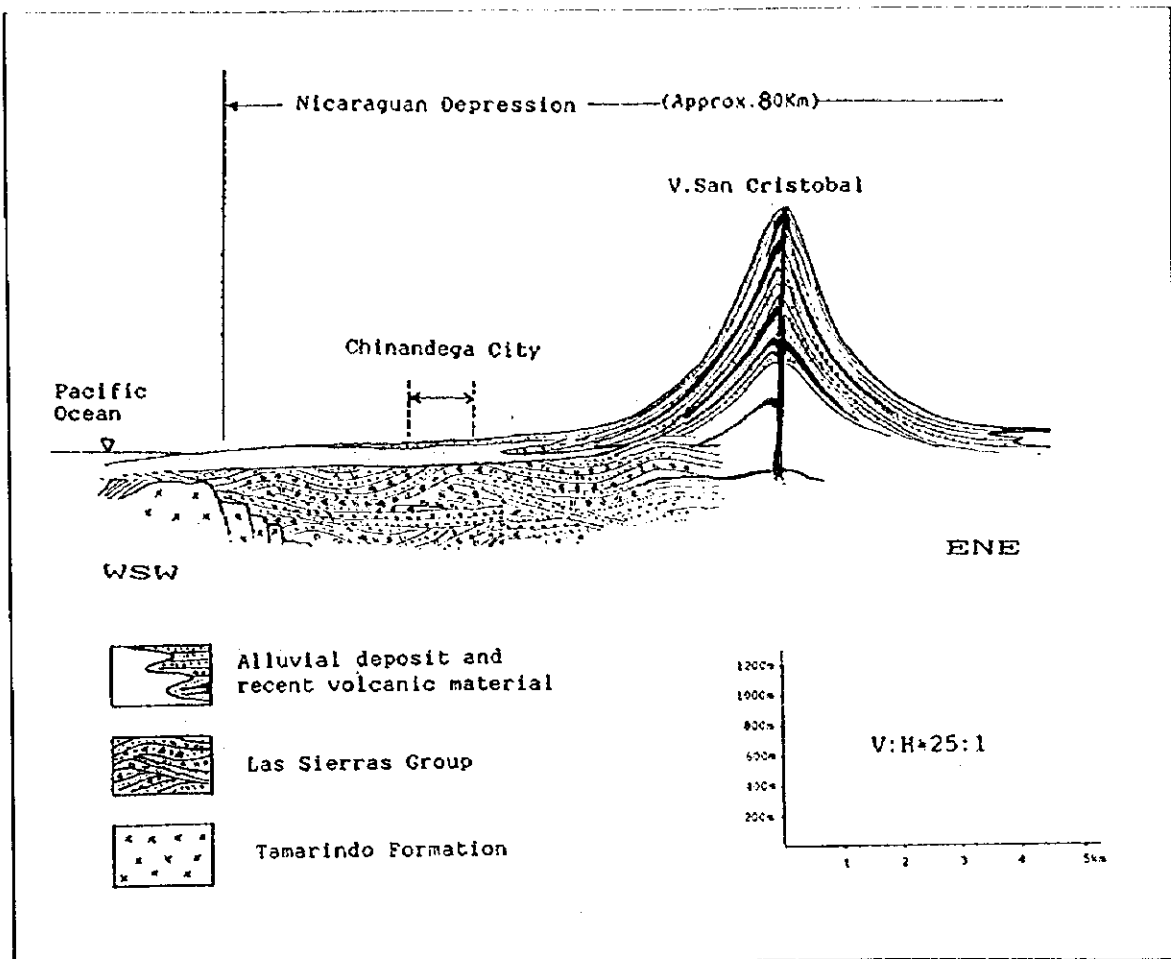


Figure B-21: Schematic Cross Section of Chinandega

B.3.3 Social Conditions

a. Administration

As established in Law No. 40 - 88, the municipal government is made up of the Municipal Council (ten councilors directly elected by the citizens) and the Executive Organ, under the Mayor, "Alcalde". The Mayor and his deputy, the Vice Mayor, are also councilors elected by the Council.

[The amended 1995 Constitution states that the mayor and vice mayor have to be directly elected.]

a.1 Executive Structure and Some Relevant Procedures

A new executive structure was recently approved by the Municipal Council, and the corresponding "Functions Handbook" would be approved shortly. The concept of this structure was created by an advisor from the Danish twin city of Eindhoven, and consists of three director level departments: Department of Municipal Services and Environment (the largest), Department of Urban Development and the Department of Finance. The cadastre will be relocated into the Department of Finance.

- Municipal Services and Administration (MSD)

The MSD is divided into four departments: Municipal Services, Environment, Equipment Management, and Personnel. Purchase and service contracts are at the Director/Auxiliary level. All municipal service sections are in the same department, where 191 people work (50.4% of total municipal employees). Each Section has a person in charge.

The solid waste services comprise residential collection, street sweeping and disposal of refuse in a landfill, involving 83 workers and 4 supervisors.

The collection routes are planned and fixed.

The quality of the services are the responsibility of two inspectors for street sweeping and one for collection.

Landfill sites are allocated 1 bulldozer operator and 1 assistant.

The municipality owns three markets (Mayoreo, Central and Santa Ana) whose boxes are rented to merchants. Seventy - five officials of MSD are allocated to these markets, for inspection, maintenance and management.

The abattoir is operated by MSD with 13 workers and a veterinary surgeon. It is the only one in the municipal area and the Japanese Government will be granting equipment to recover biogas and byproducts from residues through anaerobic digestion, using them to reduce costs and improve sanitary conditions of the abattoir. The municipal government is studying the convenience to constitute a public enterprise to manage the improved abattoir. That would be the first indirect municipal entity.

The equipment management comprises three sections: transport, maintenance, and warehouse that attend the whole municipal fleet.

Most maintenance services are performed in the workshop and some in private ones. The director of MSD considers the time taken for buying materials or services is relatively short, and informs that the department controls the economic life and maintenance costs of the vehicles.

It is allowed to expend to C\$ 500,000 asking for proposals directly to at least 3 suppliers, and more than C\$ 500,000 only through public bidding.

A private station service is contracted to supply fuel and lubrication.

The urban drainage system maintenance is considered to be INAA's responsibility, but the municipality eventually occasionally cleans sedimentation boxes. The permeable soil tends to prevent flooding. Municipal resources are used to construct new drains.

Employees in the Municipal Government (August, 1996)

Municipal Services and Administration Department (MSD)

Street sweeping	49
Waste collection and disposal	38
Abattoir	14
Central Market	29
Mayoreo Market	38

Santa Ana Market	8
Cemetery	5
Municipal Stadium	8
Administrative affairs	2
Total	191
Street and internal maintenance	16
In the whole Government	
Workers	186
Administrative Officials	99
Auxiliaries	94
Total	379

• **Financial Department (FD)**

It is included the cadastre of citizenry real estate in the section Tax Receiving, sector Real Estate. The cadastre system is the same micro station SISCAT and has the same importance and usage pointed in item 1.2.3.y) for Leon.

The urban area is divided in 4 Zones or Districts. The First District is subdivided into "barrios" and the others in 62 "repartos" with low level urbanization.

The refuse collection/disposed/sweeping services are charged through a monthly tax calculated as follows:

- residential units located in the residential area should pay C\$ 10.00;
- owners of vacant lots should also pay C\$ 10.00;
- commercial units should pay C\$75.00;
- residential units should pay C\$ 1.00 multiplied by the front length of the lot and for a increasing factor fixed to each zone;
- hospitals and health care services pay nothing for the municipal service;
- industries pay nothing but take care of their own refuse (they usually deliver it to the dumping site or burn it)

This tax is mostly paid to a tax collector that receives a commission (6% for residential and 10% for commercial receipt) on top of his basic salary. About 45% of the beneficiaries of the solid waste services do not pay, claiming financial difficulties and unemployment.

FD monitors the budget and receives monthly reports from all budgetary units. The control system is computerized.

a.2 Support from Ministries and National Entities

The local SILAIS performs hygiene inspections at markets and abattoirs, and vermin control including fumigation, with the aid of ACEM -Malaria Control and Eradication Area. MAG should also inspect the markets.

It is important to consider that municipalities have several responsibilities fixed by the Law of Municipalities. However, this does not include authorization to impose strong

sanctions such as closure of an establishment. Thus they need support from national authorities, mainly MINSA, that exercises the Sanitary Code, MARENA, the principal agency that enforces environmental laws, and INAA, the agency that manages all water and wastewater systems. Sewer nets that are poorly maintained encourage illegal discharge into the stormwater drainage system (surface or pipes), and insufficient supervision by INAA and the municipality promotes mixing of both stormwater and wastewater.

These facts are common in Chinandega and generally throughout the country.

INAA studied groundwater supply for Chinandega with the support of a Canadian Agency.

MARENA studied the hydrographic basins in Chinandega and conducted an Environmental Diagnosis on surface and groundwater.

SILVAH (Local Information System on Housing and Human Settlements) performed an inquiry into housing conditions in Chinandega.

As a newly developed nation, the Urban Development Plan for this city established in 1987 is considered dated and obsolete.

MCT sets standards for roads which are also used for urban structure.

a.3 Relevant Aspects of the Municipal Budget (MB)

Some indices may be calculated from the MB, for a macro analysis of the 1995 and 1996 budgets:

TsI/MB=	0.86
HI/MB=	0.00
D/MB=	0.00
R/MB=	0.13
MiT/TsI=	0.52
MT/TsI=	0.25
R/TsI=	0.15

Other indices may be calculated for a specific analysis, taking Relevant Costs as:
 $= RC = PpE + (S.M.P):$

WRC=	4630
MkRC=	3241
ARC=	975
WT/WRC=	0.32
MkT/MkRC=	1.05
AT/ARC=	0.89

Some conclusions are as follows:

- Taxes correspond to 86% of MB and there are no foreign donations.
- In proportion to the total tax income (TsI), direct municipal taxes for services and usage (MT) correspond to only 25%, and imposed taxes (MiT) correspond to 52% (these taxes are transferred from national taxes).

- 42% of Tsl correspond to the tax on sales and services.
- Outstanding debts reach 14% of Tsl.
- The waste & cleansing tax covers 32% of the relevant costs (RC) of the services.
- Market and abattoir taxes cover 105% and 89% of the services respectively.

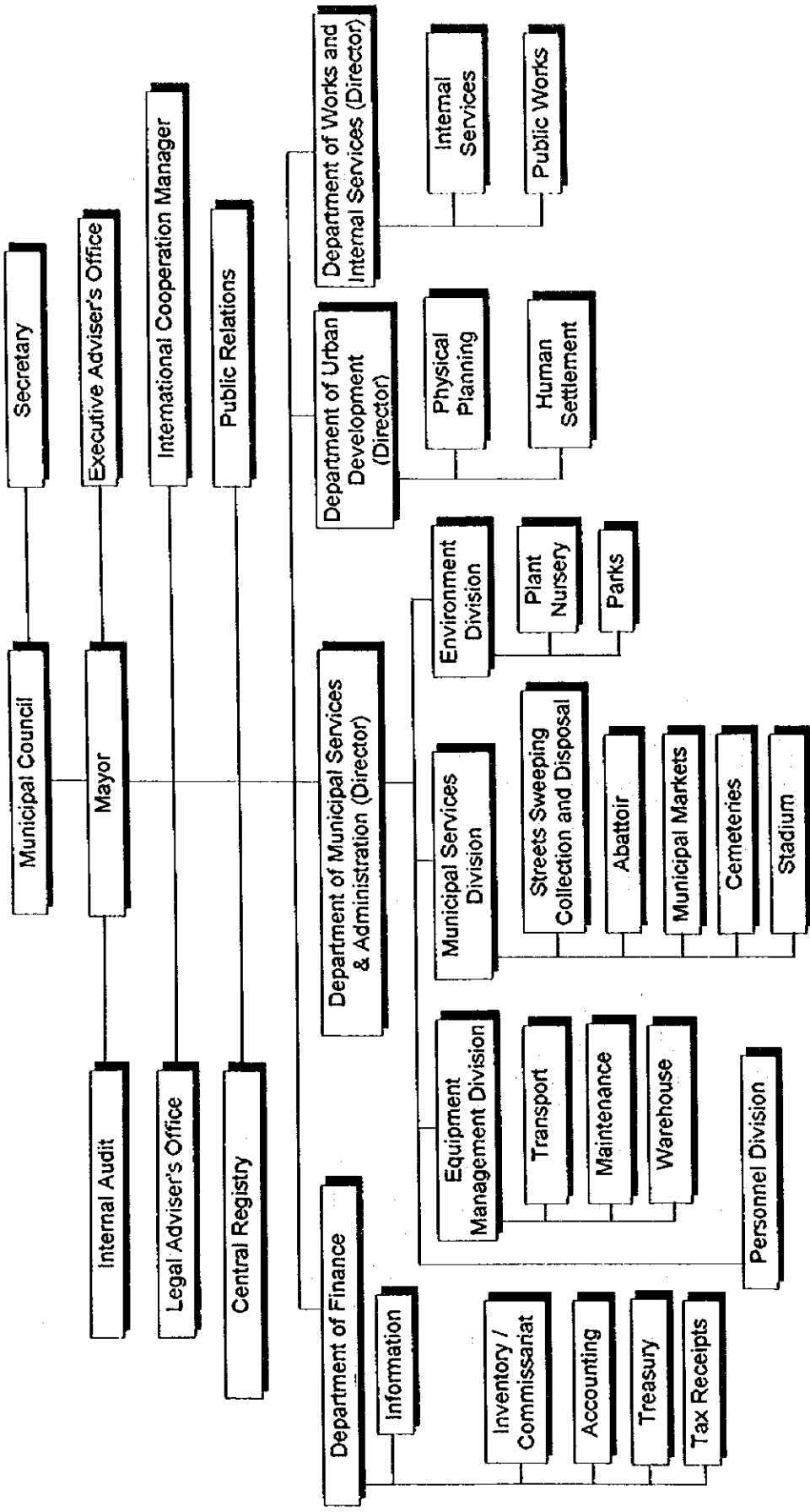


Figure B-22: Organization Chart of the Municipal Government of Chinandega

b. Community

Communities tend to be structured in levels, starting with individual premises at the bottom, then moving up to neighbors, districts, etc., and finally to the official administrative ward (e.g., barrio, reparto, etc.) level.

Communication and cooperation between authorities and a community are normally exchanged at the level of the administrative ward (i.e., barrio, reparto, etc.). Community activities supported by authorities, such as community based education programs and health promotion, are normally extended by community volunteers (called brigadas or brigadistas). Some of these volunteers' activities in relation to public health are mentioned in the following sections.

c. Public Health

At the national level, it is reported that the following diseases and/or illnesses (morbidity and mortality, as indicated in the first column of the table below) affect the people most and thus need to be taken into consideration for the improvement of national public health conditions. The cases of principal diseases (morbidity or mortality) in Chinandega Municipality recorded in 1993-1995 are shown in the table below.

Table B-45: Principal Diseases (Morbidity or Mortality)

	Morbidity or Mortality	1993	1994	1995
Acute Diarrhea	Morbidity	7,229	6,273	10,650
	Mortality	36	30	46
Acute Respiratory Infection	Morbidity	22,295	23,631	28,496
	Mortality	22	26	28
Cholera	Morbidity	327	371	325
	Mortality	3	1	1
Classic Dengue	Morbidity	62	300	88
	Mortality	0	0	1
Hemorrhagic Dengue	Morbidity	46	168	52
	Mortality	0	0	0
Malaria	Morbidity	1,253	782	729
	Mortality	0	1	0
Injury by animal bites	Morbidity	?	?	?
	Mortality	0	0	0
Maternal Death	Mortality	1	2	2
Neonatal Death	Mortality	23	26	23
Fetal Disease	Mortality	16	20	18

Source : MINSA

There is 1 public and 4 private hospitals, 15 health centers (centro de salud) and 74 health posts (puesto de salud) throughout Chinandega Department (Departamento). Medical institutions in Chinandega Municipality are shown in the table below in comparison to those in Chinandega Department.

Table B-46: Medical Institutions in Chinandega

	Unit	Chinandega Department	Chinandega Municipality
Public hospitals	No.	1	1
Private hospitals	No.	4	1
Health centers with bed facilities	No.	7	1
Health centers without beds	No.	8	1
Health posts attended by medical doctors	No.	23	0
Health posts attended only by nurses	No.	51	10

Health centers can be divided into 2 types: one with inpatient facilities, the other only for outpatients. Health posts also can be categorized into 2 types: one visited by medical doctors, the other only attended by nurses.

There were 36 medical doctors and 98 nurses and allied health professionals in Chinandega Municipality in 1996.

d. Public Health Education

Sanitary education in the city of Chinandega is the responsibility of the MINSA and MED, whereas MARENA and the municipality coordinate sanitary and environmental education. With regard to formal education managed by the MINSA-MED, the hygiene and sanitary procedures that children should practice is taught in grade schools (for example: hands should be washed before eating and after using the toilet). Furthermore, the following activities in sanitary education are held:

- 8 workshops regarding "diarrhea" are held for the teachers of primary schools.
- 40 oral re-hydration first aid units (Unidades de Rehidratación Oral Comunitaria: UROC) for community and schools.
- Vaccination sessions in the schools.
- 15 "mother clubs" formed to offer sanitary education.
- 12 houses or bases for volunteers (brigadistas) teams to attend the barrios and rural areas.
- related meetings held by respective sectors of the city;
- radio announcement and street announcement for sanitary education;
- volunteers (brigadistas) and midwives allocated in respective sectors of the city, as shown in the table below;

Table B-47: Volunteers and Midwives in Chinandega

Barrio	P. J. Ch.	Guadalupe	Roberto Gonzalez	Roberto Cortez	Villa 15 de Julio
Volunteers	45	20	58	20	35
Midwives	15	3	7	8	20

- A project of ACIDI-INAA in Chinandega covers 2 priority barrios (La Florida and Rubén Darío) to offer sanitary education to the inhabitants.
- MARENA and the municipality have a program for volunteers (brigadistas) on environmental issues. The objectives for the volunteers are to respond to community problems such as pollution, garbage accumulation, etc.
- Training workshops regarding compost making from garbage.
- Distribution of sanitary and environmental education posters by the volunteers. Posters could be e.g., how to dispose of garbage, eliminate disease focal points, etc.

e. Employment

“Statistics of socio-labor in Chinandega City” surveyed by MITRAB, reported that the number of employees in Chinandega was 23,464 in 1994. From that data, the unemployment rate can be calculated as 8.5% (refer to Table B-48). The major economic activity is “commerce, restaurant and hotel”, with 7,616 people involved, followed by “social, communal services”, with 7,392. Employees of these two major activities occupied about 64 percent of the total. The employees in the informal sector shared 60 percent, involving 14,000 people, therefore the EAP seems considerably low.

INAA reported in “Department of Chinandega” that the unemployment rate in Chinandega is 28.2 percent.

Table B-48: Number of Employees and Unemployment Rate in 1994

	EAP*	Employee	Unemployment Rate (%)	Reference INSS
Total	25,648	23,464	8.5	17,761
Primary Sector	2,464	2,352	4.5	4,048
Agriculture	2,464	2,352	4.5	4,048
Secondary Sector	5,096	4,536	11.0	5,520
Manufacturing	4,760	4,312	9.4	5,354
Construction	336	224	33.3	137
Mining	0	0		29
Tertiary Sector	18,088	16,576	8.4	8,193
Commercial, restaurant & hotel	7,728	7,616	1.4	576
Transport & Communication	1,232	1,176	4.5	1,470
Electricity, gas & water supply	224	224	0.0	68
Finance, security, property & service for enterprises	168	168	0.0	270
Social, community services	8,008	7,392	7.7	5,753
Non-specific activities	728	0	100.0	56

Note : * "EAP" = economically active population

Source : Estadísticas Sociolaborales de la Ciudad de Chinandega Anuario Estadístico 1994, INSSBI

f. Income Level

The above mentioned survey by MITRAB reported that the number of households with an income of less than C\$500 per month was 29.4 percent and those with an income between C\$501 and 1,000 per month was 30.3 percent, which is a little higher than Leon.

INSSBI reported that the average weekly salary was C\$273.27, which is equivalent to 81 percent of the average national income (C\$336.50). Comparing the average income by economic activity, the salary of unspecified activities, that of mining activity and that of electricity, gas and water supply is very low (refer to Table B-49).

Table B-49: Average Salary (Weekly)

Unit : C\$

	1991	1993	1995	ratio to whole country (%)
Total	167.26	248.3	273.27	81.2
Primary Sector	166.82	155.91		
Agriculture	166.82	155.91	174.01	71.9
Secondary Sector	171.01	428.32		
Manufacturing	172.49	434.37	433.85	116.6
Construction	128.28	238.63	216.57	66.1
Mining	167.26		146.16	33.7
Tertiary Sector	166.48	221.82		
Commercial, restaurant & hotel	188.56	269.77	274.25	65.4
Transport & Communication	243.3	325.34	352.32	68.6
Electricity, gas & water supply	60.05	117.45	222.96	40.5
Finance, security, property & service for enterprises	176.99	350.08	382.49	62.9
Social, community services	147.47	212.17	191.98	73.3
Non-specific activities	58.7	142.74	178.49	19.1
Total in Nicaragua	168.96	291.49	336.50	

Source : Anuario Estadístico 1991,1993,1995, INSSBI

B.3.4 Population of Chinandega

a. Demography

This section deals with the demographic characteristics in the urban area of Chinandega, based on the 1995 Population and Housing Census. The variables examined here include: population size, household size and population distribution.

b. Nicaragua's Population and Growth Rate

Nicaragua covers an area of 130,668 km² (121,428 km² land and 9,240 km² water area). It has an estimated population of 4.4 million based on the 1995 figures of the National Institute of Statistics and Census (INEC).

The country has an annual growth rate of 3.37% and a population density of 36 persons/km². The urban population makes up 54% of Nicaragua's total population due to migration of rural residents to Managua and other important cities.

The country is ethnically diverse and the majority of the population is made up of mestizos of Indian and Spanish descent. Like other developing countries, Nicaragua has a high birth rate and a gradually declining mortality rate. Regardless of a high population growth rate, the population density (36 persons/km²) of the nation is lower than most Latin American countries.

The country is divided into 16 Departments. Table B-24 shows the population distribution by department based on the national census taken by INEC in 1971 and 1995. According to the table, the population of Nicaragua soared from 1.9 million in 1975 to 4.4 million in 1995, showing a 2.32% increase and a 3.37% average annual growth rate.

The greater part of the country's population, 57% (1995 estimate), is concentrated in the Pacific region, which is the most urbanized and economically developed region in the country. The central zone, which is reported to have the highest annual growth rate, makes up 31% of the national population, while the Atlantic zone only covers 12%.

Table B-50: Population of Nicaragua

Country Department	Population		Growth Rate (%) 95/71
	1971	1995	
Country	1,877,952	4,357,099	3.37
Chinandega	155,286	350,212	3.45
Leon	166,820	336,894	2.97
Managua	485,850	1,093,760	3.44
Masaya	92,152	241,354	4.09
Granada	71,102	155,683	3.32
Carazo	71,134	149,407	3.14
Rivas	74,129	140,432	2.70
Chontales	68,802	144,635	3.14
Boaco	69,187	136,949	2.89
Matagalpa	168,139	383,776	3.50
Jinotega	90,640	257,933	4.45
Esteli	79,164	174,894	3.36
Madriz	53,423	107,567	2.96
Nueva Segovia	65,784	148,492	3.45
Rio San Juan	20,832	70,143	5.19
Zelaya (1)	145,508	464,968	4.96
R.A.A.N.		192,716	
R.A.A.S.		272,252	

Note : 1971 and 1995 Census (INEC)

c. Population by Municipality in Chinandega Department

The department of Chinandega covers an area of 4,926 km². It has a population density of 71 persons/km² and comprises 13 municipalities: Chinandega, Chichigalpa, Cinco Pinos, Corinto, Puerto Morazan, Pozoltega, El Realejo, San Francisco, San Pedro, Santo Tomas, Somotillo, El Viejo and Villa Nueva.

Over thirty percent of the department's total population is concentrated in the municipality of Chinandega, which is inhabited by 117,037 people. The municipality of Chinandega is the most populated municipality in the department, and 83.2% of its population resides in the urban area.

The total population distribution and growth rates by municipality in the department according to the 1971 and 1995 census are shown in the table below:

Figure B-23: Population and Growth Rate by Municipality
in Chinandega Department

Municipality	1971			1995			Growth Rates		
	Total	Urban	Rural	Total	Urban	Rural	71/95 (T)	71/95 (U)	71/95 (R)
1. Chinandega	45,298	29,922	15,376	117,037	97,387	19,650	4.03	5.04	1.03
2. Chichigalpa	22,923	14,596	8,327	41,903	28,823	13,080	2.55	2.88	1.90
3. Cinco Pinos	4,448	466	3,982	6,220	557	5,663	1.41	0.75	1.48
4. Corinto	14,687	13,371	1,316	17,177	16,926	251	0.65	0.99	-
5. Pto. Morazan	3,369	1,608	1,761	11,411	4,368	7,043	5.21	4.25	5.95
6. Posoltega	7,140	1,131	6,009	15,331	4,189	11,142	3.24	5.61	2.61
7. El Realejo	2,366	522	1,844	8,154	3,357	4,797	5.29	8.06	4.06
8. San Francisco	4,849	488	4,361	5,980	582	5,398	0.88	0.74	0.89
9. San Pedro	3,449	437	3,012	4,048	409	3,639	0.67	-0.28	0.79
10. Santo Tomas	3,142	632	2,510	6,788	369	6,419	3.26	-2.22	3.99
11. Somotillo	11,616	1,853	9,763	24,767	9,891	14,876	3.20	7.23	1.77
12. El Viejo	24,084	8,480	15,604	69,055	33,607	35,448	4.49	5.91	3.48
13. Villa Nueva	7,915	1,349	6,566	22,341	3,090	19,251	4.42	3.51	4.58
Total	155,286	74,855	80,431	350,212	203,555	146,657	3.45	4.26	2.53

Source : Population Census Data of 1995 (INEC)

d. Population of the Urban Area of Chinandega Municipality

With 97,387 people in a land area of 16.10 km², the urban area of Chinandega Municipality has a population density of 6,049 persons/km².

Table B-51: Urban and Rural Area Population of Chinandega Municipality

Chinandega	Area (km ²)	Population (1971)	Population (1995)	Population Density (p/km ²)	Growth Rate (1971/1995)
Urban Area	16.10	29,922	97,387	6,049	5.04
Rural Area	630.90	15,376	19,650	31	1.03
Total	647.00	45,298	117,037	181	4.03

Source : Population data (INEC); Growth rates estimated by the Study Team

d.1 Household

Occupying an area of 16.10 km², the urban area of Chinandega Municipality was estimated in 1995 to have 16,935 households and an average household size of 5.8 persons per household, as shown in the table below:

Table B-52: Urban Area of Chinandega: Population and Household

City	Area (km²)	Urban Population	Number of Households	Person per Household
Urban Area	16.10	97,387	16,935	5.8

Source : 1995 Population Census Data (INEC)

d.2 Population Composition and Division by District

Zones categorized by income are illustrated in Figure B-24.

INEC statistical data for population and housing figures are official data, therefore, total population and housing estimates represented in the table mentioned will be used as a reference.

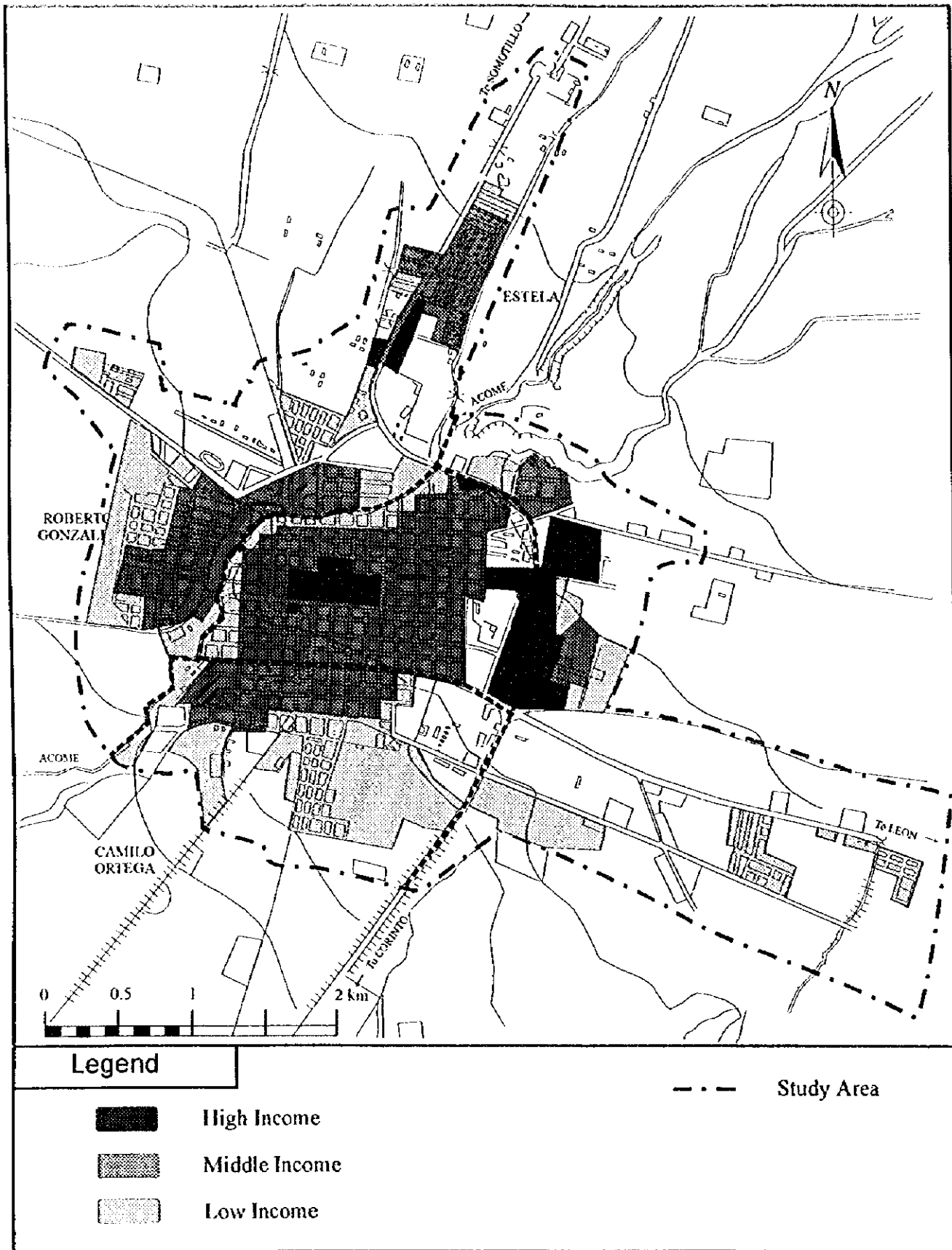


Figure B-24: Zones Categorized by Income in Chinandega

B.3.5 Housing Conditions in Chinandega

a. Housing Development

The Housing Bank of Nicaragua (BAVINIC) is in charge of housing development programs in the urban area of Chinandega. Some international organizations, e.g. Holland Cooperation Agency, also technically or financially assist in implementing housing development projects.

At present there are no planned or on-going housing projects in the city.

b. Living Conditions

Poverty and unemployment have become serious concerns of both the central and local governments. Government agencies are currently engaged in livelihood programs to counter-act impoverished conditions caused by lack of jobs.

The 1980's ended with Nicaragua facing critically impoverished conditions and a demographic structure and distribution that greatly affected the country's socioeconomic conditions. The civil war significantly influenced national economic growth as it impelled the rapid and accentuated decline in social indicators that led to the decay of productive and social infrastructure. Today, the standard of living in Nicaragua is still one of the worst in Latin America, a condition that is mainly attributed to unemployment or underemployment.

According to the magazine, "El Observador Economico" (The Economic Observer), published by the International Foundation for Global Economic Challenge (FIDEG), 53% of households in cities located in the Pacific region (including Leon, Managua and Granada) in 1995 were considered to be impoverished.

Poverty and other problems related to the living conditions of the people in the study areas are specifically identified below:

- Low income, unemployment or underemployment of the breadwinner.
- About 61% of households in the three cities headed by widows or single women are below the poverty line.
- Migration of breadwinners to other urban areas in search of better employment opportunities. However, the employment rate in these areas is worse than that of rural areas. The alarming rate of rural to urban migration further exacerbates housing conditions.
- Poor education or illiteracy.
- High percentage of school dropouts among extremely impoverished households.
- Insanitary conditions. Poverty has serious repercussions on public health, especially in children; various diseases were observed to have a high incidence rate in Leon in 1995.
- Apathy and dependence on outside assistance.

The Economic Observer also states Granada to have the highest ratio of impoverished households (57.4%), followed by Leon with 55.4%, and Managua with 47.1%.

In relation to housing, a vast number of Nicaraguans still reside in unacceptable and substandard housing conditions, such as those in spontaneous settlements and

progressive urban settlements scattered around the peripheries and suburbs of the three cities in the study.

c. Housing

As of 1995, the municipality of Chinandega was estimated to have a total of about 20,324 housing units: 16,935 in the urban area and 3,389 in the rural area. The urban and rural housing units can accommodate an average size of 5.8 persons/unit. The housing figures of Chinandega department are shown in Table B-53.

The household is the basic social unit of the Nicaraguan society. However, present economic conditions are foreseen to cause the breakdown of the extended family system and the reshaping of nuclear family households.

According to the municipal government of Chinandega, housing shortage is usually due to: 1) the dilapidated condition of the buildings, 2) unfavorable location, 3) high population density, and 4) population increase. A shortage of 7,319 housing units was estimated in 1992, and a shortage of 8,294 units is forecast for the year 2002.

Table B-53: Number of Housing Units in Chinandega Department

Municipality	1971			1995			Growth Rates		
	Total	Urban	Rural	Total	Urban	Rural	71/95 (T)	71/95 (U)	71/95 (R)
1. Chinandega	8,898	3,827	4,871	20,324	16,935	3,389	3.80	6.39	-1.50
2. Chichigalpa	4,169	1,946	2,223	7,510	5,240	2,270	2.48	4.21	0.09
3. Cinco Pinos	423	346	77	993	101	892	3.62	-5.00	10.75
4. Corinto	3,673	1,331	2,342	3,472	3,420	52	-0.23	4.01	-
5. Pto. Morazan	576	295	281	1,981	743	1,238	5.28	3.92	6.37
6. Posoltega	804	589	215	2,553	705	1,848	4.93	0.75	9.38
7. El Realejo	360	245	115	1,495	624	871	6.11	3.97	8.80
8. San Francisco	448	366	82	984	109	875	3.33	-4.92	10.37
9. San Pedro	324	259	65	647	71	576	2.92	-5.25	9.52
10. Santo Tomas	348	258	90	1,069	62	1,007	4.79	-5.77	10.59
11. Somotillo	1,295	965	330	4,230	1,773	2,457	5.06	2.57	8.72
12. El Viejo	3,191	1,912	1,279	11,910	5,668	6,242	5.64	4.63	6.83
13. Villa Nueva	844	621	223	3,612	554	3,058	6.25	-0.47	11.53
Total	25,153	12,960	12,193	60,780	36,005	24,775	3.74	4.35	3.00

Source: Population Census Data, 1995 (INEC)

B.3.6 Urban Structure

a. General Situation

Founded in 1858, the city of Chinandega is the second major city in western Nicaragua. It covers 16.10 km² and has a population of 97,387 inhabitants. The area is mainly agricultural, has the largest sugar mill (San Antonio) and the most prominent seaport (Corinto) nationwide. The area is blessed with a warm climate as it is 55.80 meters above sea level.

b. Brief History of Chinandega City

The development of the city of Chinandega shows significant Spanish influences, as can be seen from the construction of a reticulated colonial structure in the center of town.

Development of the city was also influenced by the Acome River at the northern and western sections. Later, a ring road (Somotillo Highway) and a railway that connects the city to Corinto were constructed.

From 1960, new towns with a growing population were developing in the city periphery. At present, the urban area covers about 16.10 km² and almost encircles the ring road. Developments move longitudinally towards the north (along the highway to El Viejo) and southeast (along the railway and the highway to Leon).

At present, Chinandega is administratively divided into 4 districts, and subdivided into 55 barrios, repartos, colonias, progressive settlements and spontaneous settlements.

c. City Development Plan

There are no current city development plans. The "Physical Programme for Urban Development" (EUDOFP) is the latest development plan available and was made between 1986-1987. The Department of Housing and Human Settlements and the Department of Urban Planning (VIAH-PLAFU) of the municipal government of Chinandega carry out city planning projects. The realization of these projects is considered difficult, however, in view of the shortage in economic and human resources. Unfortunately, guidelines and regulations to control urban growth, land use, etc., do not exist, thus development features are determined based on general and natural development trends in some settlement areas.

d. Land Use

d.1 Current Land Use

As mentioned above, there are no land use maps of the study area. Therefore, a land use map was prepared based on information provided by the municipal government of Chinandega and the field survey carried out by the Study Team, using the available cartographic map. This land use map is shown in Figure B-25.

The city of Chinandega has a reticulated colonial structure. Commercial and service areas are concentrated in the center of the city, and educational establishments are located within the urban area. Industrial and manufacturing establishments are widely distributed in the southeast, north and southwestern areas. For environmental conservation, the area along the Acome River is restricted for development.

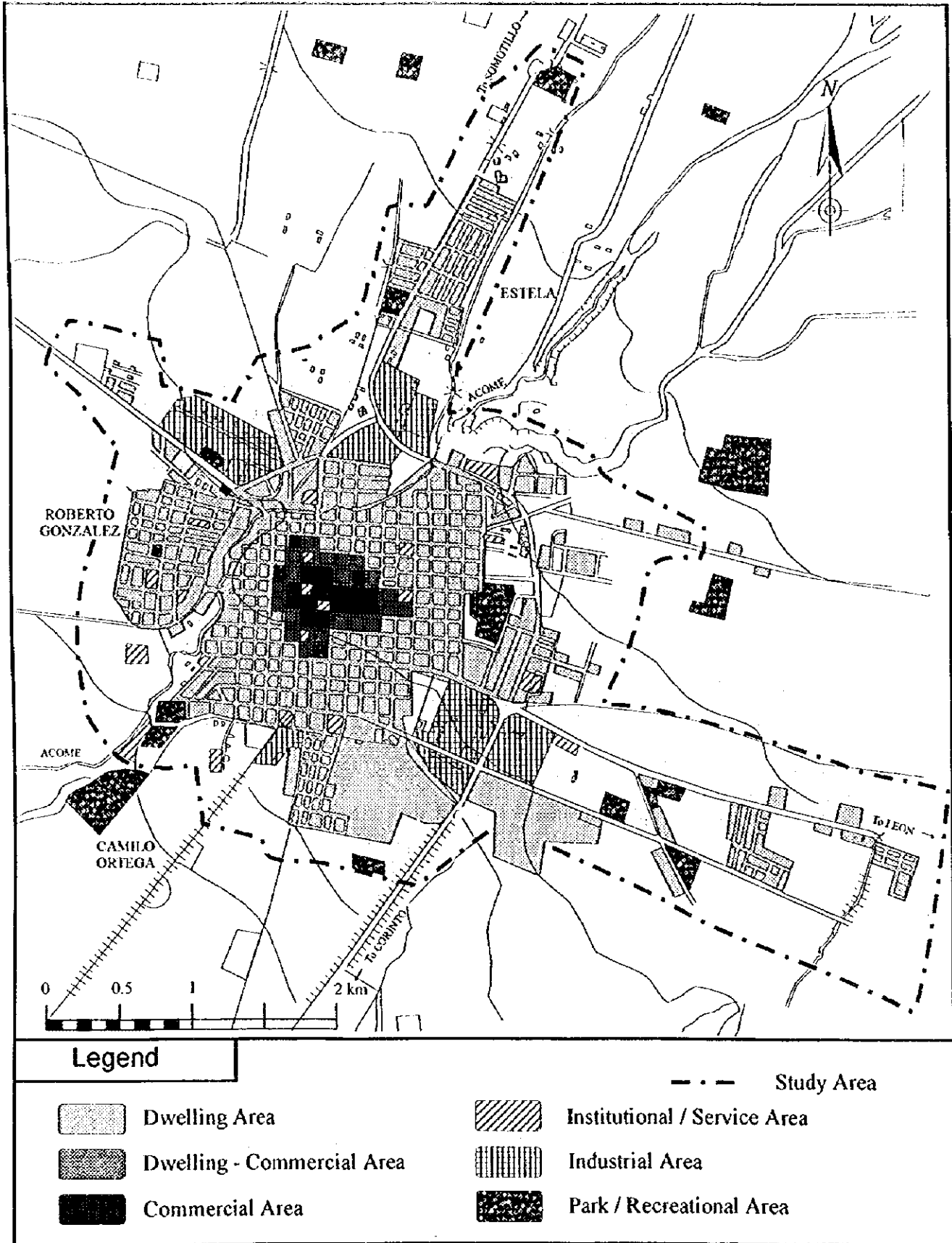


Figure B-25: Current Land Use in the Urban Area of Chinandega

d.2 Price of Land

Land values in Chinandega vary by district. To define land prices, each district is divided into zones. The land prices shown in the table below are estimates given by the municipal government.

Table B-54: Prices of Land in Chinandega Municipality

Zone	Area	Unit	Price of Land (C\$)
Zone 1	Commercial area	m ²	78.00
Zone 2	Commercial and services	m ²	50.00
Zone 3	Transition dwelling area to commercial	m ²	45.00
Zone 4	Intermediate dwelling area, central district	m ²	36.00
Zone 5	Peripheral dwelling area	m ²	30.00
Zone 6	Intensive dwelling area	m ²	20.00
Zone 7	Residential area	m ²	60.00
Zone 8	Industrial area	m ²	75.00
Zone 9	Restaurant and gas station	m ²	60.00
Rural Area	Outside the city area	ha	2,960~7,100

Source : Municipal government of Chinandega (1996)

e. Industry

The city of Chinandega has about 95 industrial establishments: mills (42%), iron casting shops (15%), factories for construction materials (13%) and others (30%). Seven large and important industrial establishments namely GRACSA (oil and grease production plant), GEMINA (wheat flour processing plant), DEPSA, CENTRAL SAN CRISTOBAL, INA and EXPASA (cotton and gin factories); and ALMESA (concentrated food processing plant), are located at the city periphery.

About 1,090 of the commercial establishments (bakeries, supermarkets, etc.) are located in the city area.

f. Infrastructure

f.1 Road Transport

Cars, motorcycles, horse drawn carts, busses, taxis, and trucks make up the city's transportation system.

The northwestern part of the city boasts a small private airfield which is also used to house planes used to fumigate surrounding agricultural zones.

f.2 Road Network

f.2.1 General

The development of a road network is important for the establishment of future growth trends, the development of city infrastructure, and the improvement of the urban sanitation environment in the three principal cities. Future highway construction

projects are likely corridors for water supply, sewerage systems and solid waste collection lines. The pattern in highway development is generally an excellent guideline to predict future trends in the settlement of people in need of a water supply and wastewater system, and for urban environmental improvement.

f.2.2 Road Network in the City of Chinandega

The maintenance of the roads and sidewalks within the municipality is the responsibility of the municipal government of Chinandega.

As in Leon, the roads in the city are arranged in a grid formation, extending from the central plaza area towards the city periphery.

The Pan American Highway intersects Chinandega as it extends toward Honduras and Managua. This highway is in a very poor condition due to passages of heavy vehicles and inefficient maintenance. Roads paved with asphalt connects the area to El Viejo and Corinto. Several unpaved roads connect the towns of the municipality to each other.

The city roads are either paved (block paving, rubble stone, macadam) or unpaved.

f.3 Power Supply and Telecommunication

The power supply of Nicaragua is provided by the Nicaraguan Institute of Energy (INE) and is distributed by the Nicaraguan Electric Company (ENEL). ENEL services cover the entire country, making it a major INE distributor.

The distribution network covers the whole city area, except for some new "repartos". A total of 12,056 electric connections, including the public lighting system, are provided in the city. In Chinandega, power is supplied through 2 sub-stations, one in the urban area and the other in the rural area.

Telephone services in the city are managed by the Nicaraguan Institute of Post and Telecommunications (TELCOR) through the Nicaraguan Telecommunication Company (ENITEL). The city is estimated to have 1,802 subscribers and 20 public telephones. Domestic as well as international postal and telegraphic services are also available.

B.3.7 Economic Conditions

a. Regional Economy

a.1 General condition

There is no study on Gross Regional Domestic Product (GRDP) in Nicaragua. The basic data needed to estimate GRDP such as industrial production and commercial sales and services according to region are too dated to estimate the current GRDP.

INAA reported the profile of the socio-economics of Chinandega in "Department of Chinandega" as follows:

- Basic economic activities of Chinandega are agriculture and commerce.
- Industrial manufactures to support agro-export have been established recently.
- Economically active population (EAP) in 1994 was 45.4% of the population, which is about 43,241 people.

- The sources of income of the employed are 68.2% from services, 20.8% from commerce and 8.6% from agriculture.

On the other hand, INSSBI reported the amount of social security contributions and number of employers by regional economic activity, which are summarized in the following tables.

Table B-55: Number of Employers by Economic Activity

	1991		1993		1995	
		%		%		%
Total of Chinandega	695	100.0	616	100.0	596	100.0
Primary Sector	195	28.1	155	25.2	53	8.9
Agriculture	195	28.1	155	25.2	53	8.9
Secondary Sector	147	21.2	115	18.7	123	20.6
Manufacturing	137	19.7	105	17.0	102	17.1
Construction	7	1.0	7	1.1	14	2.3
Mining	3	0.4	3	0.5	7	1.2
Tertiary Sector	353	50.8	346	56.2	420	70.5
Commercial, restaurant & hotel	146	21.0	154	25.0	167	28.0
Transport & Communication	21	3.0	18	2.9	23	3.9
Electricity, gas & water supply	2	0.3	5	0.8	5	0.8
Finance, security, property & service for enterprises	23	3.3	23	3.7	36	6.0
Social, community services	121	17.4	127	20.6	184	30.9
Non-specific activities	40	5.8	19	3.1	5	0.8
Total in Nicaragua	8,132		7,759		7,733	
Percentage of Chinandega (%)	8.5		7.9		7.7	

Source : Anuario Estadístico 1991, 1993, 1995, INSSBI

Table B-56: Social Security Contribution by Economic Activity

	1991		1993		1995	
		%		%		%
Total	13,221	100.0	9,392	100.0	13,080	100.0
Primary Sector	2,519	19.1	1,387	14.8	959	7.3
Agriculture	2,519	19.1	1,387	14.8	959	7.3
Secondary Sector	2,307	17.4	1,786	19.0	2,059	15.7
Manufacturing	1,607	12.2	1,305	13.9	1,246	9.5
Construction	641	4.8	410	4.4	358	2.7
Mining	59	0.4	71	0.8	455	3.5
Tertiary Sector	8,395	63.5	6,219	66.2	10,062	76.9
Commercial, restaurant & hotel	1,064	8.0	850	9.1	814	6.2
Transport & Communication	422	3.2	328	3.5	308	2.4
Electricity, gas & water supply	34	0.3	67	0.7	547	4.2
Finance, security, property & service for enterprises	729	5.5	352	3.7	215	1.6
Social, community services	5,226	39.5	4,029	42.9	8,113	62.0
Non-specific activities	920	7.0	593	6.3	65	0.5
Total in Nicaragua	228,930		207,490		208,125	
Percentage of Chinandega	5.8		4.5		6.3	

Source : Anuario Estadístico 1991, 1993, 1995, INSSBI

These tables point out the characteristics of Chinandega's economy as follows:

- The number of employers has decreased drastically in 1995, though in 1993 it was almost the same as that of 1991. In particular, that of agricultural activity and social, community service activity has decreased. The number in the primary sector in 1995 was 30 percent of 1991. The tertiary sector has decreased in 1995 to be almost the same as figures for 1991, though there was a slight peak in 1993.
- The social security contributions in 1995 have decreased sharply to be 70 percent of 1991, though it showed a slight peak in 1993. In particular, social and community activities have decreased to one third of 1993.
- The portion of manufacturing activity has increased relatively.

a.2 Estimation of GRDP

The results of the calculation of GRDP, as with Leon, are shown in Table B-57.

Table B-57: GRDP in Chinandega Region in 1991 and 1995

Unit : C\$ million in 1980

	1991		1995	
		%		%
Total	2,626.9	100.0	1,935.1	100.0
Primary Sector	1,704.0	64.9	938.1	48.5
Secondary Sector				
Manufacturing	333.6	12.7	722.1	37.3
Construction	3.7	0.1	14.6	0.8
Mining	0.6	0.0	1.7	0.1
Tertiary Sector				
Commerce	102.1	3.9	54.7	2.8
Civil Service	190.7	7.3	77.0	4.0
Transport & Communication	231.5	8.8	82.8	4.3
Bank, Security & Others	18.4	0.7	11.0	0.6
Electric, Gas & Water Supply	0.0	0.0	6.0	0.3
Property & Dwelling	23.7	0.9	14.5	0.7
Other Services	18.5	0.7	12.6	0.7
Population	350.212			
GRDP/capita	5,525.4			

Source : Calculated by JICA Study Team based on;
Anuario Estadístico 1995, INSSBI
Informe Anual 1995, BCN
Compendio Estadístico 1987-1991, INEC

The GRDP in 1995 was 74 percent of 1991 because of the drastic decline in agricultural activity. The GRDP of the manufacturing sector has increased to 2.2 times of 1991, and is the second major industry following agriculture. GRDP in the current price calculated in the same way is C\$1,431 million, which is 2.8 times of Leon region.

GRDP per capita in 1995 was C\$5,525 in constant price (1980), which is far more than the GDP per capita (C\$4,481).

a.3 Fishery

In this study, it is assumed that the delivery amount to processing factories at fishing ports represents the catch of the region. The catch in the region by fishing port is shown in Table B-58.

Table B-58: Fish Catch in the Region

Fishing ports	1994	1995	1996*
Colinto	123,756	47,679	169,117
Chinandega Total	123,756	47,679	169,117
Pacific Ocean Total	3,961,456	5,764,307	3,526,556
Share of Chinandega (%)	3.12	0.83	4.80

Note : * until September of 1996

Source : Boletín Estadístico Pesquero 1994, 1995, MEDE-Pesca

The table shows that catch in 1996 has increased sharply, though it had largely declined in 1995.

a.4 Tourism

"Tourism Inquiry 1995" surveyed by Ministry of Tourism(MITUR) reported that the number of foreign visitors in Chinandega in 1994 was 22,234, which is 9.3 percent of the foreign tourists visiting Nicaragua (237,652).

The number of people staying in the main hotel was 621 from abroad and 484 from Nicaragua. The major reasons for their visit were 24.8 percent for leisure and 75.2 percent for business. The number of customers using the hotel in 1995 slightly decreased to 600 from abroad and 399 from Nicaragua. But it is unclear whether the reasons for this decrease are due to the abatement of the urban environment.

b. Tax System and Utilities Charging System

b.1 Local Tax System

The local tax system of Chinandega is the same as in Leon.

b.2 Utilities Charging System

The utilities charging system of Chinandega is also the same as Leon.

The average fee collected in Chinandega is as follows.

Table B-59: Average Fee by Users

	1995	1996
Residential house	1.73	1.95
Commerce	3.62	4.17
Industry	2.44	3.68
Government	6.70	7.32
Public utility	1.14	1.23
Multi-families	1.08	1.20

Source : INAA/General Accounting Department

c. Financial Conditions

The preliminary revenue estimate in 1994, 1995 and 1996 and the actual revenue in 1994 and 1995 with some indicators are shown in Table B-60.

Concerning expenditure, the primary budget of the last three years and actual expenditure are shown in Table B-61.

Table B-60: Municipal Budget for the last Three Years (Revenue)

Unit: C\$1,000

	1994		1995		1996
	Budget	Actual	Budget	Actual	Budget
Municipal Budget (MB)	13,919	12,532	16,749	14,604	18,140
Tax Incomes (Tsl)	12,011	11,501	14,342	12,309	15,549
Municipal imposed taxes (MiT)	6,634	7,079	7,404	8,027	8,030
on sales & services (SsT)	5,500	6,072	5,864	6,841	6,610
on other imposed tax	1,134	1,007	1,540	1,186	1,420
Transfer from National taxes (TNT)	2,100	905	3,420	744	3,800
on vehicles	1,000	477	1,000	450	650
on real estate	1,100	429	2,420	293	3,150
Municipal taxes (MT)	2,924	3,297	3,399	3,408	3,572
for municipal services (MST)	2,884	3,277	3,340	3,392	3,550
waste & cleansing (WT)	780	550	700	645	780
municipal market (MkT)	1,500	2,007	1,885	2,052	1,515
municipal abattoirs (AT)	0	424	0	417	436
for other services	604	295	755	278	819
other municipal taxes	40	20	59	16	22
Other tax income	353	219	119	131	147
Heritage incomes (HI)	50	262	52	61	62
Donations (D)	12	46	30	730	15
Foreign (FD)	12	46	30	570	15
National			0	160	
Recoveries (R)	1,750	569	2,200	1240.692	2,321
Uncollected Revenue (UR)	1,230	496	2,050	80.778	2,119
Other recoveries	520	73	150	1,160	202
Other revenues	96	154	125	263	193
Tsl/MB	0.86	0.92	0.86	0.84	0.86
HI/MB	0.00	0.02	0.00	0.00	0.00
FD/MB	0.00	0.00	0.00	0.04	0.00
R/MB	0.13	0.05	0.13	0.08	0.13
MiT/Tsl	0.55	0.62	0.52	0.65	0.52
MT/Tsl	0.24	0.29	0.24	0.28	0.23
R/Tsl	0.15	0.05	0.15	0.10	0.15
SsT/Tsl	0.46	0.53	0.41	0.56	0.43
WT/MT	0.27	0.17	0.21	0.19	0.22
MkT/MT	0.51	0.61	0.55	0.60	0.42

Source : Chinandega Municipality Department of Finance

Table B-61: Municipal Budget for the last Three Years (Expenditure)

Unit : C\$1,000

	1994		1995		1996
	Budget	Actual	Budget	Actual	Budget
Municipal Budget (MB)	13,919	13,022	16,749	15,084	18,140
Personnel (PE)	8,468	8,819	10,140	8,887	9,453
full time employee (FIE)	4,965	4,649	5,461	4,636	5,172
for waste & cleansing(WE1)	1,803	644	1,983	586	1,751
for markets(MKE1)	909	852	1,000	850	950
for abattoirs(AE1)	256	200	281	186	260
for street maintenance	592	668	652	618	655
for other services	1,405	2,286	1,545	2,395	1,556
other personnel expenditure	3,503	4,170	4,679	4,251	4,281
Services, Materials, Products for Municipal Services (SMP)	1,194	2,099	2,626	2,355	2,258
waste & cleansing (WE2)	234	426	493	429	405
vehicles maintenance	49	99	120	116	
combustible & lubricant	70	107	122	156	
other expenditure	115	220	251	157	405
markets (MKE2)	478	395	741	706	550
slaughterhouses (AE2)	76	251	214	279	220
street maintenance	338	786	940	855	750
for other services	68	241	238	87	333
Investments (Iv)	2,076	571	1,583	1,597	2,053
new works	2,076	416	1,583	1,286	2,053
public works	1,735	345	1,583	1,285	1,497
for pipes & drainage		4	0	9	0
for others	1,735	342	1,583	1,276	1,497
others	341	71	0	1	556
on going works and others	0	154	0	312	0
public works	0	0	0	34	0
other works	0	154	0	278	0
Other expenditure	2,182	1,533	2,400	2,245	4,376
WRC=WE1+WE2	2,036	1,070	2,476	1,015	2,156
MkRC=MKE1+MKE2	1,387	1,246	1,741	1,556	1,500
ARC=AE1+AE2	332	451	495	465	480
WT*	780	550	700	645	780
MkT*	1,500	2,007	1,885	2,052	1,515
AT*	0	424	0	417	436
PE/MB	0.61	0.68	0.61	0.59	0.52
SMP/MB	0.09	0.16	0.16	0.16	0.12
Iv/MB	0.15	0.04	0.09	0.11	0.11
WT/WRC	0.38	0.51	0.28	0.64	0.36
MkT/MkRC	1.08	1.61	1.08	1.32	1.01
AT/ARC	0.00	0.94	0.00	0.90	0.91

Note: * Municipal taxes shown in the previous table.

Source: Chinandega Municipality Department of Finance

These tables summarize the characteristics of Chinandega as follows:

- The actual figures are smaller than budgetary figures, but the gap between the primary budget and actual figures is less than that of Leon. The actual revenue in 1994 was 90 percent of the primary budget. The actual revenue in 1995 worsened to only 87 percent of primary budget. The actual revenue in 1995 was C\$14.6 million, which is only 1.0 percent of the estimated GRDP mentioned earlier. The main opinion is that major factories are located outside the city area and do not contribute to the municipal finances.
- The main revenue is from municipal imposed taxes, which corresponded to 92 percent and 84 percent of the total actual revenue in 1994 and 1995, respectively.
- Transfer from national taxes on vehicles and real estate are very low and is less than half of the primary budget. In particular, the actual revenue of the real estate tax in 1995 was only 12 percent of the primary budget. The reason is that tax collection rate was very low, at 35 percent. The financial department wishes to increase the rate to 50 percent in 1997.
- On the other hand, the actual revenue of municipal taxes exceeds the primary budget. But the waste and cleansing tax could not exceed the primary budget, though the situation was improved.
- Concerning expenditure, personnel expenditure has been improved, from 68 percent in 1994 to 59 percent in 1995 in real terms. The reason is that the personnel expenditure in 1995 was the same as in 1994, while the total expenditure has increased in 1995.
- Investment has increased in 1995, from 4 percent in 1994 to 11 percent in 1995. Foreign aids makes it possible to invest in new projects.

d. SWM Costs and Fee Collection

The SWM costs in 1995 was C\$1,015,000. But the costs of SWM for the last three months in 1995 was C\$461,899, though the primary budget of these three months was C\$948,122. Personnel costs including overtime, medical expenses, social security and others are more than C\$392,160 (84.9%), though basic salary is C\$168,274 (17.7%). In Chinandega Municipality, vehicle cost is accounted separately from SWM, though drivers are paid by the SWM section. Vehicle cost is C\$21,694 (5%) for three months.

In 1996, the separate accounting of collection and street sweeping was under a trial process. The proposed budget for collection was C\$2,762,000 (72.2%) and for street sweeping C\$1,065,000 (27.8%).

The tariff for waste tax is set as follows:

- C\$10/month/house for minimum (general) residents including street sweeping services
- C\$40/month/house for residential area "A" (2,550 people/604 houses + α)
- C\$20/month/house for residential area "B" (4,412 people/738 houses + α)
- C\$30/month for small commerce
- C\$75/month for gasoline stands, restaurants and bars, private schools and clubs
- C\$120/month for industries