

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

**MUNICIPALITY OF MANAGUA
THE REPUBLIC OF NICARAGUA**

**THE STUDY
ON
THE IMPROVEMENT OF
THE SOLID WASTE MANAGEMENT SYSTEM
FOR
THE CITY OF MANAGUA**

**FINAL REPORT
VOLUME III
ANNEX**

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**THE STUDY
ON
THE IMPROVEMENT OF
THE SOLID WASTE MANAGEMENT SYSTEM
FOR
THE CITY OF MANAGUA**

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ANNEX A

PROFILE OF THE STUDY AREA

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ANNEX A PROFILE OF THE STUDY AREA

A.1 Definition of the Study Area

The Study Area is the whole area under the administration of the Municipality of Managua (ALMA). The present population of the Study Area by district is tabulated in Table A.1.1a and the Study Area is shown in Figure A.1a.

Table A.1.1a Present Population (1994)

District	Area (km ²)	Population		
		Total	Urban	Rural
D1	60.41	92,890	63,556	29,334
D2	18.65	134,696	134,696	-
D3	71.45	195,410	134,833	60,577
D4	16.61	204,711	204,711	-
D5	72.12	209,045	144,241	64,804
D6	69.97	220,855	152,390	68,465
D7	231.44	14,261	-	14,261
Total	540.65	1,071,868	834,427	237,441

Source: Population estimated by the Study Team based on 1991 CSE electoral data

For SWM, the Study Area is divided into two areas, the urban and rural area. Waste collection service is basically provided in the urban area and not in the rural area. Furthermore, the area is divided into collection and non-collection areas, with the municipality providing the collection service.

The collection area is divided into two areas according to the collection methods and in harmony with the city layout. The collection areas are as follows:

Collection Area A: City layout is good. Waste is discharged in front of the premises by the residents and is collected by municipal collection vehicles.

Collection Area B: The passage of collection trucks (compactor trucks) is hampered by poor road conditions and illegal connections to the main electric power outlets. Therefore, waste is discharged at area designated by the municipality, and

collected by municipal wheel loaders and dump trucks.

The relations of the area are summarized in Figure A.1.1a.

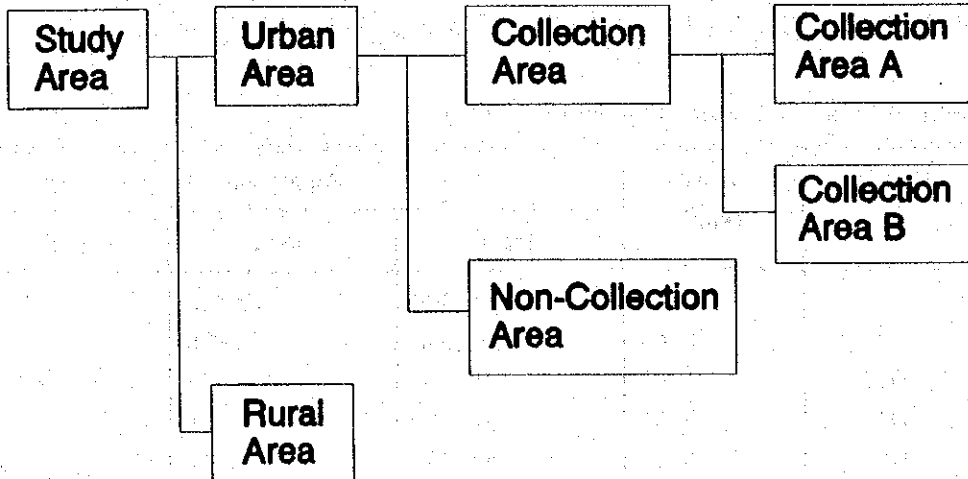


Figure A.1.1a Classification of the Study Area

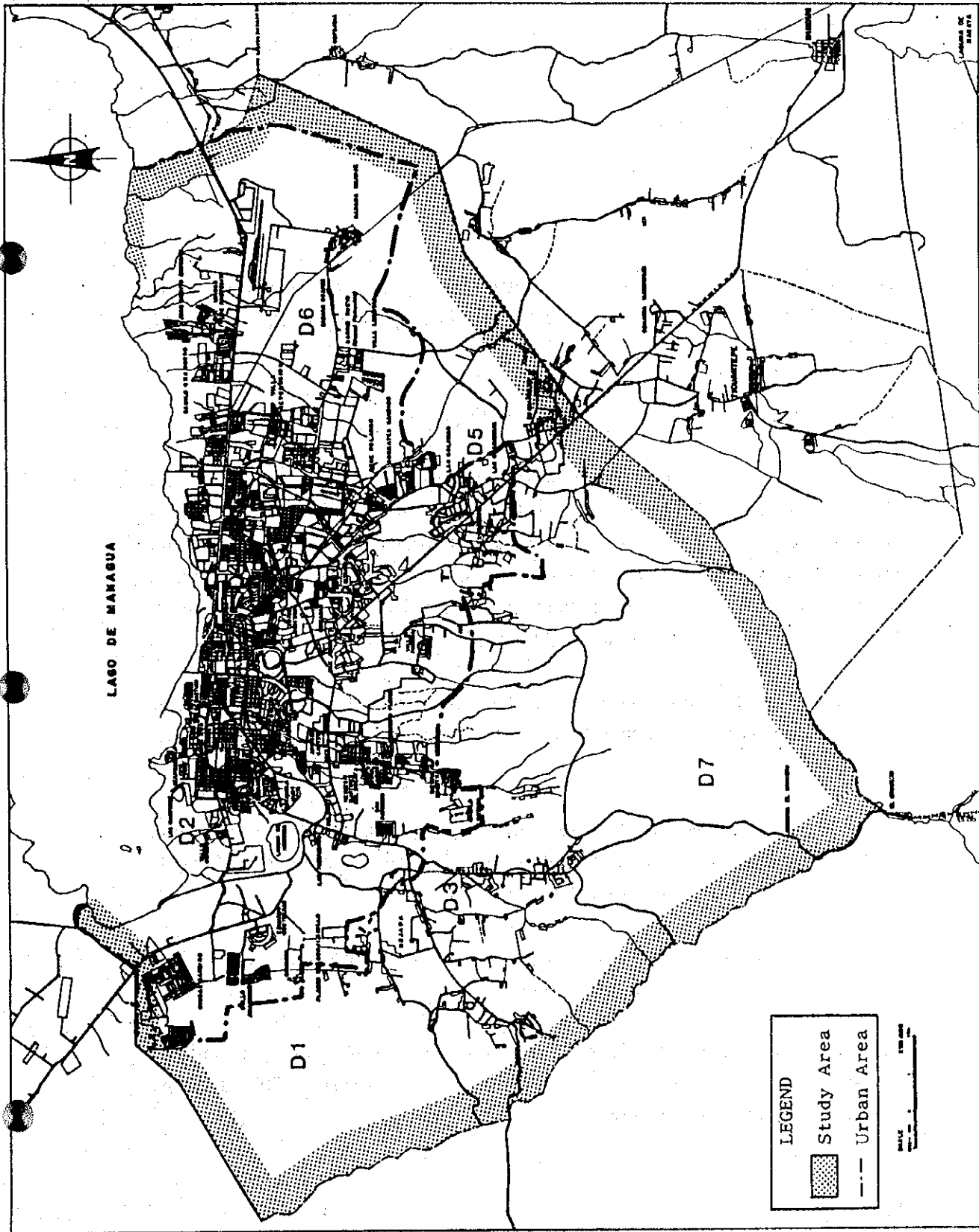


Figure A.1.1b Study Area

THE STUDY ON THE IMPROVEMENT OF THE SOLID WASTE
MANAGEMENT SYSTEM FOR THE CITY OF MANAGUA

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A.2 Natural Conditions

A.2.1 Topography and Geography

a. Topography

The western part of Nicaragua is divided into 3 provinces according to its geographical features, the Pacific Coastal Plain, Nicaraguan Depression and Interior Highland.

The study area is located in the Nicaraguan Depression.

The Nicaraguan Depression is surrounded by the Pacific Coastal Plain and Interior Highlands. It is a lowland area with a plate boundary running from north to south. Approximately half of this area is occupied by two lakes: Lake Managua (water level altitude 38.2 m, area approximately 1,040 km²) and Lake Nicaragua (water level altitude 31.2 m, area approximately 8,200 km²). Along the southwest part of the region is a volcanic mountain range running from northwest to southeast.

Most of the volcanoes are conically shaped and composed of volcanic rocks; some have formed craters and caldera. Many of the volcanoes with various craters are still active.

The Study Area is located south of the Lake of Managua in the south-west region of the Nicaraguan depression. The study area is surrounded by the Managua mountain range which borders the Municipalities.

The study area is located on a slope running from south to north and the urbanized area is developed along the Lake of Managua.

There are several crater lakes in the town, one of which is Asososca Lake utilized as a source of water supply. A volcanic chain inclusive of Asososca Lake develops towards the south-north direction.

b. Geology

The stratigraphy of the study area is shown in Table A.2.1a. The outline of the strata found widely in the study area is as follows;

ba. Middle lass sierras group(TQps(M))

- Urbanized areas predominate in this region.
- Basaltic – andesitic compact agglomerate, tuffbreccia, tuff, pyroclastic flow.

bb. Upper lass sierras group(TQps(S))

- Urbanized areas predominate in the southern and western region near the Managua mountain range.
- Basaltic – andesitic agglomerate, tuffbreccia tuff, fossil soil, tuffaceous sand and silt.

bc. Masaya group volcanics (QvM)

- There is an airport in the southern part of this region.
- Pyroclastic flows and pyroclastic fall deposits.

bd. Pleistocene Volcanics (QvP)

- Managua mountain range is found which is a located at the western and southern part of the Study Area.
- Pyroclastic fall deposits with pyroclastic flows and lavas.

be. Holocene volcanics (QvH)

- A volcano chain including Lake Asososca is sited in this area.
- Pyroclastic flows and pyroclastic fall deposits.

bf. Alluvium (Qal)

- The northern part of the airport is located in the northern section of the region.
- Sand and clay sediments with pyroclastic material, debris deposits.

Table A.2.1a Stratigraphy of around the study area

Edad Geológica GEOLOGIC AGE		Nombre de las Unidades Rocosas geológicas NAME OF GEOLOGIC ROCK UNITS	Litología LITHOLOGY
Cuaternario QUATERNARY	Holoceno HOLOCENE	Aluvio ALLUVIUM Q a l	Sedimentos arena y arcilla con material piroclástico, depósitos de escombros. SAND AND CLAY SEDIMENTS WITH PYROCLASTIC MATERIAL, DEBRIS DEPOSITS
		Volcánicos Holocénicos HOLOCENE VOLCANICS Q v H	Lavas Basálticas-Andesíticas BASALTIC-ANDESITIC LAVAS Flujos piroclásticos y depósitos piroclásticos caídos. PYROCLASTIC FLOWS AND PYROCLASTIC FALL DEPOSITS.
	Pleistoceno PLEISTOCENE	Volcánicos Pleistocénicos PLEISTOCENE VOLCANICS Q v P	Depósitos piroclásticos caídos con flujos piroclásticos y lavas. PYROCLASTIC FALL DEPOSITS WITH PYROCLASTIC FLOWS AND LAVAS.
		Volcánicos Apoyo APOYO VOLCANICS Q v A	Depósitos piroclásticos caídos y flujos (pomez) con lava dacítica. PYROCLASTIC FALL DEPOSITS AND FLOWS (PUMICE) WITH DACITIC LAVAS
		Grupo Volcánico Masaya MASAYA GROUP VOLCANICS Q v M	Lavas basálticas (dura y porosa-auto brechada) BASALTIC LAVAS (HARD AND POROUS-AUTO BRECCIATED) Flujos piroclásticos y depósitos piroclásticos caídos PYROCLASTIC FLOWS AND PYROCLASTIC FALL DEPOSITS
	Terciario TERTIARY	Plio-Pleistoceno PLIO- PLEISTOCENE	Grupo Superior Las Sierras UPPER LAS SIERRAS GROUP T Qps (S)
Grupo Medio Las Sierras MIDDLE LAS SIERRAS GROUP T Qps (M)			Aglomerado basáltico-andesítico, compacto brecha tobáceo, toba, flujo piroclástico. BASALTIC-ANDESITIC COMPACT AGGLOMERATE, TUFFBRECCIA, TUFF, PYROCLASTIC FLOW.
PLIO- PLEISTOCENE		Volcánicos Plio-Pleistocénicos PLIO-PLEISTOCENE VOLCANICS T Qpl	lavas basálticas andesíticas en las proximidades de las Calderas Masaya y Apoyo. BASALTIC-ANDESITIC LAVAS IN NEAR MASAYA AND APOYO CALDERAS.
Plioceno PLIOCENE- (EOCENE)		Formación El Salto y Sedimentos Terciarios EL SALTO FORMATION & OTHER TERTIARY SEDIMENTARY ROCKS T P S	TUFFACEOUS SANDSTONE & SILTSTONE WITH FOSSIL SHELLS. (BROWN TUFFACEOUS SHALES.)

source : The Study on Water Supply Project in Managua, JICA,1993.

A.2.2. Climate

The outline of the climate in the study area is based on the data observed in 1991 at Ingenio Julio Buitrago (I.J.B.) along the pacific coast, Managua international airport and Muy Muy in the Interior highlands. Table A.2.2a shows the results at each observation point.

a. Temperature

aa. Annual average temperature

The annual average temperature at I.J.B. is the highest, followed by Managua and Muy Muy.

The maximum temperature is in April, and the minimum temperature is 20.9°C in December for Managua.

The annual average temperature range is 28.2°C at I.J.B., 27.1°C at Managua and 24.3°C at Muy Muy, which indicates that further inland the temperature decreases.

ab. Maximum temperature

The highest temperature observed was 37.0°C in May at I.J.B., 36.4°C in April and May at Managua, and 23.8°C in June at Muy Muy. As the altitude increases further inland, the temperature decreases.

ac. Minimum temperature

The lowest temperature observed was 18.0°C in December at I.J.B., 17.8°C and 16.2°C in January at Managua and Muy Muy respectively.

Like the maximum temperature, the temperature further inland is observed to decrease as the altitude increases.

b. Annual Average humidity

Annual Average humidity is 69.3% at I.J.B., 74.2% at Managua and 82% at Muy Muy. Humidity increases further inland.

The lowest value is observed in March at all three stations. The highest value is

observed in October at I.J.B. and Managua, and from August to September at Muy Muy.

c. Precipitation

For I.J.B there is no data available for August 1990. Without this data, the annual precipitation at I.J.B is the same as that observed in Muy Muy. Therefore, annual precipitation is assumed to be highest at I.J.B. followed by Muy Muy and Managua.

Annual precipitation at Managua is half the value of the other 2 stations. There is a clear distinction between the rainy season, from May to November, and dry season, from December to April, at all 3 points. Eighty two (82%) to ninety eight percent (98%) of the annual precipitation falls during the rainy season (Figure A.2.2b).

d. Evaporation

Although there is a lack of observation data in August at I.J.B., evaporation was highest in I.J.B. followed by Managua and Muy Muy. Evaporation was highest in April at all points, and lowest in October and November at I.J.B., in November at Managua, and December at Muy Muy.

The difference in annual temperature and evaporation shows a similar trend.

e. Wind Velocity

Average annual wind velocity is 2.0m/sec at I.J.B., 1.1m/sec at Managua and 0.5m/sec at Muy Muy, indicating that wind velocity decreases further inland.

Wind velocity is higher in the dry season and lower in the rainy season at I.J.B. and Managua. However no definite trend could be observed in Muy Muy due to the calm winds recorded throughout the year (Fig.A.2.2c).

f. Wind direction

Easterly winds prevail throughout the year at all observation points.

g. Summary of natural conditions

Managua is situated between the Pacific Coastal plain and the interior highlands, therefore, its climate corresponds to the characteristics of both areas.

Precipitation in Managua is very low and the seasons are distinctly divided as the rainy and dry seasons.

Wind direction from the east prevails and wind velocity is lower in the rainy season than in the dry season.

Since annual evaporation exceeds precipitation, water shortage frequently occurs.

Tabel A.2.2a Climatic Conditions

METROLOGICAL STATION:INGENIO JULIO BUITRAGO(I.J.B.)

ALTITUDE: 10m

ITEM	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
AIR TEMP.	MAXIMU	32.7	33.2	34.7	35.2	34.1	32.5	33.6	34.4	33.4	30.6	31	32	33.1
	MINIMUM	23.1	23.8	25	25.6	25.7	24.8	24	24.5	23.4	22.5	21.8	20.9	23.8
	MEAN	27.9	29.3	29.9	30.1	29.6	28.3	28.3	28.9	28	26.2	25.8	26	28.2
RELATIVE HUMIDITY	%	66	54	51	57	66	74	73	70	75	87	83	76	69.3
PRECIPITATION	mm/MON	0	0	0	34.7	353.1	69.9	36.1	-	132.8	608.3	338.4	0	1573.3
EVAPORATION	mm/MON	264.5	275.3	340.7	343.4	274.8	192.6	229.2	-	224.4	168	168	185.8	2666.7
WIND VELOCIT	m/s	3.8	4	4.3	3	2.1	1.2	1.4	1.7	1.2	0.2	0.1	1.4	2
WIND DIRECTION		E	E	E	E	E	E	E	E	E	C	C	NE	E

METROLOGICAL STATION:MANAGUA AIRPORT

ALTITUDE: 56m

ITEM	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
AIR TEMP.	MAXIMU	32.3	32.8	34.1	35.4	34.2	32.4	32.1	32.8	33.0	32.7	31.5	31.6	32.9
	MINIMUM	21.1	20.9	22.0	23.5	23.9	23.9	23.1	23.1	23.1	22.8	22.5	20.9	22.6
	MEAN	26.1	26.4	27.7	29.1	28.3	27.3	26.9	27.2	27.0	26.8	26.3	25.9	27.1
RELATIVE HUMIDITY	%	72	69	64	61	71	79	79	78	80	82	80	75	74.2
PRECIPITATION	mm/MON	1.2	1.1	0.0	3.8	92.0	114.1	104.1	113.8	85.1	100.9	132.3	8.6	757.0
EVAPORATION	mm/MON	183.6	159.4	294.0	264.6	146.9	151.2	133.6	164.0	152.0	141.2	133.0	197.7	2001.1
WIND VELOCIT	m/s	1.6	1.5	1.7	1.6	1.3	1.1	1.0	0.8	0.7	0.2	0.3	0.8	1.1
WIND DIRECTION		NE	E	E	E	E	E	E	E	SE	SE	E	E	E

METROLOGICAL STATION:MUY MUY

ALTITUDE: 320m

ITEM	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
AIR TEMP.	MAXIMU	27.5	28.0	29.3	31.4	31.4	28.7	29.0	28.7	29.8	30.1	28.4	27.5	29.2
	MINIMUM	19.7	19.5	20.2	21.2	21.8	21.9	21.4	21.5	21.2	20.7	20.9	20.0	20.8
	MEAN	23.6	24.0	25.3	25.6	25.5	24.4	24.3	24.1	24.1	24.5	23.8	22.9	24.3
RELATIVE HUMIDITY	%	78	74	69	73	79	88	86	88	88	86	85	84	82
PRECIPITATION	mm/MON	80.7	61.8	22.3	16.3	174.4	282.6	139.9	263.7	135.1	182.6	135.4	98.8	1573.6
EVAPORATION	mm/MON	84.7	-	167.3	192.1	153.8	110.9	123.5	102.8	110.9	129.5	87.3	80.0	1342.8
WIND VELOCIT	m/s	0.2	0.2	0.2	0.2	0.1	0.8	0.1	0.1	0.7	0.6	0.8	1.5	0.5
WIND DIRECTION		NE	NE	NE	NE	E	E	E	E	E	SE	E	E	E

SOURCE:INETER(1992);METEOROLOGICAL YEARBOOK 1990.

-:NO MEASURED

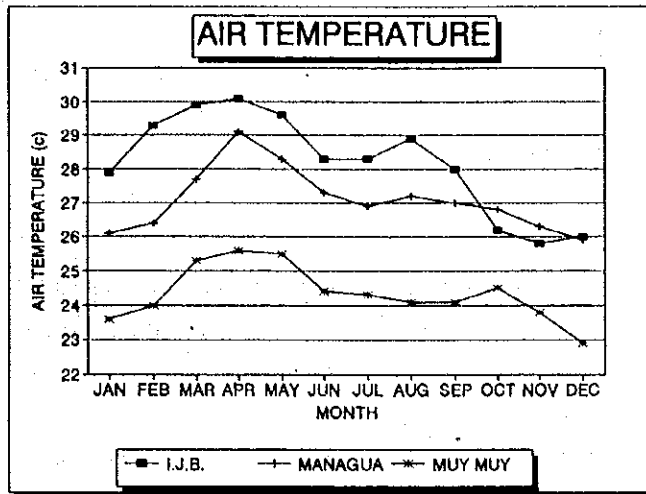


Figure A.2.2a The Condition of Air Temperature

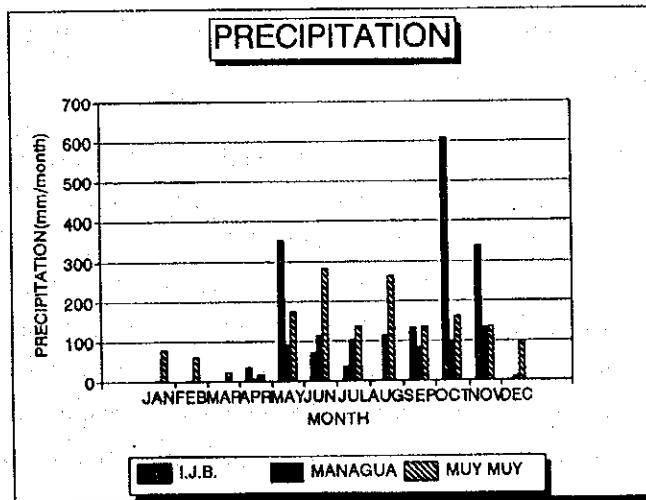


Figure A.2.2b The Condition of precipitation

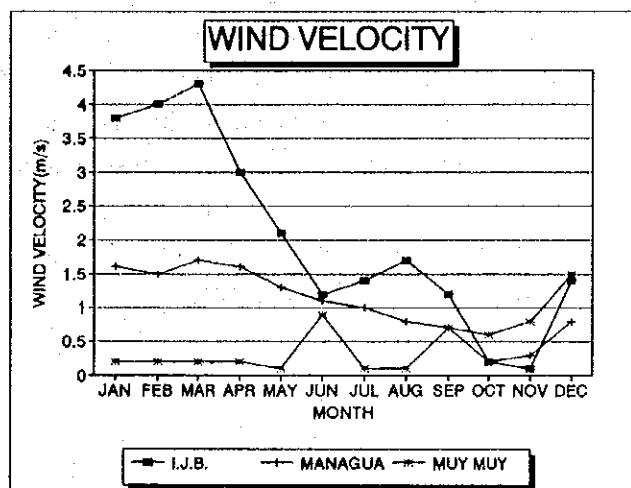


Figure A.2.2c The Condition of Wind Velocity

A.3 Social Conditions

A.3.1 Economy and the People of the Country

In the beginning of 1990, Nicaragua, like most Latin American countries, embraced democracy and held its first free election after 38 years of dictatorship and 10 years of civil strife.

Today, the country can be considered independent, free and democratic, with an active republican government.

Nicaragua is the largest country in Central America and at the same time the least populated. Its demographic growth (3.36% per year) is also one of the highest in the Central American region.

As for development, this Latin American country is among the group of nations in the economic and social developing stage. The Gross Domestic Product (GDP) in 1992 was C\$ 18,205,700,000¹⁾ (around US\$ 3,641,400) and the total export volume is around US\$300,000 per year—60% being agricultural products, such as coffee, cotton, sugar, bananas, beef and tobacco. Nicaragua has a foreign debt of around US\$ 9 billion (90% long term and 10% short term), one of the highest debt per-capita in the world. According to the Instituto Nicaraguense de Estadísticas y Censo (INEC), there were only 233 manufacturing industries with more than 30 employees in the country in 1992.

Nicaragua is a very homogeneous country, the majority of the population is of Spanish-aboriginal descent, while a small amount is made up of the Negroes along the Atlantic coast, and a very few remaining aborigines. Nicaragua, like its neighboring countries has a disproportionate wealth distribution which is reflected in the prevailing social and economic conditions of the people.

As for sanitation, the country has a system that barely covers the central areas of the main cities, as shown in the Table A.3.1a²⁾.

Note : ¹⁾source: Central Bank of Nicaragua

²⁾Ministerio de la Salud de la Republica de Nicaragua - Plan Trienal de Salud, 1991-93

Table A.3.1a Water and Sewerage Coverage in the whole Country

YEAR	% OF POPULATION					
	URBAN		RURAL		TOTAL	
	Water	Sewerage	Water	Sewerage	Water	Sewerage
1979	63	34	6	-	35	-
1988	77.1	35	14.5	-	51	-

Low water supply coverage and poor sanitation adversely affect public health.

This situation is evident when examining the high incidence rate of intestinal disorders such as acute diarrhea which was the top cause of infant mortality in 1989. The rate of infant mortality per thousand babies born alive increased from 61.0 in 1986 to 71.8 in 1989. Eighty per cent of infant mortality occurred within the first year of birth.³⁾

A.3.2 The Study Area, City of Managua

a. General

aa. Characteristics of the Study Area

Managua is the political, economic and cultural center of Nicaragua and also a city historically plagued by earthquakes, wars and floods.

The earthquakes that hit the area in 1931 and 1972, civil wars during the 1980's, frequent flooding and landslides have left the city without a core or a conventional city configuration.

During the earthquake in 1972, 54,000 housings in the central part of the city were destroyed, 90% suffered damages and 11,000 people died.

The ALMA is primarily urban. It has 1,338,180 inhabitants, 94% of which live in the urban area and 6% in the rural.

Note: ³⁾Nicaraguan Report to the XX - United Nations Conference on the Environment and Development, Rio de Janeiro, 1992

The illiteracy rate in the municipal area is 15% and 80% of the population lives below the poverty line. The average salary is estimated at C\$ 1065.00/month.

The annual population growth rate in the period of 1983-92 was 5.6%, 3.8% of which was due to migration and 1.8% due to diminishing agricultural prospects.

Rural to urban migration towards Managua has been mainly due to economical circumstances and, to a lesser degree, natural disasters, political violence and persecutions.

ab. Progressive and Spontaneous Settlements

The high rural to urban migration rate gave rise to "progressive" and "spontaneous" settlements, causing an increase in the demand for basic services such as water supply, sewerage, energy, transportation, recreation etc..

The basic difference between progressive and spontaneous settlements lies in the fact that the former is promoted by government agencies according to an urban pattern with defined streets and public spaces reserved for future development. Spontaneous settlements usually are built in disarray, without any government supervision, but (occasionally) with the help of non-governmental organizations.

While progressive settlements have been receiving basic utilities, such as water supply from public faucets, spontaneous settlements consist of illegal land occupation in areas generally considered unsuitable for housing development. This settlement area does not receive electric power supply from the city and obtains such supply through illegal (and dangerous) outlets; wood or any combustible material is used for cooking.

Each of these settlements have an average of 500 families. The population in 1991 was estimated at 126,942 persons in progressive settlements and 139,148 persons in spontaneous settlements. In 1994, these populations were estimated to have grown to 40% of the total population of the city.

According to ALMA, the number of progressive and spontaneous settlements in the capital was 128 and 163, respectively, until September 1991, the conditions in the former are observed to be very poor.⁴⁾

Note:

⁴⁾Plan de Accion para el Saneamiento y Recuperacion del Lago de Managua, pg-30.

b. Urban Infrastructure

In Managua City, 74% of the households are supplied with water via hoses connected to the public system, 20% from public faucets, 1% from wells and 5% from other systems.

Regarding toilet facilities in housing units in Managua City, 42.7% have flush toilets, 53.8% latrines and 3.5% were without any lavatories. Sewage is discharged through 16 outlets to Lake Managua, polluting approximately 3 km⁵ of its shores.

Likewise, in the urban area, 95% of the houses have electricity, many of them through illegal outlets –which are hazardous and hamper the access of trucks (such as refuse collection) in the low income communities.

In Managua, there are 1,077 km of streets, of which 650 km are paved. Public transport is very poor, many adapted flat bed trucks are being used as "buses", due to the scarcity of regular buses and in the absence of railways or street cars.

One of the consequences of this social situation is the high crime rate in the city: in 1993, 18000 cases were recorded in ALMA. These offenses were mainly: 44% burglary, 23% involved people, such as kidnapping for a ransom.

The high delinquency rate is also explained by the post-war situation of the country, fostered by the existence of a high number of fire arms in civilian hands, inherited from the civil war that plagued the country in the last decade.⁶

A.3.3 Conclusion

Managua city, like other Latin American (or third world) metropolises, is suffering a process of explosive growth without the adequate provision of public services and infrastructure, mainly for the most vulnerable portion of its population, the poor, and among them, the children. The problems of the city are further aggravated by the particular manmade and natural disasters it has been suffering throughout the years.

Source: ³*Esquema de Desarrollo Urbano de Managua*

⁶*General Division of Town Planning – Socioeconomic and Physical Urban Survey – 1994 – Draft unpublished*

Problem is solid waste management, has left the city in a very poor condition despite the efforts of the municipal authorities. This situation is highly evident in the existence of registered illegal dump sites scattered all over the city. Today, the number of these dumpsites is estimated to have reached 150. Any attempt to combat this situation has been hindered by the disregard of the people, for this environmental problem.

Due to many disasters, ignorance, health problems (mal-nourishment), and not being used to having regular and reliable refuse collection services, the inhabitants of the city dump their wastes in the nearest available place, be it a drainage ditch, a hole or depression in the ground in public parks or even in open vacant lots.

A.3.4 Administration

a. National Government Administration

Presently the country is divided into regions, departments and municipalities, the latter being the basic administrative unit. Municipal authorities are autonomous and are elected by popular, direct and secret vote for a six year term.

Politically, the country is divided into 9 regions, 16 departments and 142 municipalities. Two of the 9 regions are considered autonomous due to their peculiar ethnic and sociocultural characteristics: the north atlantic autonomous region and the south atlantic autonomous region.

Neither the Regions nor the Departments have elected an official as a head. Rather, they are supervised by a delegate of the Internal Government Ministry.

State powers at national level are divided into legislative, judiciary electoral and executive.

Legislative power is vested in a unicameral, directly elected National Assembly of 90 representatives. These representatives are elected by direct, free and secret voting; each has an alternate representative.

Judicial power is administered through Tribunals of Justice, of which the highest is the Supreme Court. The latter is composed of a minimum of seven members who are appointed by the National Assembly for a six year term. The President of the Republic appoints one member of the Supreme Court of Justice as its President.

The Electoral power has exclusive jurisdiction over elections, plebiscites and referenda, being in charge of the organization, direction and supervision of electoral processes.

The duties of the Executive power are discharged by the President of the Republic, who is the Chief of State, the Chief of Government and the Supreme Chief of the Armed Forces. The President and the Vice-President are elected by direct, secret voting, where a simple majority decides the winners for a six year term.

There are, at the national level, 14 ministries, two of which, the Ministry of Health (MINSa) and the Ministry of the Environment and Natural Resources (MARENA) are dealing indirectly with the solid waste system.

b. Municipal Administration

According to the Municipal Law (January 1987), any of the elected councilors (20 in Managua) with the highest votes in the majority party becomes the mayor of a municipality, including the capital city.

Municipalities have full political autonomy, and are in charge of providing city maintenance (waste collection, street cleansing, roads and streets maintenance and construction, storm drainage maintenance, parks and gardens maintenance and construction of related facilities, like storm sewers and ditches, road pavements, playgrounds etc., and land use planning.

In Nicaragua municipalities have no control over the education, health care, police and public transportation systems. ALMA, however, has been renovating and constructing schools and medical centers mainly in the most deprived areas of the city and placing traffic lights in city streets and avenues.⁷

A.3.5 Customs and Religion

Nicaragua is made up of a multi-ethnic race, and has no official religion. Although, Roman Catholicism predominates, a part of the population professes faith in other Christian denominations, e.g., Protestant, Episcopal, Baptist, Methodists, etc.

⁷*Memoria Municipal de Managua - Direccion de Divulgacion y Prensa, Alcaldia de Managua, 1993.*

Ninety-six percent of the population are mestizos, (descendants of spanish settlers and indians), 3% indians (miskitos, sumos y ramas) and 1% Afro-Americans, originating from the black workers brought in by the British from Jamaica to work the plantations in the Atlantic Coast.

The population of Nicaragua is very young, 60% of which is under 17 years of age.

Spanish is the official language, although English and Miskito are spoken in the Atlantic Coast.

The illiteracy rate has decreased in the last decade and it is estimated that 88% of the population can now read and write. Higher education is provided by the Nacional Universidad Autonoma de Nicaragua (UNAN) the private Jesuit Universidad Centroamericana (UCA) and several other private institutions.

A.3.6 Public Health

The Public Health System in Nicaragua is delegated to the Ministry of Health (MINSAL) at the national level.

In August of, 1979, the "Single National Health System" was established. The system aims mainly to increase health care coverage and enhance its efficiency through decentralization and by granting autonomy to these units.

The basic unit of this system is the SILAIS - Integral Health Care Local System (Sistemas Locales de Atencion Integral a la Salud). Every department is established with except for Managua, which is supervised by three, the western, central and eastern SILAIS.

SILAIS holds all health care resources and mechanisms of a defined area for a defined population.

The operations of the SILAIS are considered as Specialized Programs.

One of the programs is the Environmental Program which aims to promote the development of potable water systems, sewerage, solid waste control and food control.

According to the data obtained from the Epidemiology Vigilance, public health

conditions are not very good. The occurrence of acute respiratory diseases, acute diarrhea (major cause of mortality), malaria, dengue fever, cholera and hansenosis are high, even for Latin American standards. This condition is attributed to the absence of environmental sanitation measures, poor food and potable water control, and a poor health services system, and is exacerbated by the very poor economic status of a significant part of the population. A national survey made by the Ministry of Health in 1988 found that 11% of the children in the urban area of Managua suffer from malnutrition.

Some health status indicators:⁸

- .Death rate: 6.6/1000 inhabitants
- .Infant death rate: 49.8/1000 born alive
- .Contagious diseases rate: 102/10,000 inhabitants
- .Average life expectancy: 66.2 years

A.3.7 Sanitation and the Environment – Policies, Legislation, Enforcement and Activities

The national government has appointed INAA – Nicaraguan Institute of Water and Sewerage (Instituto Nicaraguense de Acueductos y Alcantarillado) and the MARENA – Ministry of the Environment and Natural Resources (Ministerio del Ambiente y Recursos Naturales) in charge of sanitation and environmental issues.

Additionally, the Ministry of Health (MINSAL), through the Hygiene and Epidemiology Direction, also deals with all sanitation and environmental matters that may be of concern to human health. Through Solid Waste Management, food control and storm water drainage, installation, municipalities also promote sanitation.

Concerning environmental control, the municipalities so far have a very limited role. Although some like Managua, have an Environmental Head Office, the activities of these offices are mainly restricted to tree planting, environmental education and some specialized fields of studies, besides investigating and trying to solve public complaints generally on bad odors, water discharges and improper solid waste disposal.

⁸Source: *Plan Trienal de Salud - 1991-93; Ministerio de la Salud, Republica de Nicaragua*

A.3.8 Employment

Employment conditions in Nicaragua reflects the economic state the nation is in – "Recession"–; a condition that has plagued most Latin American countries for the past decade. This circumstance has adversely affected the labor market and the social conditions of these countries. In Nicaragua, for instance, unemployment has affected a total of 8.6% of the economically active population. The economically active population is estimated at 842,000, equivalent to 65% of the city's total population⁹.

Open unemployment is 24.7% and underemployment (open unemployment plus employment under 40 hours a week) 35.7% as of August 1993. The age group most affected by unemployment is the young.

A sad evidence of this situation is the existence of a large number of hawkers, many of them selling goods ranging from electronic apparatus to water bags, at almost all the traffic junctions in the city of Managua.

⁹Source: *ibid* 6

A.4 Population

A.4.1 Present Population

The basic population information presented in this Section was obtained from the National Institute of Statistics and Census (INEC), the Planning Head Office of the Municipality of Managua (ALMA) and the Electoral Supreme Council (CSE).

The last Population and Housing Census was conducted in 1971 and since then INEC has not carried out any field research on population distribution because the scheduled 1982 census was not carried out due to warring conditions.

Therefore, due to lack of updated data, the Nicaraguan population was determined based on the population estimates and projections of INEC, population estimates of the Planning Head Office of ALMA, and the supplementary estimates of the Study Team.

a. Population of Nicaragua

INEC estimates the 1993 total population of the country at about 4.3 million, 2.4 million more than its population twenty two years ago (1971) when the last census was conducted, with an annual growth rate of 3.3% (refer to Table A.4.1a). The average population density was 33 persons per square kilometer.

The country is multi-ethnic and the majority of the population is made up of mestizos, a mixture of Indian and Spanish descent. The population is very young; over 50% is under 20 years old (refer to Figure A.4.1.b). Like any other developing countries, Nicaragua is characterized by a high birth rate and a gradually declining mortality rate. The growth in population is greatly attributed to the natural increase in the birth rate which exceeds the death rate. However, compared with other Latin American countries Nicaragua's population density, 33 persons per square kilometer, is low. Although Nicaragua is slightly industrialized oddly enough 65% of its people live in towns while the rest live in rural areas. Migration to urban areas like Managua and other cities of economic importance is one of the reasons why urban sectors prevail over the rural.

Table A.4.1a Population Estimate of Nicaragua

Year	Population	Growth Rate %
1971 (Census Year)	1,877,952	2.2
1975	2,162,272	3.6
1980	2,591,048	3.7
1985	3,272,064	4.8
1990	3,870,820	3.4
1993	4,264,845	3.3
1995	4,539,499	3.2
2000	5,261,315	3.0

Source: INEC (National Institute of Statistics and Census)

The country's population is concentrated mainly in the pacific zone, where 64.3% of the inhabitants live and work, while 27.3% live in the central zone and only 8.4% in the atlantic zone. This uneven distribution is reflected in the density in the said zones: 72 persons/km² in the pacific zone, 28 per/km² in the central zone, and 7 in the atlantic zone. The dense forest of the eastern lowlands along the Caribbean was found unsuitable for living because of its high annual rainfall, which is associated with many tropical diseases and health problems.

The country is divided into 6 regions and 3 special zones, which are subdivided into 16 departments. Table A.4.1b shows the population distribution by region and department.

Table A.4.1b Population of Nicaragua by Region and Department (1993)

Region	Population	Department	Population		
			Total	Urban	Rural
R-I	401,408	Nueva Segovia	126,806	82,424	44,382
		Madriz	100,436	65,283	35,153
		Estelí	174,166	113,208	60,958
R-II	705,040	Chinandega	344,977	224,235	120,742
		León	360,063	234,041	126,022
R-III	1,300,252	Managua	1,300,252	845,164	455,088
R-IV	678,215	Masaya	217,048	141,081	75,967
		Carazo	159,339	103,570	55,769
		Granada	159,259	103,518	55,741
		Rivas	142,569	92,670	49,899
R-V	390,107	Boaco	124,044	80,629	43,415
		Chontales	266,063	172,941	93,122
R-VI	572,767	Jinotega	183,278	119,131	64,147
		Matagalpa	389,489	253,168	136,321
ZE-I&II	180,837	Zelaya	180,837	117,544	63,293
ZE-III	36,219	Río San Juan	36,219	23,542	12,677
Total	4,264,845		4,264,845	2,772,149	1,492,696

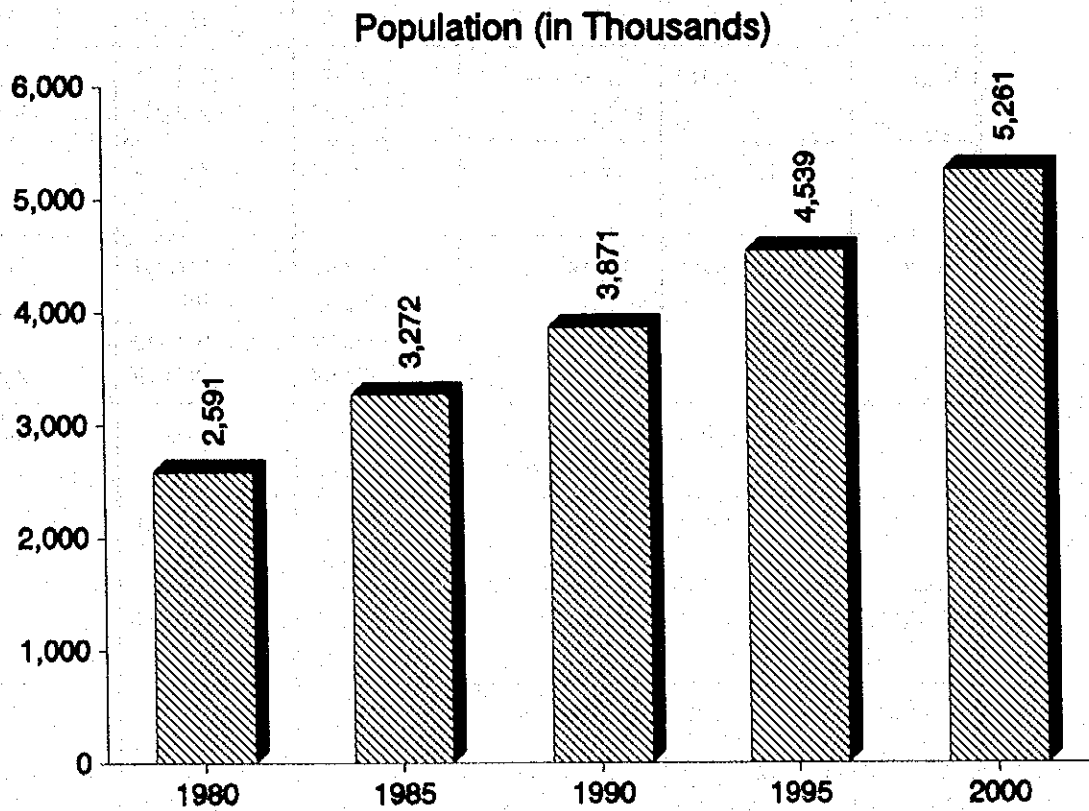
Source: Estimation and Projection of Population 1950/2025 (INEC), ESDENIC 85 and Electoral Registration Data
Planning Head Office (ALMA)

Note: These figures are for reference only

As for population by region, II, III and IV are the most populated areas. The population of region is especially high as it covers III of the Department of Managua, where urban migration is high. The least populated areas are observed in the special zones (atlantic zone) for the same reasons described above.

Nicaragua's population growth trend and age distribution are shown in Figures A.4.1a and A.4.1b, respectively.

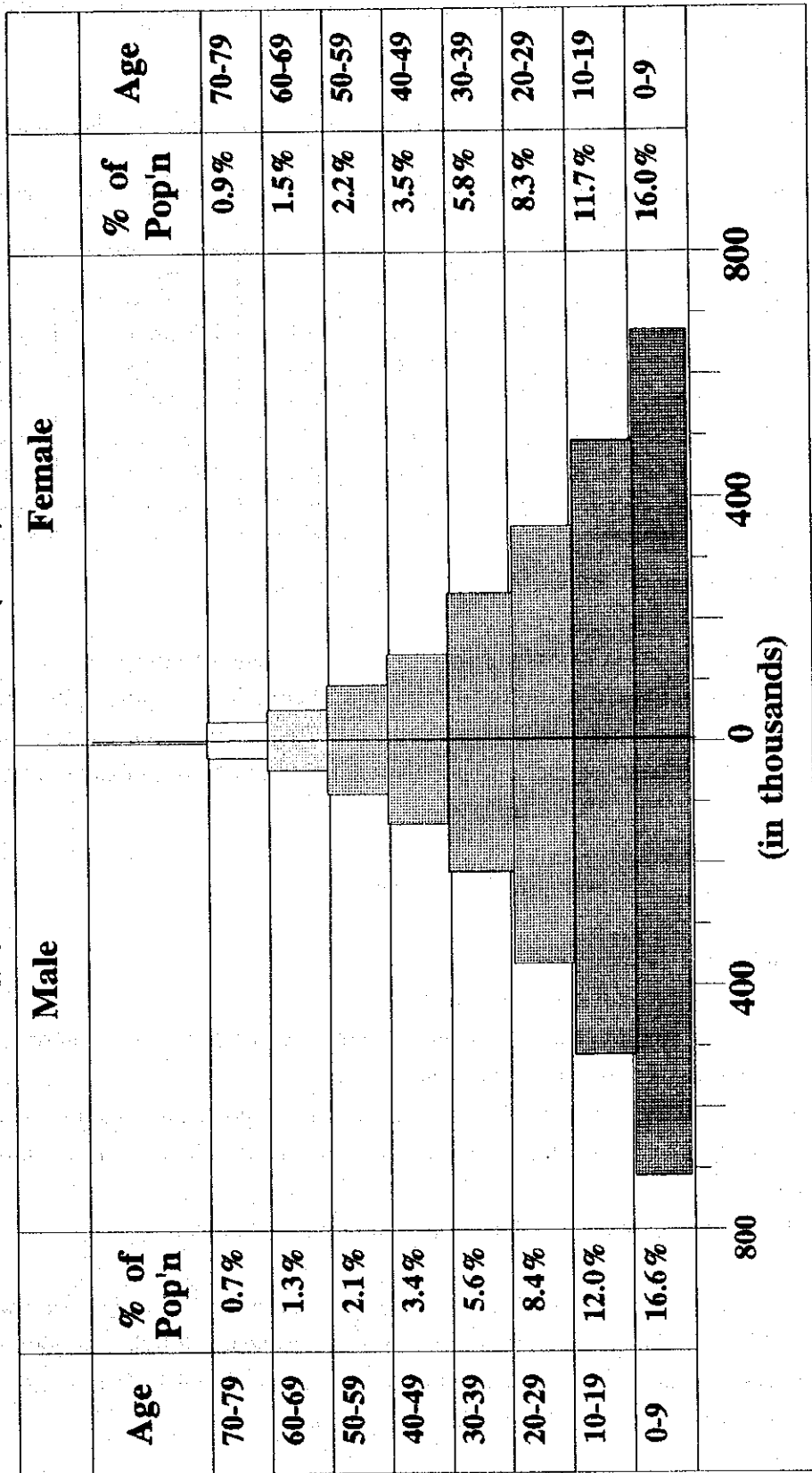
Figure A.4.1a Nicaragua's Population Growth Trend



- Annual Pop'n Growth 3.3%
- Pop'n Density 33 persons/km²
- Pop'n Doubling Time: 20 years
- Urbanization: 65%

Source: Arranged by the Study Team based on INEC data

NICARAGUA
AGE DISTRIBUTION (1993)



- Total Population : 4,265,000
- Life Expectancy (Male) : 61 year
- Total Male Population : 2,140,000
- Life Expectancy (Female): 63 year
- Total Female Population: 2,125,000

Figure A.4.1b Age Distribution

b. Urban and Rural Population

The changes in the population of Nicaragua in terms of urban and rural population is shown in Table A.4.1c.

Table A.4.1c Population Growth in Urban and Rural Sectors of the Country

Year	Population					
	Urban	%	Rural	%	Total	%
1950	369,028	35.2	680,583	64.8	1,049,611	100
1963	627,292	40.9	908,296	59.1	1,535,588	100
1971	896,378	47.7	981,574	52.3	1,877,952	100
1980	1,392,765	52.3	1,198,283	47.7	2,591,048	100
1990	2,300,000	59.4	1,570,820	40.6	3,870,820	100
1993	2,772,149	65.0	1,492,696	35.0	4,264,845	100

Source : INEC (National Institute of Statistics and Census)

As in other Latin American countries, Table A.4.1c, shows how fast the urban population has increased in contrast to the rural sector. In fact, urban population growth has increased from 35.2% in 1950 to 47.7% in 1971 (census year), and 65.0% in 1993. In contrast, the rural population has decreased from 64.8% in 1950 to 52.3% in 1971, and 35.0% in 1993.

The reasons this population growth trend are:

- Land tenure form
- Low salary of agricultural workers
- Temporary employment – agricultural activities, the main GDP contributor, has enough workers and is cyclical
- A better salary is expected from the secondary and tertiary sectors of the economy. These sectors have a relative degree of development in the urban areas
- The urban sector have better social and basic infrastructures.

Consequently, if there are no changes in the rural economy, the population will tend to migrate to the city in order to improve their standard of living, to look for new sources of economic activities and to obtain permanent jobs. As a result, the growth rate of small rural communities will decrease.

c. Population of the Study Area

The Study Area covers the whole area under the administration of ALMA, and is composed of 7 Districts: D1, D2, D3, D4, D5, D6 and D7.

The municipal area covers 540 km², while the urbanized area extends over 250 km². The present population of ALMA is only an estimate because of the absence of new data. The last population census was conducted in 1971, before the 1972 earthquake which destroyed the central area of the city.

The 1994 population of the municipal area is based on electoral registration data given by CSE and arranged by the Study Team. The figure was also determined in consideration of the population data provided by the Planning Head Office of ALMA.

Based on these data, ALMA is estimated to have a population of about 1.07 million in 1994. The population for the urban and rural areas is estimated at 834 thousands and 237 thousands respectively. Almost 78% of the population live in the urbanized area, while 22% live in the rural area. The most densely populated districts are D4 and D2 with 12,325 persons/km² and 7,222 persons/km² respectively. The least populated districts were D1 and D7 with 1538 persons/km² and 62 persons/km² respectively (refer to Table A.4.1d).

Table A.4.1d Present Population, Population Density, Household Population by District(1994)

District	Area (km ²)	Population			Density (pers/km ²)	Household	Pers./Hold
		Total	Urban	Rural			
D1	60.41	92,890	63,556	29,334	1,538	10,192	9.1
D2	18.65	134,696	134,696	-	7,222	22,062	6.1
D3	71.45	195,410	134,833	60,577	2,735	29,423	6.6
D4	16.61	204,711	204,711	-	12,325	28,465	7.2
D5	72.12	209,045	144,241	64,804	2,899	33,052	6.3
D6	69.97	220,855	152,390	68,465	3,156	35,316	6.3
D7	231.44	14,261	-	14,261	62	1,186	12.0
Total	540.65	1,071,868	834,427	237,441	1,983	159,696	6.7

Source: Population estimated by the Study Team based on 1991 CSE electoral data

- 1) 31.6% of rural population was added to district D1
- 2) Part of district D7; population based on CSE data was divided into D3 & D5 rural population
- 3) Population provided by ALMA was used for district D7

The information (1991 Registration Data) given by CSE only shows the population

of those over 16 years of age. Therefore, a factor of 1.43 was applied in order to estimate the population of those under 16 years of age, and then the total population. According to this calculation, the total and urban population was estimated at 1.071 million and 834 thousand respectively. These results shall be used as basic data for future projection.

As mentioned above, the population estimates by district were based on the CSE data, however, some adjustments were made in D1, D3, D5 and D7 as follows:

D1: The CSE data shows the urban population only, therefore, a 31.6% increase in the rural population was added

D7: Based on the CSE data, the population of District 7 (D7) was estimated at 86,476. This figure was considered too high for the whole rural area of D7. ALMA's district population estimate of 14,261 is deemed more reliable than the CSE data and was used therefore to represent the D7 population. The rest of the population (difference $86,476 - 14,261 = 72,215$) was divided among the surrounding districts of D3 and D5, at a ratio of 6.4, considering the boundary length area, land use and suitability for urbanization, topographical condition, etc.

D3 and D5 : As described in D7

d. Establishment of the Population

The preliminary survey on solid waste collection states that 70% to 80% of the urban area is covered by collection service. Taking this data into account, INEC's population estimate is considered more approximate. However, because of the difference in the population data provided by INEC and ALMA, the Study Team estimated the population based on the CSE electoral data. The results were modified in consideration of some of ALMA's population data (refer to Table A.4.1e).

Table A.4.1e Comparison of Population Estimates by Institution

Institution or Agency	Population (1994)	Difference from Study Team Population	Remarks
INEC	996,899	- 74,969	Population based on CSE electoral data
ALMA	1,327,908	+ 256,040	Population provided by the District Coordination Office, Planning Head Office (ALMA)
Study Team	1,071,868	0	Population based on CSE electoral data, and arranged by the Study Team

The above-mentioned situation concerning the service area coverage and the setting of population estimates was discussed with the authorities of ALMA who are concerned with this Study. ALMA decided to take the population estimate of the Study Team as a reference for future projection.

A.4.2 Household

According to the Planning Head Office of ALMA, Managua has about 159,696 households with an average rate of 6.7 persons per household.

As of 1994, the bulk of Managua's population is concentrated in D5 and D6, with 33,052 and 35,316 households respectively. However, the most densely populated districts are D2 and D4, where about 22,062 and 28,465 households with an average size of 6.1 persons and 7.2 persons per household reside respectively. The smaller household population is found in D1 and D7, with 10,309 and 1,186 households, and 9.1 and 12.0 persons per household respectively. This latter district is considered as a complete rural district.

Total household distribution within the ALMA is shown in Table A.4.1d (refer to section A.4.1c).

A.4.3 Population Forecast

The most crucial factor in the formulation of the Study on the improvement of SWM and the physical development plan for ALMA is population.

Population projections are the basic data for development planning and estimation of future solid waste generation amount for the improvement of SWM. Therefore, the establishment of the population which is directly related to the solid waste collection coverage, was carefully discussed with ALMA, which decided to take the Study Team's present population estimates to project future population and plans on SWM.

Based on the previously estimated population in Table A.4.1d, the future population by district and urbanized area are projected and shown in Table A.4.3a and Table A.4.3b.

For population projection an increase of 5.2% from 1994 to 2000 and 3.6% for the period 2000–2010 was assumed. Given these growth rates, the population of ALMA is expected to increase 1.4 times the present population in 2000, and 1.9 times in 2010, reaching a total population of 2,069 million inhabitants.

The average population density of ALMA is 1,983 persons/km² in 1994. This density will increase to 2,687 and 3,828 persons/km² by the years 2000 and 2010 respectively. On the other hand, population density in the urbanized area which is 3,338 persons/km² will increase to 4,524 and 6,444 persons/km² by 2000 and 2010. However, these figures will be low compared with other Latin American countries.

Among the seven districts shown in Table A.4.1d, District 6 shows a density of 6.3. Nevertheless, the bulk of the population is mainly concentrated at the west side of the district's urbanized area; most of the district area has a very low population density. This uneven distribution is due to large land subdivisions, and the rise in progressive and spontaneous settlements caused by migration, where living conditions are poor. This trend may be reduced if zoning regulation is applied by the government.

On the other hand, the population is also seem to concentrate in District 5 (D5), according to the present development trend.

Table A.4.3a Population Projection by District (1991-2010)

District	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
D1	57,158	59,216	61,347	92,890	97,720	102,802	108,147	113,771	119,687	125,911
D2	121,136	125,497	130,015	134,696	141,700	149,069	156,820	164,975	173,554	182,578
D3	136,771	141,695	146,796	195,410	205,571	216,261	227,507	239,337	251,782	264,875
D4	184,103	190,731	197,597	204,711	215,356	226,554	238,335	250,729	263,767	277,483
D5	162,023	167,856	173,899	209,045	219,915	231,351	243,381	256,037	269,351	283,357
D6	198,622	205,772	213,180	220,855	232,339	244,421	257,131	270,502	284,568	299,365
D7	77,771	80,571	83,471	14,261	15,003	15,783	16,603	17,467	18,375	19,331
Total	937,584	971,337	1,006,305	1,071,868	1,127,605	1,186,241	1,247,925	1,312,084	1,381,084	1,452,900
District	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
D1	130,444	135,140	140,005	145,045	150,267	155,676	161,280	167,087	173,102	179,333
D2	189,151	195,961	203,015	210,324	217,895	225,740	233,866	242,285	251,008	260,044
D3	274,411	284,289	294,524	305,127	316,111	327,491	339,281	351,495	364,149	377,258
D4	287,472	297,821	308,542	319,650	331,157	343,079	355,430	368,225	381,481	395,215
D5	293,558	304,126	315,075	326,417	338,168	350,342	362,955	376,021	389,558	403,582
D6	310,143	321,308	332,875	344,858	357,273	370,135	383,460	397,264	411,566	426,382
D7	20,026	20,747	21,494	22,268	23,070	23,900	24,761	25,652	26,576	27,532
Total	1,505,204	1,559,392	1,615,530	1,673,689	1,733,942	1,796,364	1,861,033	1,928,030	1,997,439	2,069,347

Source: Population projection estimated by the Study Team based on electoral data provided by CSE. Population in 1994 was adjusted according to the data provided by ALMA

Table A.4.3b Population Projection of the Urban Area by District (1994-2010)

District	1993	1994	1995	1996	1997	1998	1999	2000	2001
D1		63,556	66,861	70,338	73,995	77,843	81,891	86,149	89,251
D2		134,696	141,700	149,069	156,820	164,975	173,554	182,578	189,151
D3		134,833	141,844	149,220	156,980	165,143	173,730	182,764	189,343
D4		204,711	215,356	226,554	238,335	250,729	263,767	277,483	287,472
D5		144,241	151,742	159,632	167,933	176,665	185,852	195,516	202,555
D6		152,390	160,314	168,651	177,420	186,646	196,352	206,562	213,998
D7		0	0	0	0	0	0	0	0
Total		834,427	877,817	923,464	971,484	1,022,001	1,075,145	1,131,053	1,171,770
District	2002	2003	2004	2005	2006	2007	2008	2009	2010
D1	92,464	95,792	99,241	102,813	106,515	110,349	114,322	118,437	122,701
D2	195,961	203,015	210,324	217,895	225,740	233,866	242,285	251,008	260,044
D3	196,160	203,222	210,538	218,117	225,969	234,104	242,532	251,263	260,308
D4	297,821	308,542	319,650	331,157	343,079	355,430	368,225	381,481	395,215
D5	209,847	217,401	225,228	233,336	241,736	250,439	259,454	268,795	278,471
D6	221,702	229,684	237,952	246,519	255,393	264,587	274,113	283,981	294,204
D7	0	0	0	0	0	0	0	0	0
Total	1,213,954	1,257,657	1,302,932	1,349,838	1,398,432	1,448,775	1,500,931	1,554,965	1,610,944

Source: Population projection estimated by the Study Team based on electoral data provided by CSE. Population in was adjusted according to the data provided by ALMA

A.5 Urban Structure of the Study Area

A.5.1 General

The Study covers the whole area under the administration of ALMA and consists of 7 districts which covers approximately 540 km², while the urbanized area extends over 250 km².

ALMA differs greatly in population, economic strength, employment ratio, etc. from the rest of the country. Managua has always been demographically, socially and economically advanced, and activities in ALMA result in the uneven distribution of population and economic factors. Thirty percent of the country's urban population reside in ALMA, where job opportunities exist, further leading to greater inequalities in economic distribution due to the concentration of tertiary industries in the area.

Managua is characterized by gradual and progressive urbanization leading to serious problems in the infrastructure of services such as sewerage, drainage, solid waste disposal, and other public utilities.

A.5.2 Land Use

The present land use condition is a historical reflection of the way Managua has developed and the natural, political and social factors which have played a major role in its development.

The 1972 earthquake was a historical event, as it destroyed the central area of the city (political, administrative, social, recreational and living centers). This caused further random growth of the urban area towards the city periphery, and at the same time, the dispersion of the main activities from the center of the city.

Radical changes in the urban land use pattern was caused by the earthquake, due to the control exercised by the private sector over the on real estate market.

The growth of Managua city, up to now, has remained uncontrolled and government response is currently weak. There are no provisions of specific guidance for private sector and government agencies engaged in development framework upon which an environmentally sound land use plan can be based. The current Zoning

Ordinance is based on existing land use patterns and, therefore, reinforces existing development trends.

Land use presented in Figure A.5.2a covers the urbanized area of Managua. This area is mainly influenced by the development of low rise buildings. According to the Town Planning Head Office of ALMA, 58% of the Urbanized Area is allotted for dwelling. This housing concentration is characterized by mixed land use: residential/commercial/service. During the last years, the number of housing settlements (especially spontaneous settlements) has increased considerably in the peripheral areas of the city, causing environmental problems to the vast sector of the population.

The industrial areas are developed in the six zones of the city, mainly along the North Avenue and the access road to Leon. The industries were established along the North Avenue during the Central American Common Market, because the area was quite accessible, close to the airport, and facilitates waste disposal to the Lake. 80% of the nation's industries are concentrated in the city of Managua, this figure, however, only represents 4% of the urban land, thus indicating a low industrial area availability.

Service areas consist of institutional buildings such as health, administration, education, transportation and storage, and occupy the second largest category (17.7%). Some service areas are concentrated along the main roads, and others are dispersed, due to the lack of a main city core.

Vacant areas represent 8.8% of the total urban land, and green area and recreation covers only 1.23% and 0.44% respectively.

The 9,474 hectares within the Urbanized Area is used as follows:

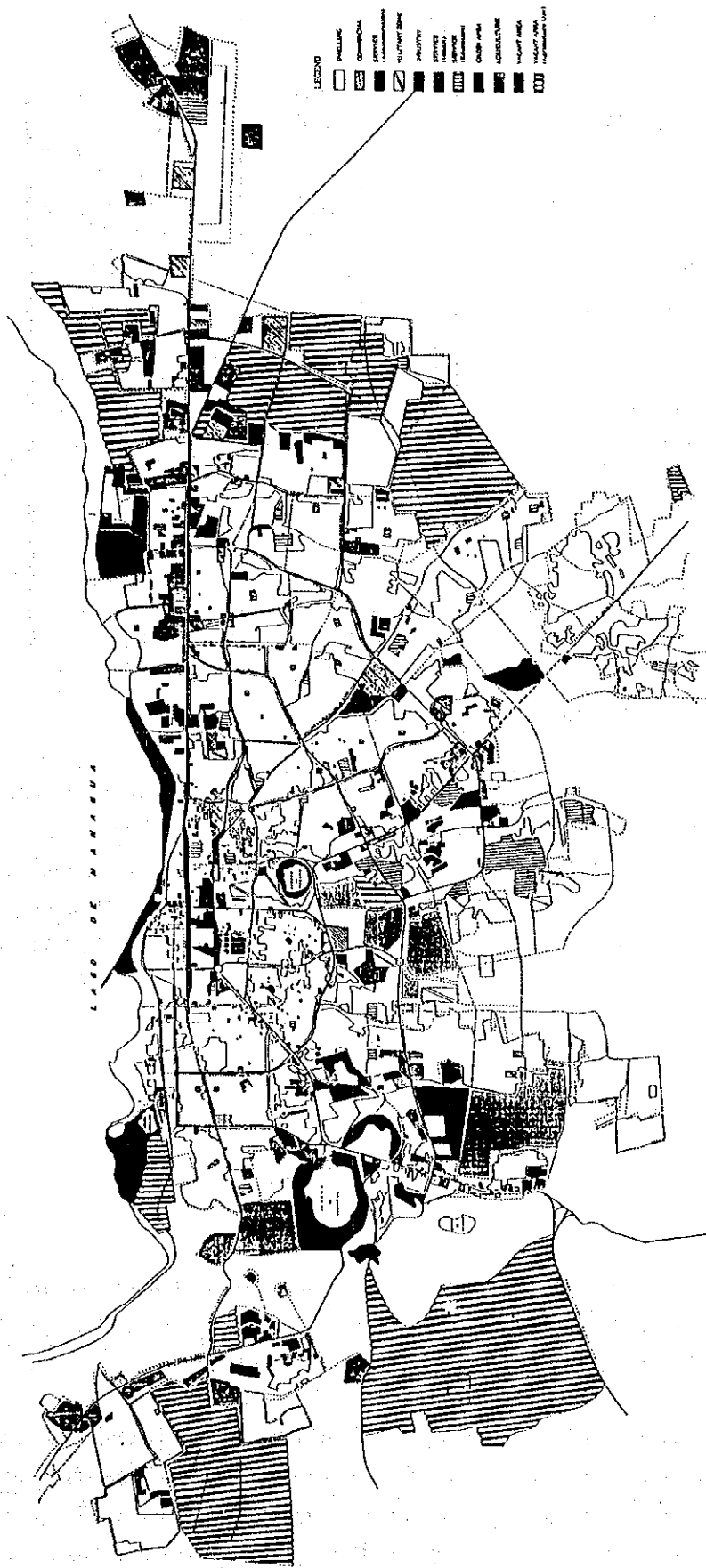


Figure A.5.2a Land Use of the Urbanized Area

Table A.5.2a Area by Land Use

LAND USE	Total Urbanized Area	
	(ha)	(%)
Housing	5,495.16	58.01
Industry	386.00	4.07
Commercial	196.75	2.08
Service	1,678.56	17.71
Sport	41.65	0.44
Green Area	116.27	1.23
Military	148.24	1.56
Vacant	830.68	8.77
Agriculture	254.68	2.69
Road	265.29	2.80
Others	60.30	0.64
Total	9,473.58	100

Source: Town Planning Head Office, ALMA

These figures clearly show the wasteful use of the urban land. The city has a population density of 88 people/hectare and 17 dwellings/hectare, a situation reflecting the way Managua has developed, and the natural and social factors which have played a large role in this uncontrolled development. Besides, even with a zoning ordinance, the government does not enforce its power to stop this disorderly urban development.

A.5.3 Housing

a. General

Like most large cities in the developing world, Managua is characterized by high urban migration and natural growth. However due to the present economic conditions, the housing demands are difficult to meet.

Housing is a basic necessity which contributes to the populations' productivity, welfare, social stability and economic development. Nevertheless, despite well-meaning intentions and significant accomplishments in the past, there yet remain a vast number of Nicaraguan's living in unsuitable and substandard housing conditions.

Apparently, the household, the basic social unit in the Nicaraguan society, has become smaller in size giving rise to speculations that the extended family system may be breaking up in response to present economic conditions.

For the last few years, the country has been experiencing a serious economic crisis that has adversely affected the people's income and employment opportunities.

In February 1994, the Town Planning Head Office of ALMA conducted a study (General Plan for Urban Development of Managua) on the number of dwelling units and its characteristics in the urbanized area of Managua. The estimates showed 158,510 dwelling units and a 6.4 average number of people per household. This estimate, however, does not include District 7, because the whole district is considered as a rural area.

According to this study, there is a housing shortage of about 50,300 dwellings in Managua; in addition to this shortage, about 33% of the housings need to be renovated or replaced due to poor condition.

Causes of the high housing shortage are:

- Lack of resources assigned to the housing sector
- Low socio-economic level of the population, together with low income
- Urban migration. The migration rate in Managua accounts for 3.4% of the population growth
- High demographic growth rate

The government should act on this housing shortage problem in order to satisfy the demand of the low income population sectors.

Table A.5.3a shows the latest housing estimate provided by the Town Planning Head Office and the population estimate of the Study Team. According to Table A.5.3a, there are 159,696 housings occupied by an average of 6.7 inhabitants.

Table A.5.3a Number of Housing by District in Managua

District	Area (km ³)	Nº of Housing	Housing (%)	Estimated Total Population	pers/house
D1	60.41	10,192	6.4	92,890	9.1
D2	18.65	22,062	13.8	134,696	6.1
D3	71.45	29,423	18.4	195,410	6.6
D4	16.61	28,465	17.8	204,711	7.2
D5	72.12	33,052	20.7	209,045	6.3
D6	69.97	35,316	22.1	220,855	6.3
D7	231.44	1,186	0.7	14,261	12.0
Total	540.65	159,696	100	1,071,868	6.7

Source: Housing data from PGDU (General Plan for Urban Development), Town Planning Office. Population estimated by the Study Team.

On the other hand, the Town Planning Head Office, through EDUM ("Scheme of Urban Development of Managua"), classifies housing units into 5 categories depending on structure, location, land size, etc., as shown in Table A.5.3b.

Table A.5.3b Housing Categories in Managua

Housing Category	Description	%
Residential Housing	Housing designed and well constructed on 200m ² to 700m ² of land. This housing category is inhabited by medium and high income people (Las Colinas, Altos de Santo Domingo, El Carmen, Las Palmas, Altamira, Colonial Los Robles, etc)	9.55
Traditional Housing	Built mainly before the 1972 earthquake in the old town of central Managua. Most of the buildings are made of sun-dried bricks, roofing tiles, etc., and constructed on 300 m ² of land.	7.32
Popular Housing	Housing of simple design, constructed by individuals or construction firms on 80 m ² to 250 m ² of land. Construction materials consist of masonry, wood or pre-fabricated material.	49.74
Progressive Settlement (in poor condition)	This progressive settlement comprises of houses built in 1980 because of the acute housing shortage. Usually constructed with low-cost materials by the land owner or the community on legalized land plots.	14.87
Spontaneous Settlement (in poor condition)	These settlements are constructed from debris or waste materials (woods, plastics, zincs, blocks, etc.) illegally.	18.52
Total		100.00

Source: General Plan for Urban Development of Managua, Town Planning Head Office, ALMA

Among the housing categories in Table A.5.3b, more than 33% are in poor condition needing replacement or renovation. Most of these dwellings are located in progressive and spontaneous settlement areas where fundamental changes in government policies and urban planning strategies are necessary for a better and effective housing service.

Figure A.5.3a shows the housing location (residential, traditional and popular housings) within the urbanized area of Managua.

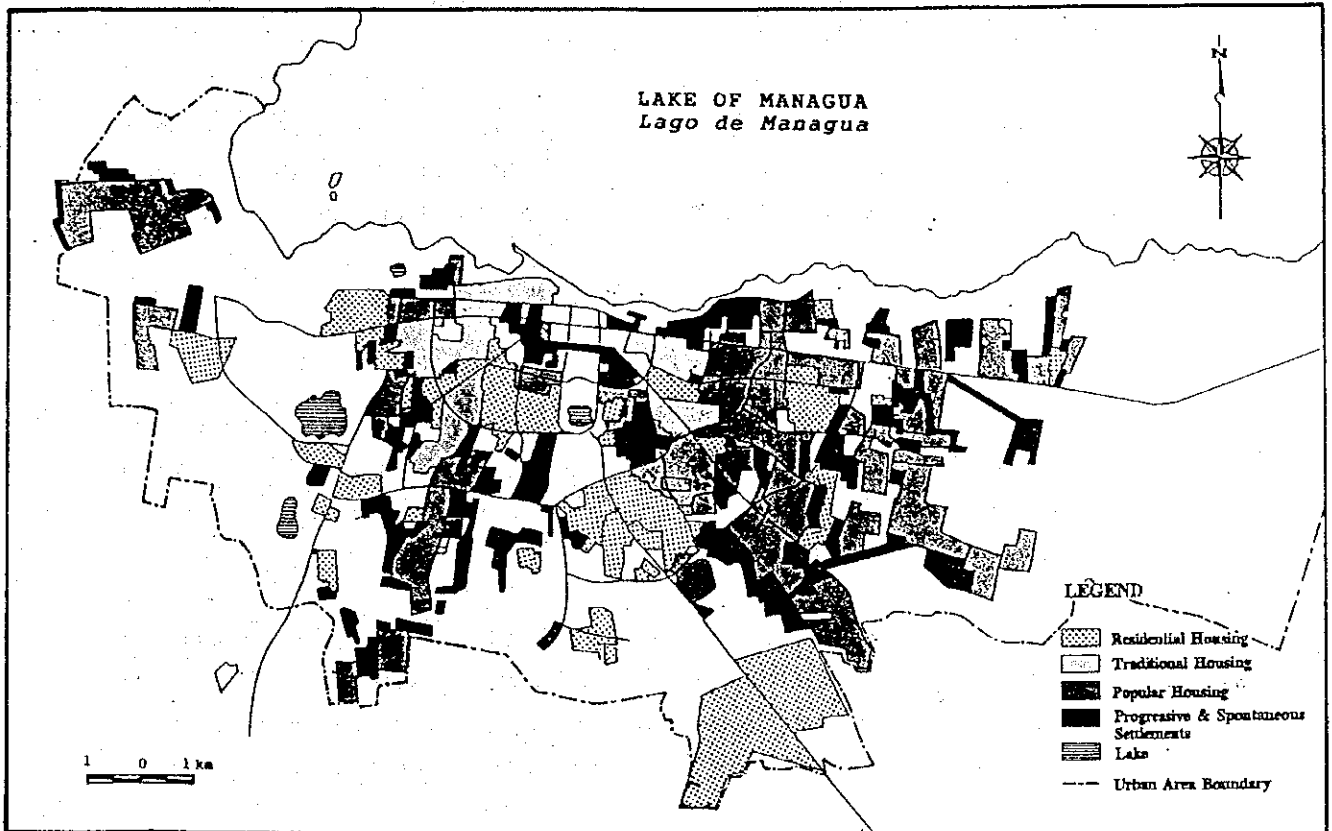


Figure A.5.3a Location of Housing within the Urbanized Area

b. Progressive Settlements

The national government, formerly through MINVAH (currently under the responsibility of MCT, BAVINIC and the Municipalities), has legalized the use of government lands for the development of settlements and rendered assistance to the urbanization layout. The progressive urban program, started by MINVAH in 1982, consisted of an alternative program that would benefit families of low income.

The program consisted of urban development activities such as location, design, provision of land, public water faucets and consolidated road infrastructure, and other works to be constructed in a gradual way.

As of April 1994, the urbanized area of Managua has 113 progressive settlements on 750 hectares, with about 145,614 inhabitants. This population represents approximately 17.5% of the total urban population (refer to Table A.5.3c).

c. Spontaneous Settlements

Special attention is to be given to the spontaneous settlements, where basic infrastructure and services are lacking, because of their increasing role in the urban structure and the environmental problems they have caused to a large sector of the city's population, especially since 1984.

After MINVAH was dissolved in 1988, the illegal taking-over of urban lands by the poorer population became the solution to the housing shortage problem. These illegal settlements were established spontaneously without planning, generally in areas considered as unsuitable for human habitation and housing development.

This population reside in areas which lack adequate infrastructural services and social community facilities for a sanitary living such as adequate electric and water supply, and waste disposal facilities. Materials for spontaneous housing are residual materials (woods, cardboards, tins, plates, corrugated iron bars etc.).

About 65 % of the housings need to be replaced; 27 % of the buildings are in decay, 30% is badly located (near canals, in flooding areas, near high voltage electric cables, in polluted areas, etc.) and 8 % are located in dangerous earthquake zones.

As of 1994, ALMA estimated 170 spontaneous settlements with 178,978 people, which is 21.4 % of the total urban area population, as shown in Table A.5.3d.

Table A.5.3e shows the number of lots/dwellings and population of progressive and spontaneous settlements, and Figure A.5.3b shows the approximate locations of progressive and spontaneous settlements in Managua City.

Both progressive and spontaneous settlements represent 38.9% of the urban area population and 30.3% of the total municipality population. These figures are attributed to the vast migration rate coming from rural areas, caused by the present economic situation.

Table A.5.3c Number of Progressive Settlements (1994)

District	N° of Settl.	Area (ha)	Estimated Population	Density (pers/ha)	N° of Houses	Pers/House	% of Estim. Population	Urb. Area Populat.	P.S/U.A. Populat.(%)
D1	7	85.7	15,015	175.2	2,400	6.3	10.31	63,556	1.80
D2	25	66.5	16,776	252.3	2,808	6.0	11.52	134,696	2.01
D3	24	157.1	29,634	188.6	4,662	6.4	20.35	134,833	3.55
D4	17	108.5	21,420	197.4	2,973	7.2	14.71	204,711	2.57
D5	16	106.9	23,958	224.1	3,954	6.1	16.45	144,241	2.87
D6	24	225.6	38,811	172.0	6,769	5.7	26.65	152,390	4.65
D7	0	0.0	0	0.0	0	0.0	0.00	0	0.00
Total	113	750.3	145,614	194.1	23,566	6.2	100.00	834,427	17.45

Source: Town Planning Head Office, ALMA
 Urban area population and percentages arranged by the Study Team

N.B.P.S = Progressive Settlements
 U.A = Urban Area

Table A.5.3d Number of Spontaneous Settlements (1994)

District	N° of Settl.	Area (ha)	Estimated Population	Density (pers/ha)	N° of Houses	Pers/House	% of Estimate Population	Unempl. rate (%)	Urb. Area Populat.	S.S/U.A. Populat. at.(%)
D1	3	11.5	963	83.7	161	6.0	0.54	60	63,556	1.52
D2	30	93.1	18,457	198.2	3,176	5.8	10.31	17	134,696	13.70
D3	46	217.3	50,503	232.4	8,119	6.2	28.22	43	134,833	37.46
D4	26	106.9	34,042	318.4	5,437	6.3	19.02	54	204,711	16.63
D5	27	131.3	34,266	261.0	5,564	6.2	19.15	69	144,241	23.76
D6	38	185.9	40,747	219.2	6,950	5.9	22.77	64	152,390	26.74
D7	0	0.0	0	0.0	0	0.0	0.00	No data	0	0.00
Total	170	746.0	178,978	239.9	29,407	6.1	100.00	51	834,427	21.45

Source: Town Planning Head Office, ALMA
Urban area population and percentages arranged by the Study Team

N.B.S.S = Spontaneous Settlements
U.A = Urban Area

Table A.5.3e Summary of Progressive and Spontaneous Settlements

District	N° of PS/SS		Area (ha)			N° of Houses			Estimated Population			Urban Area Populat.	PS & SS /U- rb.A. Populat. (%)
	P.S	S.S	P.S	S.S	Total	P.S	S.S	Total	P.S	S.S	Total		
D1	7	3	85.7	11.5	97.2	2,400	161	2,561	15,015	963	15,978	63,556	1.9
D2	25	30	66.5	93.1	159.6	2,808	3,176	5,984	16,776	18,457	35,233	134,696	4.2
D3	24	46	157.1	217.3	374.4	4,662	8,119	12,781	29,634	50,503	80,137	134,833	9.6
D4	17	26	108.5	106.9	215.4	2,973	5,437	8,410	21,420	34,042	55,462	204,711	6.6
D5	16	27	106.9	131.3	238.2	3,954	5,564	9,518	23,958	34,266	58,224	144,241	7.0
D6	24	38	225.6	185.9	411.5	6,769	6,950	13,719	38,811	40,747	79,558	152,390	9.5
D7	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0	0.0
Total	113	170	750.3	760.0	1,496.3	23,566	29,407	52,973	145,614	178,978	324,592	834,427	38.9

Note: PS: Progressive Settlement

SS: Spontaneous Settlement

A.5.4 Infrastructure

a. Transportation

aa. Road Traffic

According to the traffic survey made by ALMA, the average traffic in central Managua is about 57,000 vehicles/day, where 70% of the vehicles travel in the East-West direction and 30% in the North-South direction. Traffic mainly consists of automobiles, buses and trucks at a rate of 73.0%, 22.7% and 4.3%, respectively.

The public transportation in Managua is predominantly road-based, consisting largely of buses. There are 21 urban bus routes, each about 18 km long. Among them, 7 lead to the central area, where 3 bus stations are located. 32.4% of the public transportation is operated by the state and 67.6% is run by private bus companies, as shown below:

State-owned buses	180
Privately-owned buses	375
Taxis, hired cars	1,400
Privately-owned cars	101,400

The main problem in transportation is the acute shortage of vehicles and of spare parts for maintenance.

Traffic hours peak twice in a day, in the morning around 10.00 A.M. and in the afternoon from 3.00 P.M. to 6.00 P.M., indicating that traffic in the streets of the central area are mainly influenced by the business sector.

At present, there are no traffic problems. However, for the smooth conduct of the haulage system, Solid Waste collection vehicles routes should be traced, in order to be able to determine areas which tend to be congested and consequently be able to avoid the peak-hours.

aaa. The Road Network

(1) Roads in the Country

As of 1994, there are approximately 24,748 km of roads of all types in Nicaragua. Most of the roads serve the densely populated pacific coast regions. The 368.5 km north-south Pan-American highway links Nicaragua with northern Honduras to the

north and its neighbor Costa Rica.

Nicaragua is the only country in the isthmus that faces to both oceans but has not still linked the Atlantic Coast to the Pacific Coast, neither by road nor by railway. The existing road network in Nicaragua is not satisfactory both in terms of length and surface condition to support and activate sound social and economic activities in the country. As of 1991, only 10.7 % of the existing roads are paved.

The national road network is administered by the Ministry of Construction and Transport (MCT), and roads within the periphery of ALMA are under the responsibility of ALMA.

(2) Roads in the City of Managua

The Municipal Works and Services Head Office of ALMA is responsible for the construction and maintenance of roads and bridges within the jurisdiction of Managua. However, it is not clear whether MCT or ALMA is responsible for the maintenance of the main access roads to the city, because of economic reasons and differences between the two government organs.

As of May 1994, the road network in ALMA totaled 1,112.5 km. By surface type, asphalt accounted for 44.93 % of the total road network, followed by earth surface with 35.54 % and stone paving block 18.74 %, while only 0.09 % and 0.07 % have concrete and unpaved surfaces respectively. The road network by surface type and length provided by the District Coordination Office of ALMA is shown in Table A.5.4a.

Table A.5.4a Road Network in Managua (km)

District	Asphalt Surface (km)	Stone Paving Block (km)	Concrete Surface (km)	Un-paved (km)	Earth Surface (km)	Total (km)	%
D1	20.32	2.64	-	-	75.29	98.25	8.83
D2	110.46	26.43	0.79	5.11	36.10	178.89	16.08
D3	76.56	54.92	0.15	0.89	83.81	216.33	19.45
D4	134.07	65.24	-	1.27	63.72	264.30	23.76
D5	88.56	43.50	0.06	0.54	45.66	178.32	16.03
D6	61.54	15.75	-	-	81.72	159.01	14.29
D7	8.35	-	-	-	9.06	17.41	1.56
Total	499.86	208.48	1.00	7.81	395.36	1,112.51	100.00
%	44.93	18.74	0.09	0.70	35.54	100.00	

Source: District Coordination Office, Planning Head Office (ALMA)

The road networks in the city are ring and radial systems, which allow for the

traffic to flow smoothly. Traffic problems occur mainly because not enough measures are taken to promote optimal transit-ways. Direct causes are insufficient number of roads and improperly parked vehicles.

ab. Other means of Transport

Other means of transport in the city are the national railway and air systems.

aba. Rail Traffic

The railroad is out of service because of low profit and high operation and maintenance costs in 1994.

The state railway covered 370 km, distributed over different parts of the Pacific Zone, connecting Corinto with Leon, Managua, Masaya and Granada. The trains transported about 500 passengers and 600 to 1000 tons of cargo each day. In the city of Managua, a 6 km long truck called "metro urbano", from Acahualinca to "Mercado Mayoreo" were used for passenger transport.

abb. Air Traffic

The international airport Augusto C. Sandino is the country's only airport for international air traffic. It can accommodate four planes simultaneously with a runway 2,440 meters long. In 1991, 137,510 passengers, traveling by different airlines, and a total of 4,914 tons of cargo were registered (source: Nicaragua en Cifras INEC, MCT).

b. Water Supply and Sewerage System

ba. Water Supply Sector of Nicaragua

Water supply of the Republic of Nicaragua is undertaken by the Nicaraguan Institute of Waterworks and Sewerage (INAA).

At present, INAA is managing 148 water supply systems in Nicaragua, 73% of which uses groundwater as a supply source for about 2 million people.

bb. Water Supply Sector of Managua City

The water supply works in Managua City are undertaken by INAA's division for Region III. The city water supply master plan established in 1971 came to a deadlock due to the great earthquake that occurred at the end of 1972. Fortunately,

however, since most of the supply source had been groundwater, Asososca Lake was one of the sources, the direct damage to the supply system was recovered soon and INAA was able to continue its water supply services. A new water supply master plan was formulated in 1976, aiming to improve and expand water supply services. These objectives were assessed to have been accomplished up till the 3rd construction stage. The 4th construction stage has not been fully implemented yet due to lack of funds.

The most serious problem to be solved in Managua's water supply sector is the difficulty in meeting the demands of the very rapidly increasing population of the capital. The number of households receiving water service was about 100,000 as of December, 1991. But services for an additional 30,000 to 35,000 households are a problem for the administration of the water supply sector. The water charge collection rate is very low for progressive settlements, and the majority of the households in spontaneous settlements have installed illegal pipe connections.

It is recently reported that illegal water consumption, including leakage from supply pipes, has reached over 50% of the total consumption. Consequently, an alternating periodical water supply suspension during the dry season (2 days a week) was imposed by supply zone.

bc. Sewerage System

The sewerage system consists of 130 km collection and 160 km conveyance pipes (concrete pipes) and is based on the gravity system. Sewage is discharged without any prior treatment into Lake Managua, at sixteen different places. The sewerage system covers about 55% of the built-up area.

This capacity can be increased if obstructions to the pipelines are reduced. Rain water enters the system through illegal connections leaving behind sediments and other solid materials.

A.5.5 Urban Development

Urban development can be defined as a process of creation, transformation and improvement of urban areas, for the purpose of improving the general welfare of the citizens. It involves the modification of the physical and socioeconomic characteristics of both urban and surrounding rural areas and entails the priority of activities that will contribute to the development of the nation. The standards of living and income of the population will be improved under productive efforts and by developing the basic infrastructure.

a. Analysis of Development Trend

aa. Population Growth

The population of Nicaragua registers high growth rates and is presently estimated to be about 4.3 million people, mainly concentrated in the city of Managua.

The population has experienced substantial changes in terms of distribution. Arising from the population influx in urban areas. Urban population currently represents 65% of the overall population. On the other hand, this population flow into cities causes conditions that makes it difficult for municipalities to meet the people's needs. In fact, there are no intermediate cities in Nicaragua worthy of supporting regional development. Urban population is mainly concentrated in Managua which is unable to incorporate a national urban system.

The problems of urban areas are as follows:

- Economic structure: industrial activities and services tend to concentrate mostly in the city of Managua, resulting in underemployment and unemployment.
- Urban structure: wide vacant lands in Nicaragua are not adequately used for national production; dislocation of urban system because there is no specific definition of urban hierarchy and functions; high dispersion of populated centers; incomplete urban sub-systems; very few relations between urban and rural area.
- Services: deficient national, regional and road infrastructures; partial coverage of basic utilities (water, drainage, electricity and housing) in many national territories, and poor coverage of health and education services.
- Population: increasing trends of migration from rural to urban areas leading to rapid growth of the population principally in the city of Managua; this aggravates the problem of people being treated marginally because their basic needs remain unsatisfied.
- Finance: most of the municipalities are not self-sufficient and depend on the central government; except ALMA.
- Administration: unsuitable organization of public administration; deficient management of projects; institutions with unspecified duties; lack of interinstitutional coordination; operational deficiency because relations

between institutions are not legalized; very slow decision making;

- National plans: lack of plans and strategies, policies and actions for the national and regional development plans.

ab. Forecast

The national population is likely to continue registering high growth rates in the next few years. The total population forecast for 2000 is 5 million. The national urban population figure will continue to rise and is estimated at 3.2 million for 2000. It will double and represent more than half of the population. The population is likely to go on concentrating in the pacific zone, especially in ALMA where it will reach 1.5 million. At the same time, the population of the central zone is expected to increase, but without taking a significant role in regional development.

At the end of this century, ALMA will probably hold 28% of the national population as a result of migration from rural areas to the capital city. It must be pointed out that if the current economic tendencies persist, land occupancy problems in the main urban areas will aggravate and probably generate stronger social tensions.

b. Evolution of Managua City

The city of Managua founded in 1852 was originally built on the banks of Lake Xolotlan (Lake Managua) and has developed out of a regular and compact structure, characteristic of a colonial city. Today, Managua has the shape of a half joined adhered to the coast of Lake Managua, with radial arteries and reticular structure, at an average of 83 meters above sea level. The municipal area has an area of 540 km², while the city extends over 250 km². Figure A.5.5a shows the urban growth in Managua City from 1972 to 2010.

In 1950, Managua counted about 100,000 habitants and, by 1984 this number increased to 730,800. Today, over 25% of the nation's population is concentrated in Managua. Most of the immigrants that arrived in the capital city came from the pacific region and other urban centers, such as: León, Chinandega or Granada. Generally, however, immigrants come from all over the country including the atlantic zone.

Managua, an agricultural village in former times, started to grow rapidly. It has, however, suffered various earthquakes of considerable magnitude in 1844, 1885, 1931, 1968 and 1972. The earthquake of 1931 almost destroyed the whole city, which then had a population of 40,000.

After the earthquake of 1931, the city was rebuilt following modern urban plans. It was constructed with two main avenues that form a square allowing passage from east-west and north-south, and several parallel and perpendicular streets which are slightly sloped from the residential zone of Tiscapa Hill to the coast of Lake Managua. The city economically thrived from the cotton export boom and by the modernization of the financial institutions. During the sixties the city continued to grow randomly towards the city periphery where living conditions were poor due to the lack of public services.

In December 1972, the most harmful earthquake destroyed the capital city damaging 90% of its buildings and affecting approximately 80% of the population. This caused the economy to be further concentrated in the city periphery.

Today, many of the old colonial style "manzanas" continue to be destroyed; they either become idle strips of land covered by vegetation or used for the construction of houses. Ruins of many buildings such as the Cathedral – the restoration of which is under discussion – can still be observed.

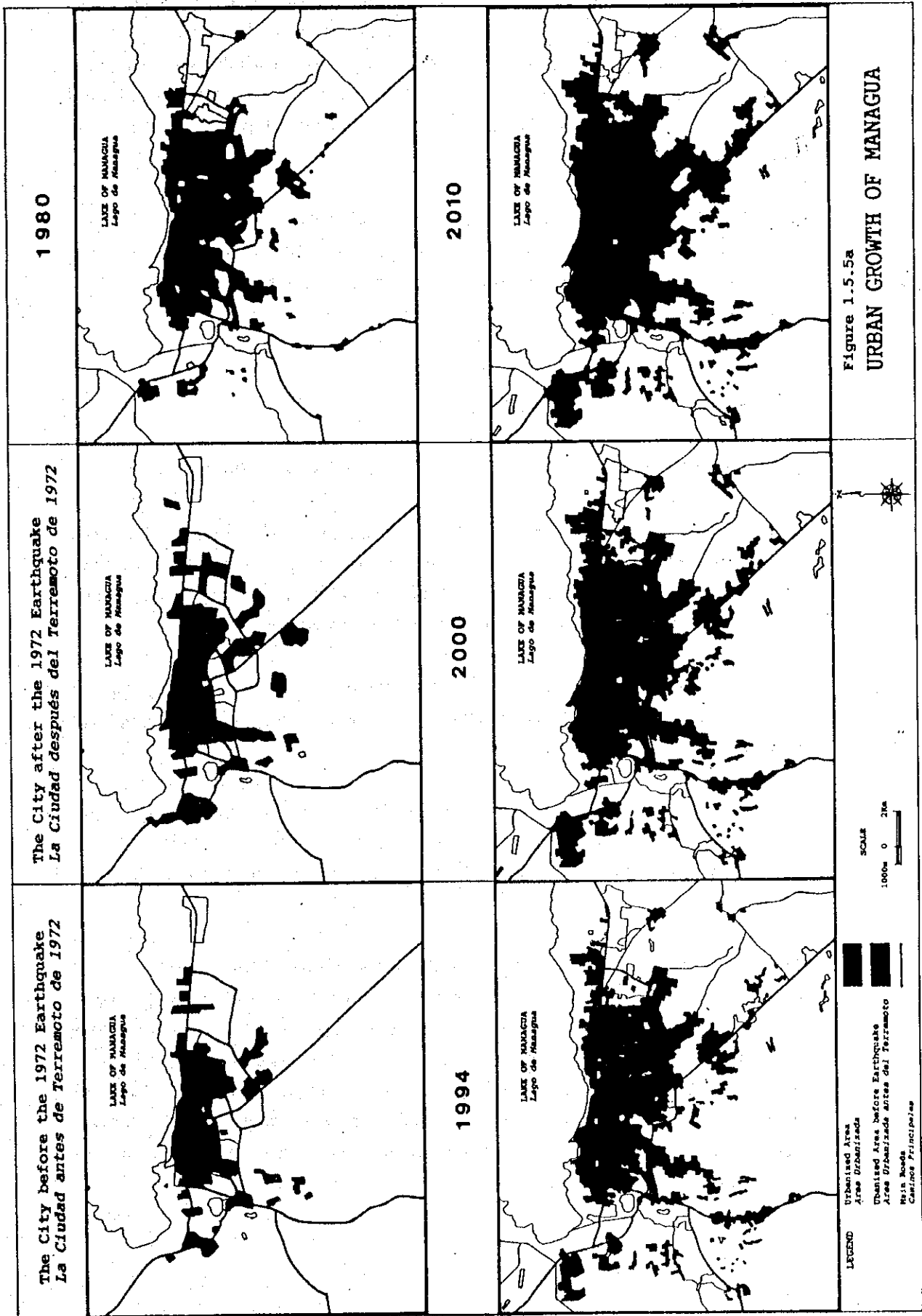


FIGURE 1.5.5a Urban Growth of Managua

As a consequence of the latest earthquake, the migratory trend, the economic crisis, and the war the country faced, the living conditions in the city has deteriorated leading to serious problems in infrastructure. Unemployment rate is 24% and the unemployment rate in informal sector has increased due to the inflow of rural immigrants. It is assumed that a third of the employed population are rural immigrants.

Therefore, if the concentration of population would continue to go uncontrolled, the living and environmental condition will further deteriorate. From the urban point of view, this problem will be difficult to solve if no measures and political determination are applied by the Government.

c. Existing Regulation and Plan

ca. "Plan Regulator" (Zoning Ordinance, Land Use, Building Code)

Since 1983, ALMA and MINVAH (former Ministry of Housing) have worked together for the urban development of Managua, laying down substantial objectives for the present and future development of the city within the physical and economic restrictions which will influence the city's future development.

The "Plan Regulator" is the only legal element used for urban development. It refers to zoning and land use, architectural structures and urban development regulations for the city of Managua.

In 1982, the "Plan Regulator" for Managua formulated the concept of a radial/semicircular structure for the city. This plan was based on studies of the population and of its needs, and contained proposals for land use until the year 2000.

The Managua area seen today is the result of a lack of political determination to plan its development. Although unpredictable natural factors have played a disruptive role in the development of the city into its present form, this alone does not justify the urban disorder of today. There has been a lack of plans in the past, but an institution with a clearly defined task could have avoided some, if not, all of the damage caused by natural disasters. Also, there are many obstacles for development, because many of its structural problems are a result of an under-developed economy.

cb. Master Plan for the Central Area

Recently, the City Planning Head Office of ALMA, together with the assistance of the Municipality of Amsterdam, has prepared a Master Plan for the reconstruction and urban development of the central area of Managua.

This Master Plan presents a model for development including urban concepts, zoning ordinances and future urban models for the central area of Managua. The proposal of the Master Plan contains methods for development and strategical projects, together with complementary data such as urban regulations and preliminary plans on land policies prepared specifically for the central area.

The urban concepts define the main structure of the central area and establish the basic guidelines for the zoning ordinance and the future urban model. On the other hand, the zoning ordinance arranges the urban functions of the central area through the land use plan and road network. It also considers the seismic zones and the environment, and defines the type of urban development and the characteristics of every zone.

The future urban model is designed taking into account open public spaces, the urban complex and prominent historical buildings. The strategies comprise development of the center in a short term period for the public use.

The Study Area considered in the Master Plan covers an area of 590 ha. and comprises urbanized and urbanizable zones, including physical and natural limitations (geological fault zones) of the central area (refer to Figure A.5.5b).

The Master Plan proposes the establishment of urban service and the reduction of dispersed and uncontrolled population growth with efficient land use and low population density, and the recovery of the lost ambience of the old city center, in consideration of the socio-economical aspects.

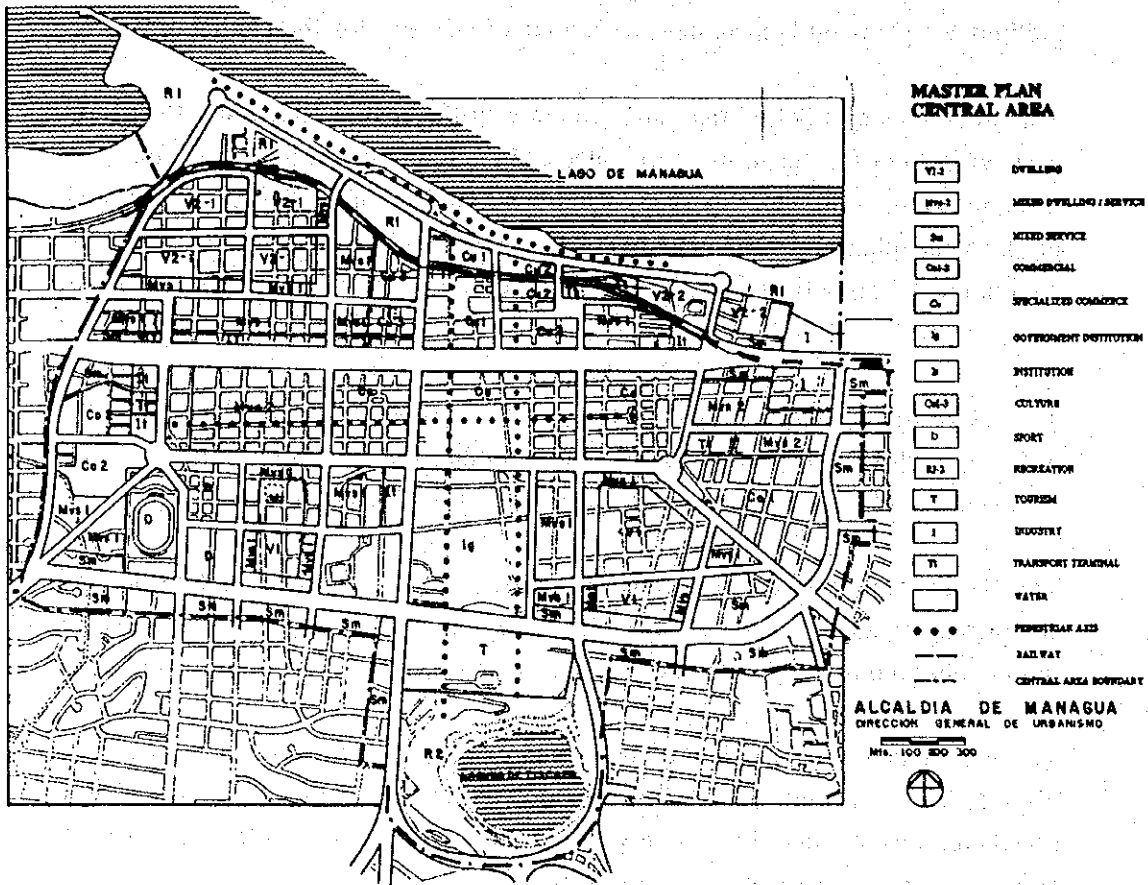


Figure A.5.5b Zoning Distribution (Master Plan, Central Area)

The main guidelines of the Plan are:

- a) To locate political-administrative, commercial, cultural and recreative functions in the main center of the capital city.
- b) To organize the functions of the metropolitan center, considering the city structure, together with the existing road networks, infrastructure, landscaping and the seismic zones of the area.
- c) To integrate the physical-natural elements (Lake Managua coastal area, hills, Lake Tiscapa and the geological faults) to the spatial city structure.
- d) To promote the dwelling usage to complement the metropolitan functions in order to achieve diversity and revival of people in the area.

d. Urban Development in the Study Area

The Study Area for the improvement of the Solid Waste Management System for the City of Managua is vast and encompasses 7 districts. Background information and updated data were provided for the whole municipal area, however, the urban development analysis is centered only in the urbanized area of Managua as shown in Figure A.5.5c.

ALMA is the central agency responsible for the preparation of city plans and for coordination with other governmental agencies.

The Town Planning Head Office of ALMA has prepared the "Urban Development Plan for Managua", and recently finished the Master Plan for the Central Area and specific plans on urban development. However, at present, it is difficult for ALMA and the Central Government to realize the plans, due to shortage of funds and other related issues.

Unfortunately, even though regulation and guidelines for the city plan within the urbanized area exist, the determination of development features becomes a speculative process based on general and natural trends observed in many sectors of the city.

The land use pattern in the Study Area is focused towards the outskirts. Many spontaneous settlements are located without any established pattern, while activities were established according to convenience or due to the presence or availability of major roads.

As the city of Managua continues to attract migrants, existing pressure on urban services and facilities reflected by the uncontrolled rise of settlements, will lead to more slum areas, housing shortage and very poor environmental conditions.

The development along the north-eastern corridor (D1) at present has not gained much progress due to soil condition, wild landscape and lack of sonic attractions. Nevertheless, it is expected that practical programming as well as intensive housing developments will push its development through.

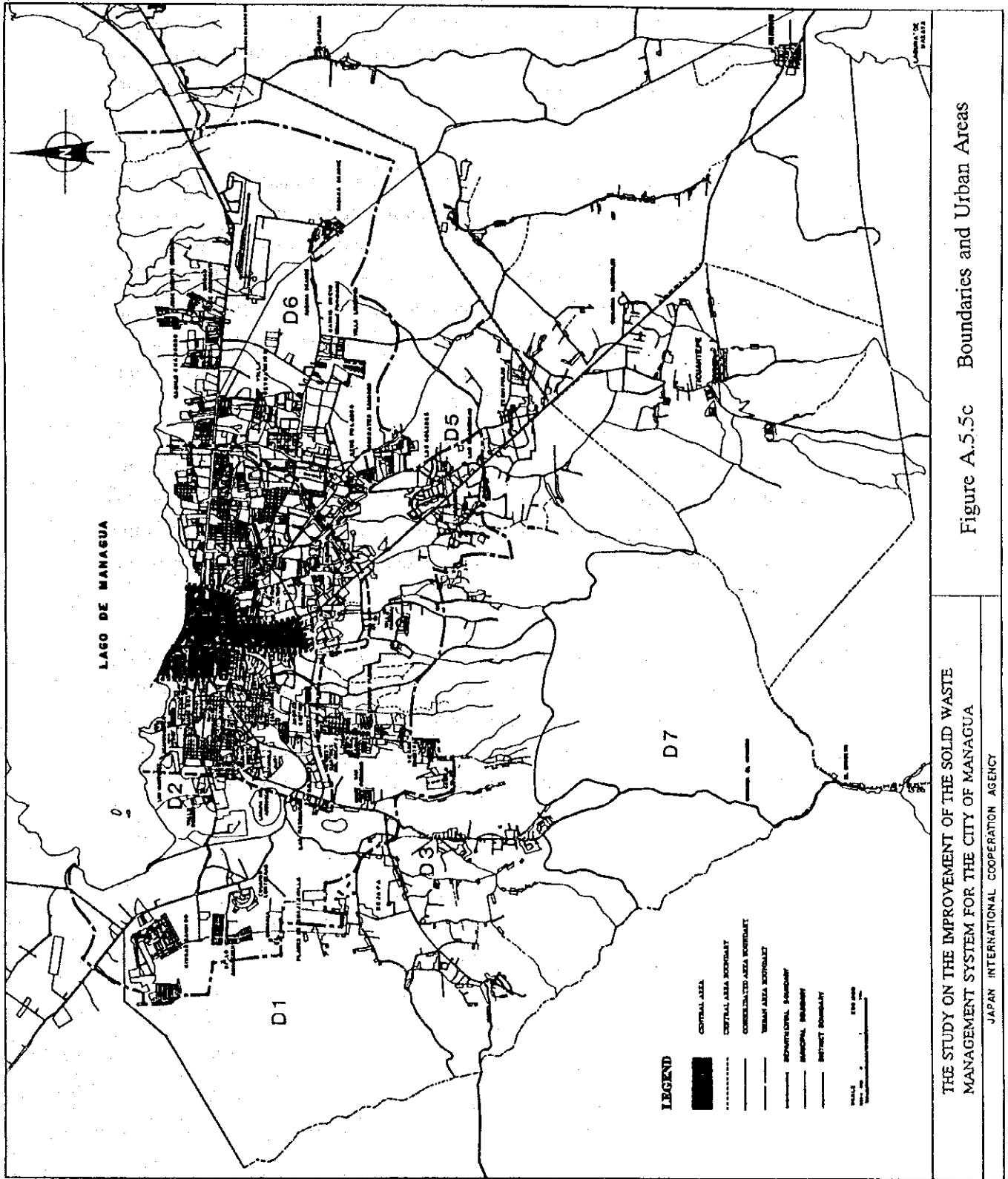


Figure A.5.5c Boundaries and Urban Areas

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However, full development may not be feasible if no multi-functional activities are promoted by the government and private sectors.

The southern part of the Study Area (D7) is not developed because of its topographical condition and poor accessibility. Therefore, there is limited probability for medium and long term development in this area, except dotted developments along the main transport route (south road), projecting a linear-cellular pattern.

Further growth is anticipated in the south-east route along Managua-Masaya road (D5) because of its huge potential for urban development and the existing activities of the private sector. Urban concentration in this sector is expected to develop multi-functional activity centers providing expanded opportunities for housing, employment and social services, as well as educational and cultural facilities. Areas lying between these routes shall, however, be subjected to development guidelines to ensure the conservation of certain areas, e.g., forests, watershed, development restricted areas and prime agricultural areas.

The area along the north-eastern route (D6) is expected to absorb a considerable amount of urban growth because of the advantageous location of industries in this sector. However, there will not be enough job opportunities and at the same time, a rise in unsuitable housing (spontaneous settlements) developments is expected to take place.

Figure A.5.5d shows the areas to become overpopulated due to urban nucleation, especially by progressive and spontaneous settlements. The areas considered to become very populated are D5 (northern part) and D6 (western part) due to the large land subdivisions and the progressive and spontaneous settlement growth caused by migration. This trend is expected to continue in the future.

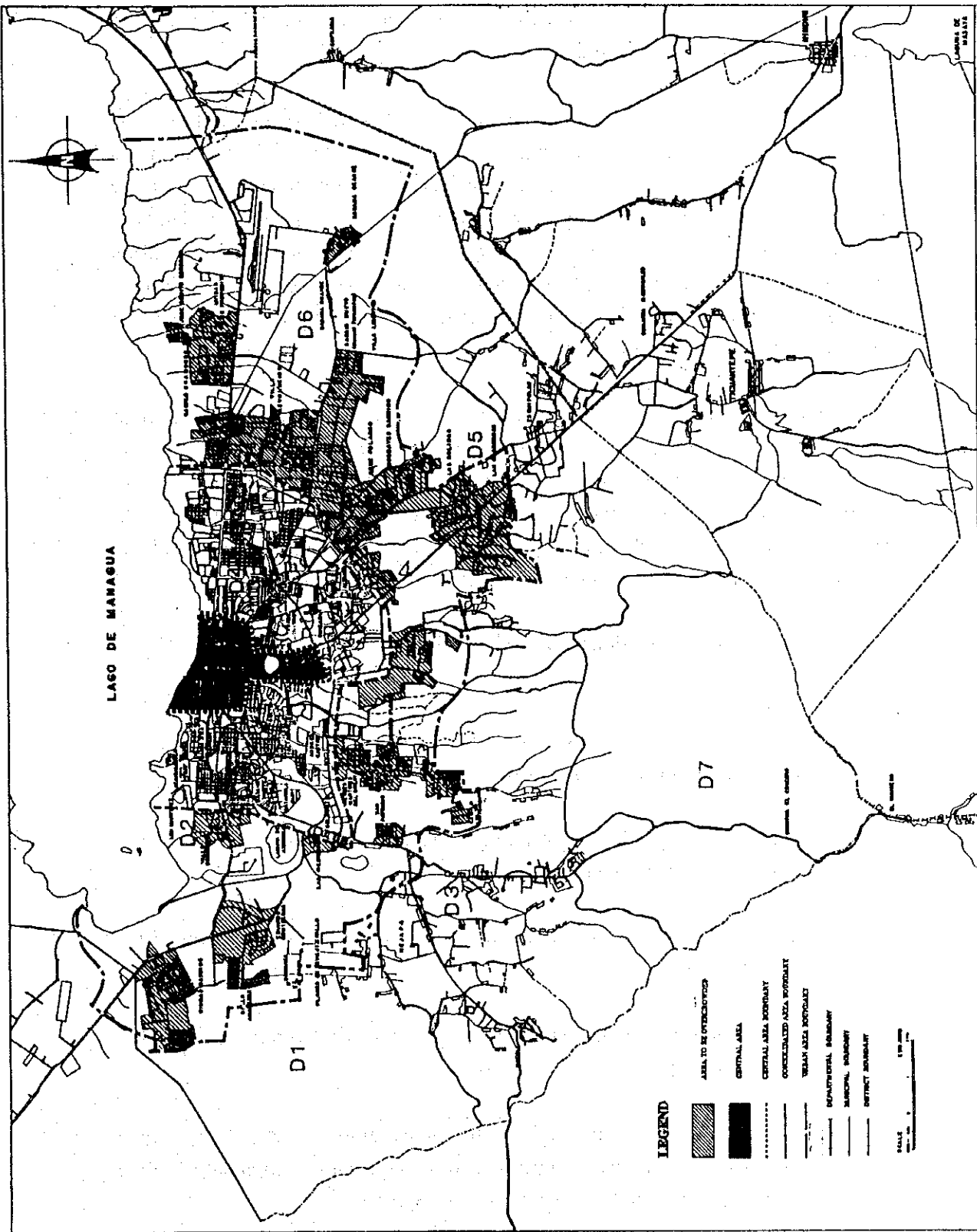


Figure A.5.5d Expansion Area to be Overpopulated

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e. Recommendations

A master plan that does not only cover the central area but the whole municipal area, providing an efficient space cope with the population growth and the city expansion, should be formulated.

The implementation of the "Plan Regulator" and master plan to guide the urbanization process, land use, zoning ordinances, and subdivision control is an urgent concern. As previously stated, general plans are formulated but none are implemented to this day. For instance, the practical measures enforcing the land use plan have not been institutionalized. Consequently, the implementation of efforts to improve city planning in ALMA must be enforced. Moreover, measures concerning institutionalization and coordination of the master plan shall be considered the urban development.

A development plan dealing with the basis of a social consensus must be easy to understand. Thus, the objectives, processes, and methods used should be clear, and the plan should be expressed in quantitative terms as much as possible. To prepare a city plan that effectively promotes public welfare is of the utmost importance to establish a standard city plan system relying on technical and planning standards based on studies of actual physical and socioeconomic conditions.

To achieve the above mentioned objectives, the following measures should be implemented:

- Distribution of population for medium and long term periods according to the available urban open spaces and rural areas;
- Concrete implementation of planning standards, regulations and guidelines (Plan Regulator, master plan, etc.);
- Updating and review of regulations related to the urban development of the City of Managua;
- Improve relations with planners of different sectors and with those belonging to other agencies;
- Assistance to the municipalities for the preparation of basic studies for a practical land use, service efficiency, and harmonized development of urban activities, taking advantage of available resources;
- Establishment of a common city planning database.

With the aim to stop further migration to Managua and encourage citizens to stay in their places of origin, the following regional and urban policies should be implemented:

a) Employment policy for urban population

- Job creation program;
- To provide the unemployed population with training services and qualifications necessary for urban activities;
- To promote urban activities to channel investments and credits for favorable conditions;
- To give priority to the execution of projects that generate more jobs;
- To propose legal measures to create a "social salary";
- To establish credit strategies, for favorable conditions, to stimulate productive and social activities in urban areas.

b) Policy of strengthening relations between urban and rural areas

The objectives of this policy are to strengthen and diversify urban activities. The rural areas shall bring resources to the national economy, and the urban activities that serve and support such rural areas shall be stimulated. Special attention shall be paid to this policy in the rural service centers and in small cities.

- To develop informal education programs intended for rural populations according to their potentials;
- To sponsor the development of cottage industries;
- To organize rural enterprises for production, storage, commercialization and distribution of rural production;

c) Policy for planning and regulation of growth in the City of Managua.

Proper planning and regulations are necessary to cope with rapid urban growth taking into account the dynamic factors that suit the capital city. It is assumed that the population will double within 15 years, hence the urgent need for a city plan to solve the rising pressures involved in coping with the required public facilities and services.

- To promote and coordinate technical assistance and public or private investment programs, at both city and municipal levels;
- To develop programs based on community organization, for the construction and maintenance of equipment and public services;
- To carry out training programs for the deprived urban population;
- To provide family orientation for the metropolitan population;
- To regulate the suitable use of urban land;
- To coordinate governmental actions at different levels (municipal, regional, departmental and national);
- To develop municipal property (cadastre, real estate, tariffs, taxes, contributions, etc.), so that the operation and the exorbitant cost of the services will be self-sustainable.

A.6 Economic Conditions

A.6.1 National Economy

a. GDP and GDP per capita

The Gross Domestic Product (GDP) decreased from 21,099.9 million in 1987 to 18,014.2 million in 1993, indicating a 2.6% annual rate. Because some of the figures used to estimate GDP contradicted with the deflation rate in recent years, the adjusted figure shown in Table A.6.1a is used hereafter.

The changes in the Nicaraguan economy in 1994 is the direct result of an increase in a 10 year deflation. It is reported in a newspaper that the growth rate of GDP is estimated at 3% and that export volume has increased by 28% (La Prensa, December 22nd 1994).

The above newspaper summarized the 1994 economy of Nicaragua using the following figures:

- Inflation	12.64 %
- Increment of GDP	3 %
- Exports	US\$ 349 million
- Imports	US\$ 782 million
- Investment	US\$ 445 million

The 1993 GDP per capita was estimated at US\$ 393, indicating an annual decline of 3.7% since 1988, as shown in Table A.6.1c. The population in 1993 is estimated at about 4.26 million. In another estimation, the GDP per capita was shown to have decreased from US\$ 421 in 1993 to US\$ 404 in 1994 (Nestor Avendano).

The GDP composition is shown in Table A.6.1b.

Table A.6.1b outlines the characteristics of Nicaraguan economy according to the following:

- The primary sector has increased, while the secondary sector has decreased from 1987 to 1993. This tendency basically started from 1987 to 1990.
- After 1990 to 1993, the secondary sector has increased, while the tertiary sector has decreased.
- Livestock within the primary sector and electricity, gas and water supply

within the tertiary sector has increased, while the service industry within the tertiary sector has decreased.

These figures reflect the present unstable situation of the Nicaraguan economy.

The selected economic indicators assumed for the study are shown in Table A.6.1c.

Table A.6.1a Changes in the GDP of Nicaragua

	unit	1987	1988	1989	1990	1991	1992	1993
GDP1	US\$ mill.			1,018.0	2,220.0	1,625.0	1,686.0	
GDP2	CS\$ mill.1980 (1980)	21,099.9	18,473.0	18,159.4	18,136.5	18,108.3	18,173.8	18,014.2
GDP3	US\$ mill.				1,563.7	1,717.3	1,846.0	1,796.9
Growth rate 1 (%)			-12.4	-1.7	-0.1	-0.2	0.4	-0.9
Growth rate 2 (%)			-14.3	-3.7	0.1	-0.4		
Growth rate 3 (%)				-1.7	-0.3	-0.2	-0.1	-0.7
GDP adjusted	US\$ mill.		1,725.0	1,696.1	1,691.1	1,687.7	1,686.0	1,674.2

Sources: GDP1, Growth rate 3 Country profile 2nd quarter 1994
 GDP2 ALMA
 GDP3 BCN, Nestor Avendano La Economía de Nicaragua
 Growth rate 1 calculated from GDP2
 Growth rate 2 Banco Interamericano de Desarrollo Informe anual 1991

Table A.6.1b Changes in GDP Composition

unit: %

	1987	1988	1989	1990	1991	1992	1993	1994*
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary Sector	21.7	22.2	24.7	24.7	23.8	24.4	24.8	25.9
Agriculture	14.2	14.4	16.0	15.9	15.1	15.0	14.2	15.1
Livestock	6.7	7.3	8.1	8.2	7.9	8.6	9.6	9.5
Forestry	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Hunting & Fishing	0.5	0.3	0.4	0.3	0.4	0.5	0.8	1.0
Secondary Sector	30.5	26.8	26.5	25.8	27.1	26.1	26.0	26.0
Manufacturing	26.4	22.6	22.5	22.2	23.7	22.4	22.2	22.1
Construction	3.5	3.8	3.2	3.1	2.8	3.0	3.1	3.3
Mining	0.5	0.5	0.8	0.6	0.6	0.7	0.7	0.7
Tertiary Sector	47.8	50.9	48.8	49.5	49.2	49.5	49.1	48.1
Commerce	17.4	17.3	17.1	17.2	18.1	18.3	17.9	18.2
Service	11.8	14.5	12.3	12.8	11.2	11.2	11.1	10.2
Transport & Communication	5.1	4.9	4.8	4.9	5.1	5.2	5.0	n.a.
Bank, Security & others	2.9	3.3	3.3	3.3	3.3	3.2	3.2	3.4
Electric, Gas & Water Supply	2.4	2.6	2.7	3.0	3.0	3.1	3.2	3.0
Property & Dwelling	3.9	4.2	4.3	4.1	4.2	4.2	4.2	n.a.
Others Services	4.3	4.0	4.1	4.2	4.4	4.4	4.5	13.2

Sources: Figures calculated by the Study Team based on ALMA information 1994 and FIDEG El Observador(No.32)

Table A.6.1c Selected Economic Indicators

		1989	1990	1991	1992	1993
Population	million	3.74	3.87	4.00	4.13	4.26
Economically active population	1,000	1,276.9	1,371.2	1,386.3	1,445.4	1,378.7
Gross Domestic Product	mill.US\$ (1992)	1,696.1	1,691.1	1,687.7	1,686.0	1,674.2
Distribution						
Primary Sector	%	24.7	24.7	23.8	24.4	24.8
Secondary Sector	%	26.5	25.8	27.1	26.1	26.0
Tertiary Sector	%	48.8	49.5	49.2	49.5	49.1
GDP per capita	US\$	453.5	437.0	421.9	408.2	393.0
Unemployment rate	%	8.4	10.8	14.0	16.2	20.0
Underemployment rate*	%	39.4	43.3	52.1	54.0	51.3
Export (FOB)	mill.US\$	310.7	330.5	272.4	223.1	266.9
Import (CIF)	mill.US\$	614.7	637.5	751.3	855.0	727.2
Total External Debt	mill.US\$	9,743.0	10,615.6	10,304.1	10,808.2	10,987.4
Exchange rate (ave.)	C\$/US\$	3.12	140.90	4.27	5.00	5.70

Notes: * $(\text{unemployment} + \text{underemployment}) / \text{Economically active population} \times 100$

Sources: BCN Informe Anual 1992
 Indicadores de Actividad Economica a Abril 1994
 INEC Compendio Estadistico 1987/1991
 FIDEG El Observador

b. Employment

The 1992 Economically Active Population (EAP) was estimated at 1,445,400 representing 35.0 % of the total national population of 4,130,700. Between 1987 and 1991, while the total population grew at a rate of 2.51% per year rate, the EAP grew at 4.21%. Changes in the number of employees are shown in Table A.6.1d, which shows a growth of only 1.87% per year. Unemployment rate in 1992 was 16.2% and underemployment rate was 54%. It is said that these rates have increased between 2 and 3 points in 1993.

Table A.6.1d Changes in the Employment System of Nicaragua
(Unit: 1,000 persons)

	1987	1988	1989	1990	1991
Total employee	1,106.8	1,151.4	1,169.8	1,183.4	1,192.1
Primary Sector	382.6	385.1	387.5	400.1	415.4
Agriculture	374.3	377.5	380.3	392.9	405.9
Forestry	2.4	2.3	2.2	2.2	2.8
Fishing	5.9	5.3	5.0	5.0	6.7
Secondary Sector	215.5	224.9	229.5	229.5	227.4
Manufacturing	169.8	178.0	188.7	188.7	188.2
Construction	36.9	37.9	31.2	31.2	30.2
Mining	8.8	9.0	9.6	9.6	9.0
Tertiary Sector	508.7	541.4	552.8	553.8	549.3
Commercial	165.8	173.4	182.3	182.3	195.5
Services	78.0	75.5	71.3	72.3	93.5
Transport & Communication	38.5	41.9	42.6	42.6	42.6
Finance	23.0	25.2	24.7	24.7	24.7
Electricity, gas & water supply	10.0	10.6	10.3	10.3	10.3
Social, communal services and others	193.4	214.8	221.6	221.6	182.7

Sources: INEC Compendio Estadístico 1987-1991

The sectoral distribution of employment in 1987 and 1991 are summarized in Table A.6.1e.

Table A.6.1e Sectoral Employment Distribution (%)

Sectoral Employment	1987	1991
Primary sector	34.6	34.8
Secondary Sector	19.5	19.1
Tertiary sector	45.9	46.1

c. Industries

ca. Primary Sector

The agricultural produce of Nicaragua is marketed internationally and domestically. The distribution of cropping areas in 1993/94 and 1994/1995 is as shown in Table A.6.1f.

Table A.6.1f Cropping Areas in 1993/94 and 1994/95

(Unit: Mz=0.705ha)

Type of Farm	Cropping Area (1,000 Mz)		Percentage (%)	
	1993/94	1994/95	1993/94	1994/95
For export	161.8	165.5	22.2	21.5
Coffee	105.0	105.0	14.4	13.6
Sugar cane	54.1	56.0	7.4	7.3
For domestic market	566.2	604.8	77.8	78.5

Crops main export were coffee (US\$ 31.9 million), sugar cane (US\$ 17.5 million), sesame seeds (US\$ 8.3 million), banana (US\$ 5.5 million) and cotton (US\$ 0.4 million). The exports of these crops generated US\$ 63.5 million, 24% of the total export volume in 1993.

The production of cattle in 1992 accounted for C\$ 2,114 million based on the 1980 prices, a figure that may have increased 5.8 times based in 1992 prices.

cb. Secondary Sector

The manufacturing industry was badly hit by the armed conflict which;

- destroyed plants, raw materials and final goods,
- caused loss of markets,
- discouraged investments to Industry.

In 1991, manufacturing showed some relative returns which again later declined. In 1993, a slight production increase was gained particularly in the food, leather, footwear, wood, chemicals, rubber manufacturing industries. But due to the energy crisis, a decrease in domestic demand and lack of competitive spirit, the 1994 GDP value was the same as that of 1993.

The situations which characterize the manufacturing industry in Nicaragua are as follows:

- strict enterprises
- high interest rate
- decrease in domestic demand
- obsolete machinery
- low level of technology
- suspension of energy
- unstable expectations on the exchange rate

cc. Tertiary Sector

The tertiary sector in Nicaragua employed about 40% of the EAP and its production accounted for nearly half of the GDP in 1993. The relative weight on the tertiary sector in the GDP and employment shows the present stage of development of the Nicaraguan economy. The high employment rates in commerce and other services suggest underemployment of people who are unable to find suitable jobs in the primary and secondary sectors.

Recession and high taxes are said to have hampered the tertiary sector from achieving a better production year something especially seen in commerce and services in 1990 and 1991. But, it is said that the commercial activities continued to be active because of their variety, and many people explored the possibility of starting new businesses. However, some old enterprises were closed down due to lack of customers.

d. International Trade and Foreign Debt

da. International Trade

daa. Exports

Nicaraguan exports increased from US\$ 238.6 million in 1988 to US\$ 330.5 million in 1990, but decreased in 1992 to US\$ 223.1 million, as shown in Table A.6.1g. The 1993 figures shows recovery and an overall 2.5% annual growth rate for four years was also attained when the export figures reached US\$ 266.9 million. During the same period, traditional export products decreased from 79.5% to 67.4%.

dab. Imports

Imports, on the other hand, decreased from US\$ 805.2 million in 1988 to US\$ 727.7 million in 1993, whereby trade deficits declined from US\$ 566.6 million to US\$ 460.8 million. Imports were classified into consumption goods, petroleum, intermediate goods and capital goods, which accounted for 33.5%, 14.6%, 30.7% and 21.2% respectively, of total imports in 1993. Import of consumption goods increased from US\$ 147.2 million in 1998 to US\$ 243.5 million, equivalent to 15.3 points, while import of capital goods has decreased from US\$ 265.6 million in 1988 to US\$ 154.4 million, 12.8 points down.

db. Foreign Debt

The Nicaraguan foreign debt increased from US\$ 9.7 billion in 1989 to US\$ 10.8 billion in 1992, 5.8 times the GDP. Foreign debt consisted of 82% medium and long-term debts, 3% short-term debt, 14% interest for moratorium and 1% commercial debt. Within medium and long-term debts, two thirds is incurred by the Central Government, one fourth by the Central Bank, and the rest by other financial systems and public sectors. Creditors were mostly bilateral organizations which held three fourths of the medium and long-term debts, while multilateral organizations accounted for 14%, commercial banks for 12% and the rest by suppliers and other organizations.

This elevated foreign debt becomes a serious obstacle to the development of Nicaragua. An international cooperation community for Nicaragua begun to sound the possibilities of reducing the foreign debt.

dc. Exchange Rate

In 1992 the official rate did not change. C\$ 5.00 was equivalent to US\$ 1.00, and the beginning price in the black market was 4.37 in December 1992. The official exchange rate fluctuated from C\$ 6.0524 – US\$ 1.00 in March 1993 to C\$ 6.8612 – US\$ 1.00 in April 1994, and then C\$ 7.1271 – US\$ 1.00 in the first week of January 1995 as a measure against inflation.

Table A.6.1g Exports and Imports

(unit: mill.US\$)

	1988	1989	1990	1991	1992	1993
Export Total	238.6	310.7	330.5	272.4	223.0	266.9
Traditional	189.6	231.6	261.7	211.8	171.4	179.9
Coffee	81.4	89.7	71	36.2	45.3	31.9
Cotton	50.6	28	37.2	44.4	26.2	0.4
Sesame seeds	2.2	2.9	6.5	7.3	4.3	8.3
Sugar	5.4	17.2	38.6	31.3	19.1	17.4
Molasses		0.7	1.5	3.3	4.6	1.6
Meat	13.4	46	57	37.5	40.8	60.8
Seafood	6	10.9	8.7	12.9	21.1	26.6
Bananas	14.7	20.1	27.1	28.7	10	5.5
Gold	14.5	16.1	14.1	10.2	-	26.1
Silver	1.4	-	-	-	-	1.3
Non-Traditional	49.0	79.1	68.8	60.6	51.6	87.0
Agriculture	4.4	10.7	19.2	15	18.1	30.4
Manufacturing	44.6	68.4	49.6	45.6	33.5	56.6
Import Total	805.1	614.9	637.4	751.2	854.6	727.5
Consumption goods	147.2	107.8	158.7	223.5	292.8	243.5
Petroleum	120.9	94.5	123	114.5	121.4	106.1
Intermediate goods	271.4	212.7	158.5	222.6	227	223.5
Capital goods	265.6	199.9	197.2	190.6	213.4	154.4
Trade Balance	-566.5	-304.2	-306.9	-478.8	-631.6	-460.6

Source: BCN Indicators of Economic Activities in April 1994

e. Central Government Finances

ea. General

Though the Nicaraguan economy shows potential for improvement, the country does not have enough reserves, as shown in Table A.5.1h. The deficit in 1995 will be equal to that in 1994.

Table A.6.1h Central Government Finances

	Unit	1993	1884	1995
Revenue	C\$ mill.	2,223.3	2,538.5	2,677.8
	US\$ mill.	390	407	387
Expenditure	C\$ mill.	2,939.9	2,790.4	2,940.8
	C\$ mill.	516	448	424
Deficit	C\$ mill.	-716.6	-252.3	-263.0
	US\$ mill.	-126	-41	-38

eb. Revenue

The revenue of the central government was C\$ 2,223.3 million (about US\$ 390 million) in 1993, about 1.7 times the revenue in 1990. In the last three years, tax revenues has increased from 91.1% in 1990 to 93.9% in 1992. Taxes imposed on goods and services have particularly increased from 46.9% to 58.1%, while direct taxes have decreased from 24.4% to 16.5%.

ec. Expenditure

Expenditure in 1993 was C\$ 2,939.9 million (about US\$ 516 million). This consisted of current expenses, which was about 78% of total expenditure, and capital expenses, which is about 21%. Current expenses exceeded total income in these three years, and has decreased relatively from 95% in 1990 to 78% in 1993. Within current expenditures, goods & service counted for 36% in 1992, salaries and wages 28%, and the rest comprised of interests and transfer payments. Interest and transfer payments showed increasing trends, while goods & services declined.

Deficits exceeded C\$ 700 million (about US\$ 136.5 million) in 1993.

Table A.6.1i The Changes in Revenue and Expenditure of The Central Government

Items	C\$ mill.			Ratio(%)		
	1990	1991	1992	1990	1991	1992
Total Income	229.3	1,446.7	1,893.2	100.0	100.0	100.0
Current Income	222.6	1432.0	1880.6	97.1	99.0	99.3
Direct Tax	55.2	251.4	311.7	24.1	17.4	16.5
including Income Tax	44.2	205.1	305.6	19.3	14.2	16.1
Tax on goods & services	111.9	798.0	1,099.8	48.8	55.2	58.1
International Trade	31.3	267.0	364.4	13.6	18.5	19.2
Specific Tax	0.0	0.6	1.1	0.0	0.0	0.1
Non Tax Income	6.4	72.0	86.7	2.8	5.0	4.6
Current transfer	17.6	43.0	16.9	7.7	3.0	0.9
Capital Income	6.7	14.7	12.6	2.9	1.0	0.7
Total Expenditure	545.3	2,003	2,575.9	100.0	100.0	100.0
Current expenses	521.0	1,353.5	1,461.4	95.5	67.6	56.7
Salaries	112.3	337.4	414.7	20.6	16.8	16.1
Goods & services	330.5	569.9	523.5	60.6	28.5	20.3
Interest	0.0	65.9	190.3	0.0	3.3	7.4
Current transfer	78.1	380.4	332.8	14.3	19.0	12.9
Capital expenses	24.3	260.4	533.9	4.5	13.0	20.7
Total deficit	316.0	556.3	682.7	57.9	27.8	26.5

Notes: Percentage of Total deficit is calculated based on Total expenditure
Source: BCN Indicadores de Actividad Economica a Abril 1994
Detailed figures adjusted by the Study Team based on
BCN Informe Anual 1992 and INEC Compendio Estadistico 1987-1991

f. National Development Plan

The present Government, which was elected in February 1990 for a six-year term, has formulated a development plan for the 1992-1996 period, to build up the achievements of the first two years, which included the pacification of the country, control of hyperinflation, stabilization of the exchange rate, delegation and liberalization of the private sector, and foreign debt rescheduling. The 1992-1996 Development Plan also showed the GDP growth target by year (see Table A.6.1j) and the medium-term objectives for 1994-1996. The achievements of the first two

target economic growth in those years.

Table A.6.1j Target Economic Growth and Actual Growth

Year	GDP Growth Target (%)	Actual Growth (%)
1992	4.0	- 0.1
1993	4.5	- 0.7
1994	5.0	+ 3.0*
1995	5.0	

Notes: * - Official announcement; FIDEG estimated the economic growth of Nicaragua in 1994 as 1.4%

The medium-term objectives for 1994-1996 are summarized as follows:

- 1) Definition of the legal and institutional framework for the private sector
- 2) Export based growth
- 3) Improvement of human resources
- 4) Institutional reform
- 5) Promotion of domestic savings and investments
- 6) Consolidation of democracy

A.6.2 Regional Economy

a. General

It is said that Managua has become the economic and financial center of the nation, as it is established with integrated industries, private and state owned banks, commerce, government offices, ministries, embassies, consulates, and universities. Besides coffee plantations in the southern area of Managua, there are textile industries, footwear factories, slaughterhouses, food processing industries, plastics, pharmaceutical, paint and furniture factories, etc..

b. Gross Regional Domestic Product

Since the Gross Regional Domestic Product (GRDP) of Managua cannot be calculated due to absence of data, the GDP and the data on social security charges according to major economic activities shown in Table A.6.2a were used for GRDP

estimation. The result is shown in Table A.6.2b. The number of employers in Managua in 1991 and those paying social security in 1992 are as shown in Table A.6.2c.

Table A.6.2a Changes in Social Security Charges and Share of Managua

(Unit: C\$ mill.)

	1990	1991	1992	Share of Nicaragua (%)
Total in Managua	249.2	1,227.8	1,615.9	
Primary Sector	11.3	62.3	86.7	31.9
Secondary Sector				
Manufacturing	47.5	272.2	355.9	68.0
Construction	5.9	60.3	71.7	75.5
Mining	0.7	5.2	8.1	53.7
Tertiary Sector				81.1
Commercial, restaurant & hotel	27.3	196.1	288.4	70.8
Transport & Communication	12.0	71.8	99.3	96.4
Electricity, gas & water supply	12.4	84.1	126.6	81.6
Finance, security, property & service for enterprises	23.4	127.7	169.8	42.9
Social, communal services	108.4	346.1	406.0	81.6
Non-special activities	0.4	2.1	3.4	42.9
Total in Nicaragua	342.0	1,935.0	2,701.0	-
percentage of Managua (%)	72.8	63.5	59.8	-

Source: INSSBI Anuario Estadístico 1990,1991,1992

Table A.6.2b Estimated GRDP of Managua

	1990	1991	1992	Share of Nicaragua (%)
Total	10,709.6	10,158.9	9,856.2	54.5
Primary Sector	1,378.2	1,374.6	1,402.2	31.9
Secondary Sector	3,142.3	3,442.0	3,216.4	
Manufacturing	2,764.4	3,014.9	2,761.1	68.0
Construction	322.7	358.4	389.1	75.5
Mining	55.3	48.7	66.1	53.7
Tertiary Sector	6,189.2	5,362.3	5,237.7	
Commercial, restaurant & hotel	2,366.9	2,638.7	2,698.7	81.1
Government Institutions	2,051.9	1,076.1	869.3	42.9
Transport & Communication	554.5	638.2	665.8	70.8
Bank & Security	443.3	454.6	480.4	81.6
Electricity, gas & water supply	0.9	1.0	1.0	0.2
Living Property	665.5	402.1	326.4	42.9
Other Services	106.1	151.6	196.1	24.3
percentage (%)	59.1	56.2	54.1	

Source: Figures calculated by the Study Team based on CBN and INSSBI information

Table A.6.2c Number of Employers and Number of those covered by the Social Security System

	Employers in 1991			Employers covered by the S.S.S in 1992		
	Nicaragua	Managua	Share (%)	Nicaragua	Managua	Share (%)
Total	14,474	3,947	27.3	228,930	117,663	51.4
Primary Sector	8,132	341	4.2	33,293	7,686	23.1
Secondary Sector	1,677	1,003	59.8	47,328	28,591	60.4
Manufacturing	1,491	878	58.9	36,695	22,148	60.4
Construction	158	111	70.3	9,219	6,138	66.6
Mining	28	14	50.0	1,414	313	22.1
Tertiary Sector	4,665	2,603	55.8	148,309	81,378	54.9
Commercial, restaurant & hotel	2,081	1,218	58.5	21,133	15,104	71.5
Transport & Communication	315	211	67.0	9,826	6,308	64.2
Electricity, gas & water supply	55	16	29.1	5,809	5,328	91.7
Finance, security, property & service for enterprises	313	183	58.5	14,221	9,901	69.6
Social, communal services	1,785	942	52.8	95,718	44,533	46.5
Non-special activities	116	33	28.4	1,602	204	12.7

Source: INEC Compendio Estadístico 1987-1991
INSSBI Anuario Estadístico 1992

c. Employment

The employment condition in Managua is shown in Table A.6.2d.

Table A.6.2d Indicators of Employment in Nicaragua and Managua

	Nicaragua		Managua	
	1991	1992	1992	1993
Total Population	3,999,200	4,130,700		920,737
Economically Active Population	1,386,300	1,445,400		375,870
Employment	1,192,100	1,211,100		321,745
Primary Sector	415,400			16,087
Secondary Sector	227,400			64,349
Manufacturing	188,200			41,827
Construction	30,200			22,200
Mining	9,000			322
Tertiary Sector	549,300			241,309
Commerce	195,500			86,871
Transport & Communication	42,600			21,477
Finance	24,700			10,618
Electricity, gas & water supply	10,300			4,102
Other services	276,200			118,241
Unemployment	194,200	234,300		54,125
Underemployment	722,000	781,200		163,503
Percentage of Unemployment(%)	14.0	16.2	18.8	14.4
Percentage of Underemployment(%)	52.0	54.0	35.7	43.5

Source: ALMA
 FIDEG Condiciones de Vida de la Poblacion Urbana de Managua
 BCN Informe Anual 1992
 INEC Compendio Estadistico 1987-1991

The figures in the Table A.6.2d state the following:

- Unemployment and underemployment rates in 1993 is lower than the national figure. The FIDEG survey showed different figures for unemployment such as 18.0%.
- The situation in 1993 was worse than in 1992.

It was reported that the rate of employment in Managua has improved from 40.4% in August 1993 to 43.4% in August 1994, an increase that should be attributed to children and young men who work in order to support their families(see Table A.6.2e).

Table A.6.2e Employment Rate and Characteristics of Workers

	August 1993	August 1994
Employment Rate (%)	40.4	43.4
male	46.1	51.5
female	35.2	36.4
breakdown by generation (%)		
children	1.4	2.7
young men	19.4	20.3
adults	57.7	56.5
seniors	21.5	20.5
breakdown by economic activities (%)		
Production	20.1	24.7
Services	66.4	62.9
Education/Health	10.9	10.7
Others	2.6	1.7

Sources: FIDEG El Observer(No.35)

A.6.3 Income Levels

a. General

The actual figures of both GDP and population are not clear in Nicaragua, therefore GDP per capita is also unclear. The GDP per capita and national income per capita according to "La Economía de Nicaragua"(Nestor Avendaño) is as shown in Table A.6.3a.

Table A.6.3a GDP per capita and National Income per capita

(Unit: US\$)

	1990	1991	1992	1993	1994
GDP per capita	404	429	447	421	404
	343	338	323	291	285

Source: Nestor Avendaño La Economía de Nicaragua - El Año 2000 y las Posibilidades de Crecimiento

The Economic Adjustment Plan (Plan de Ajuste Económico) reduced the inflation rate in Nicaragua as shown in Figure A.6.3a. The national policy on income and wages in 1991 remains unchanged, freezing, therefore, nominal salaries. However, some adjustment were made on basic cost increase, as shown in Table A.6.3b.

Table A.6.3b Basic Cost for Official Salary and Actual Salary

(Unit: C\$)

	1991		1992	1993	1994
	Mar.	Dec.	Dec.	Dec.	Oct.
Basic Cost (INEC)	668.40	704.47	771.26	1,011.95	1,162.83
Central Government Employees	420.00	624.50	703.93	790.00	820.00
Insured Active (INSSBI)	466.30	964.70	1,160.01	n.a.	n.a.
National Average (MITRAB)	564.49	867.94	982.67	1,098.00	1,200.00

Source: BCN Informe Anual 1992
FIDEG El Observador(No.35)

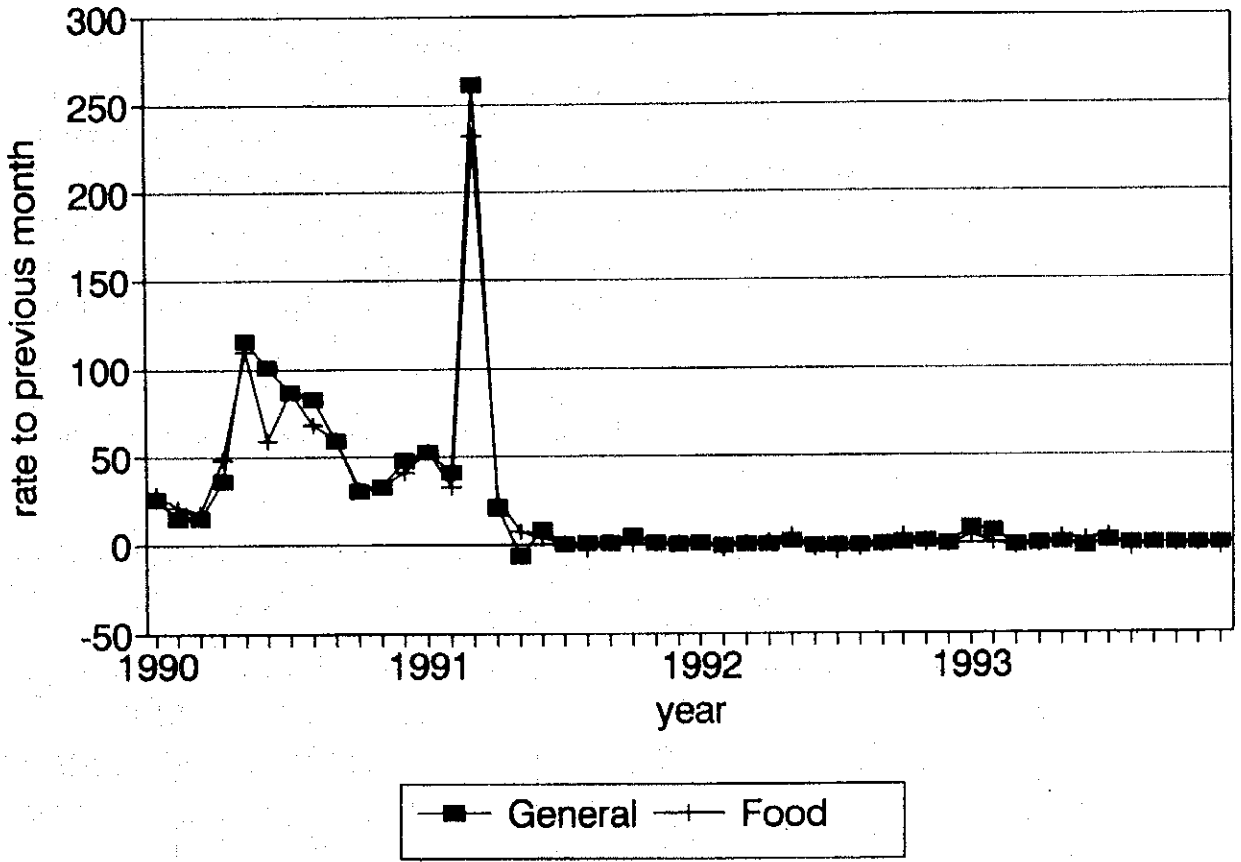


Figure A.6.3a Inflation Rate Trend (%)

b. Income Levels in Managua

From the estimated GRDP, the GRDP per capita of Managua exceeds US\$ 800 in 1993, while GDP per capita is estimated at around US\$ 400. According to the survey carried out by ALMA in September 1992, the monthly income of employees living in Managua ranged from C\$ 250 to C\$ 3,000 and the average income was C\$ 1,065.6. Other surveys showed that the average monthly income of the employees of formal sector was C\$ 1,308.9 in August 1993, in contrast to the average income of the informal sector which was only C\$ 804.4 in the same month.

The survey carried out by FIDEG in August 1992 summarizes income distribution as shown in Table A.6.3c.

Table A.6.3c Distribution of Income in Managua (C\$/month) in Aug.1992 and Income in three Cities in August 1993 and August 1994

(Unit: C\$)

		Managua			(Leon, Granada & Managua)							
		August 1992			August 1993			August 1994				
Rank		Range		Aver	Range		Average	Range				
bottom	20%	60	-	400	277.9	0	-	350	84.4	0	-	360
lower	20%	400	-	600	552.5	351	-	520	589.0	361	-	500
middle	20%	600	-	1,000	873.0	521	-	800	1,081.7	501	-	800
higher	20%	1,000	-	1,750	1,355.4	801	-	1,400	1,783.6	801	-	1,215
top	20%	1,750	-	10,000	3,854.2	1,401	-	10,000	4,151.1	1,216	-	16,000

Source: FIDEG Condicion de Vida de la Poblacion Urbana de Managua, Leon y Granada

The average income of employees in three cities, Managua, Leon and Granada, has increased from C\$ 1,024.4 in August 1993 to C\$ 1,027.6 in August 1994, showing a nominal increase of 3%. The basic household expenses(C.B.) in Managua has increased from C\$ 1,001.1 to C\$ 1,088.2 cordobas in the same period, thereby deteriorating the standard of living of the people.

From these studies, the average of income of the people is about 1.2 times the average of the cities in the pacific coast area, such as Granada and Leon.

The serial study of FIDEG in "El Observador"(Economy & Business Bulletin) states a very huge discrepancy in the income of the people of Managua. The breakdown of the income of workers according to basic household expenses(C.B.) is shown in Table A.6.3d.

Table A.6.3d Breakdown of the Income of Workers according to Basic Household Expenses

(Unit: %)

				August 1993	August 1994
	-	1/2	C.B.	28.5	39.2
1/2	-	1	C.B.	31.2	31.2
1	-	2	C.B.	23.3	18.8
2	-	3	C.B.	8.3	5.0
3	-	4	C.B.	3.9	1.7
4	-		C.B.	4.8	4.1

Source: FIDEG El Observador

A.6.4 Industries

Although it is difficult to obtain statistical data on the industries in Managua, especially on production amount and sales amount, it is said that about 80% of the national manufacturing industries is concentrated in Managua. According to the data from MEDE, a total of 2,097 manufacturing industries are in Managua, 60 of which hold more than 50 employees.

The various manufacturing industries in Managua are as follows:

- Food, Beverage & Tobacco
- Textiles & Apparel
- Chemical & Chemical Product
- Wood & Furniture, and
- Paper, Printing & Publishing

The large international corporations located in Managua are as follows; Casa Pellas, Coca Cola, Pepsi Cola, Cerveceria Toña, Induquinisa, Cerveceria Victoria, Tanic, Cementera, Chevron, Texaco, Esso, Tropigas, Shell, Esso Gas, Kola Shaler and Fosforera.

A.6.5 Municipal Finance

a. General

The financial situation of Managua Municipality is also still tight, though the 1995 budget is projected to be 25% more than the 1994 budget, as shown in Table A.6.5a.

Table A.6.5a Budget of Managua Municipality

(Unit: C\$ 1,000)

	1990	1991	1992	1993	1994	1995
Revenue						
Municipal Sales Tax	20,915	64,805	102,805	110,549	95,607	124,538
Waste Fee		1,339	13,316	10,551	8,033	12,487
Others	2,503	51,100	51,410	41,301	40,571	68,127
Total	23,418	117,244	167,531	162,401	144,211	205,152
(1,000 US\$)	23,418	23,449	33,506	27,067	21,817	27,390
Expenditure						
Current Expenditure	5,875	80,885	120,550	138,593	101,998	121,452
Capital Expenditure	11,405	37,416	43,635	31,192	44,954	71,293
Others					4,112	12,408
Total	17,280	118,300	164,185	169,785	151,064	205,152
(1,000 US\$)	17,280	23,660	32,837	28,297	22,854	27,390
Balance	6,138	-1,056	3,345	-7,384	-6,853	0
(1,000 US\$)	6,138	-211	669	-1,231	-1,037	0

Source: ALMA

The waste tax is projected to increase from C\$ 7,280,300 to C\$ 12,487,100, an increase of more than 70%.

b. Revenue

The operation, management and investments of the city are financed using the sales tax, vehicle license tax, cemetery services fees and general service fees. The management of the taxes and fees is made by the Tax Collection Head Office.

From 1991 the management of the Vehicle License tax and the Property Tax (Real Estate) has been transferred to the municipalities, and the tax for Maintenance and Beautification (C\$ 20.00) which was charged to all persons as airport tax has been

abolished. This tax used to amount to around C\$ 1,000,000.00 each year. Table A.6.5b shows in detail the municipal revenues for 1992 and 1993, and the projected revenue for 1994.

Table A.6.5b Municipal Revenue

(1,000 US\$)

Item	1992	1993	1994	
			Initial	Projected
Municipal Sales Tax	20,561	18,425	19,118	14,464
Waste Fees	2,663	1,759	3,177	1,215
Other Income	10,282	6,883	10,801	6,138
Rents and Leases	76	52	77	n.a.
Miscellaneous Taxes*	519	242	412	n.a.
Registration & Licenses	2,233	1,473	1,677	670
Services Fees**	555	493	501	n.a.
Fines	415	366	310	n.a.
Cemetery Fees	137	108	130	n.a.
Real Estate Tax	3,303	2,398	4,497	2,490
Vehicle License Tax	2,568	1,684	2,508	1,215
Others	476	67	689	1,763
Total	33,506	27,067	33,096	21,817

Notes: * - slaughterhouse tax, beautification tax, pavement breaking tax, advertisement tax, Parcel Division and Urbanization tax, rental tax, etc.
 ** - Birth certification, certificate of tax clearance, Parking in municipalities parking lots, pavements construction, tree planting, etc.

Source: ALMA

c. Expenditures

The application of municipal assets is divided roughly between current operational costs and investments cost, the highest item always being salaries of municipal employees.

Investment levels have been around 30-40% of all expenditures, and the municipal debt is relatively small at this time. A picture of the expenditures in the last two years and a projection for 1994 is given ahead¹⁰:

¹⁰Source: Managua Municipal Planning Head Office

Table A.6.5c Municipal Expenditure

(Unit: 1,000 US\$)

TYPE OF EXPENDITURES	1992	1993		1994		
		Initial	Actual	Initial	Projected A*	Projected(Nov.)
Personal Services	12,140	11,175		9,758	10,580	
Salaries	11,434	10,577			10,131	
Others	706	598			449	
Non-Personal Services**	5,662	4,303		1,549	1,706	
Materials and Supplies	4,821	4,328		2,874	2,969	
Current Transfers***	1,356	1,500		2,410	1,824	
Public Debt	131	16		635	245	
CURRENT EXPENDITURES	24,110	21,322	23,098	17,226	17,323	15,431
Machines and Equipment	2,414	1,907			271	
Real Estate	0	226			196	
Municipal Investments****	5,123	2,566			6,809	
Debt Service	1,190	100			2,856	
CAPITAL EXPENDITURES	8,727	4,799		13,882	10,132	6,801
Commercial Commitments	0	0		1,981	799	622
TOTAL	32,837	26,121		33,109	28,254	22,854

- Notes * : Adjusted to values lower than the initial projections
 ** : Telephone, Water, Electricity, Advertisement, Per-diem, etc
 *** : Social Benefits, Workers Insurance, etc.
 **** : Construction Works including design

The 1994 budget is estimated to appropriatable US\$ 730,000 for SWM, excluding wages.

A.6.6 Municipal Tax System

The municipal taxation system, which is composed of three categories; indirect tax, fee and other income, is based on the Municipal Taxes Act for the Municipality of Managua. Main taxes or fees collected by the Municipality of Managua are as follows:

a. Indirect Tax

aa. Sales Tax(Income Tax):

Any permanent or non-permanent resident who habitually or irregularly sells goods or operates any industrial or professional activities, or provide a specific service, shall pay a monthly tax of 2% of the net income obtained (Municipal Tax Act for the Municipality of Managua, Art. 3).

ab. Registration and License:

Every person of residing permanently or otherwise who sells goods or operates an industry or services shall register yearly from December 1 to January 31 (Art. 9).

ac. Property Tax:

Every real estate owner within the city of Managua, either in the urban or rural areas, shall pay an annual tax; a value of 10% of the cadastral value of the property. Owners of properties with a cadastral value higher than C\$ 40,000 are obliged to pay property tax (Art.17).

ad. Vehicles License Tax:

Every owner of a motor vehicle or any other haulage vehicle shall pay an annual bearing tax (Art. 19).

b. Fees

ba. Waste Fee:

The Municipality of Managua, according to the Municipal Tax System Act currently in effect (Section II, chapter I, Art.27) has the right to collect a municipal fee in order to cover the costs of public cleansing in the city.

bb. Service Fees:

Service fees are charged when someone requests permission to brand cattle or to transport cattle from one place to another, to issue certifications from the register office, to issue certificates of payments for taxes, registrations and other certifications. These fees also include pavement and block paving services and parking vehicles in municipal areas.

bc. Miscellaneous Taxes:

Miscellaneous taxes are those collected by the declarations of slaughter, booth modification, breaking of pavement, lotteries, vacant lots looting and urbanization of areas, building and building improvement, real state renting and coin record player renting.

bd. Fines:

Every permanent or non-permanent residents who performs an economic activity in the Municipality of Managua - (or even if they do not perform an economic activity in this municipality) - and violates the provisions in the Municipal Tax System, shall pay a fine, according to Article 57. These fines can be either monthly, yearly or conditional fines.

be. Cemetery Fees:

The burial rights and the service and maintenance fee of the cemeteries is estimated according to the costs the Municipality spends for giving that service (Art. 31).

c. Other Income

ca. Other revenues:

Other revenues are those taxes collected over the selling of plants, computer services and some other services.

A.6.7 Tax System and Utilities Charging System

Taxes in Nicaragua are imposed by the central government and the municipal governments. Utilities are charged by companies which supply these services.

a. National Government Tax

The national taxation system in Nicaragua is based on three different groups of tax; the income tax, the consumption tax and property tax.

aa. Income Tax

Income tax is charged to all net incomes in Nicaragua borne from economic activities by all permanent or non-permanent residents. Permanent residents should pay tax according to Table A.6.7a. Juridical persons should pay 30% of their taxable incomes.

Table A.6.7a Incomes and Income Tax (yearly)

Income		Base Income C\$	Rate %	on excess of C\$
from C\$	to C\$			
1.00	25,000.00		0.0	
25,000.00	40,000.00		7.0	25,000.00
40,000.00	60,000.00	1,050.00	12.0	40,000.00
60,000.00	100,000.00	3,450.00	20.0	60,000.00
100,000.00	180,000.00	11,450.00	26.0	100,000.00
180,000.00	more	32,250.00	30.0	180,000.00

ab. Consumption Tax

Consumption tax include many different types of taxes, most important of them being the IGV – the value added tax (Impuesto General al Valor) – generally 15% is added to all goods and services according to their value.

Some imported products such as vehicles , perfumes,etc. are under the ISC – Selective Consumer Tax (Impuesto Selectivo de Consumo).

Other imported or consumed goods listed as special products are under the IEC – the Special Consumer Tax (Impuesto Especifico al Consumo).

ac. Property Tax

Property tax, which was transferred to the municipality in 1991, is imposed to all property owners, both natural and juridical persons.

ad. Custom Tariffs

The custom tariffs, the DAI – the tariff of import (Derechos Arancelarios a la Importacion), which is commonly adopted in Central America, and the ATP – the temporary tariff for protection (Arancel Temporal de Protection), which is aimed to motivate Nicaraguan industries, will decrease until 1999. After 2000 the rate will be 0%.

b. Municipal Government Tax

Municipalities have the right to impose taxes and fees in order to execute municipal activities as stated above.

c. Public Utilities Charges

The Public Utilities provided in the area are electricity, telephone system, water, sewage and drainage systems. Charges are imposed where they are provided, based on Table A.6.7b.

Table A.6.7b Public Utilities Charging System

Utility Services	Executing body	Frequency	Collection System'	Basic Fee	
Electricity	INE	Monthly	combination of 1,2,3	25kw	C\$ 11.00
Water Supply	INAA	Monthly	combination of 1,2,3	House	4,000 gallons C\$ 11.80
				Commercial	10,000 gallons C\$ 64.50
				Industrial	10,000 gallons C\$ 54.50
				Government	10,000 gallons C\$ 44.50
Urban Drainage	INAA			including Water Supply	
Telephone	TELCOM	Monthly	combination of 1,2,3	minimum	C\$ 50.00

Notes: INE : Instituto Nicaraguense de Energia
 INAA : Instituto Nicaraguense de Acueductos y Alcantarillados
 TELCOM : Instituto Nicaraguense de Telecomunicaciones
 Collection System 1: Collection by collectors
 Collection System 2: Consumers pay at offices
 Collection System 3: Consumers transfer through banks or post offices

