JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NO. 27

THE MUNICIPALITY OF THE CENTRAL DISTRICT
THE REPUBLIC OF HONDURAS

社会開発調査部報告書

THE STUDY ON SOLID WASTE MANAGEMENT OF THE URBAN AREA OF TEGUCIGALPA'S CENTRAL DISTRICT

FINAL REPORT
VOLUME IV

ANNEX

MARCH 1999

KOKUSAI KOGYO CO., LTD.

SSS
JR
99-053

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

THE MUNICIPALITY OF THE CENTRAL DISTRICT
THE REPUBLIC OF HONDURAS

THE STUDY ON SOLID WASTE MANAGEMENT OF THE URBAN AREA OF TEGUCIGALPA'S CENTRAL DISTRICT

FINAL REPORT
VOLUME IV

ANNEX

MARCH 1999

KOKUSAI KOGYO CO., LTD.

List of Volumes

Volume I	Summary
Volume I(S)	Summary (Spanish Version)
Volume II	Main Report
Volume II(S)	Main Report (Spanish Version)
Volume III	Revised Main Report
Volume III(S)	Revised Main Report (Spanish Version)
Volume IV	Annex
Volume V	Data Book

Note:

The revised main reports (English and Spanish) are being made taking into account the effect of Hurricane Mitch on solid waste management works.

Since the other reports were made before Hurricane Mitch hit Honduras, its effect on solid waste management works was not taken into account.

Although the revised main reports (English and Spanish) best illustrate the current conditions, the other reports should also be referred to for detail.

This is the Annex.

In this report, the project cost is estimated using the July 1998 prices and at an exchange rate of 1US$ = 143.85 Japanese Yen = 13.4892 Lempiras.

Contents

Chapter 1

Profile of the Study Area

1 Profile of the Study Area

1.1 Natural Conditions

1.1.1 Location

Honduras is located in Central America stretching from longitude: 83° 10' to 89° 22' west and latitude: 12° 58' to 16° 02' north.

The Study Area is located in the south-central region of Honduras, comprising the cities of Tegucigalpa and Comayaguela, which until 1938 were administratively independent as "Municipalities" under the Department of Tegucigalpa. In that year, the two cities merged to form what is now the "Central District". It is the capital of Honduras and commonly referred to as only "Tegucigalpa City" meaning the whole of the Central District, belonging to the Department of Francisco Morazan. The coordinates of the Study Area are from longitude 87° 12' to 87° 22' west and latitude 13° 99' to 14° 13' north.

1.1.2 Climate

The Study Area basically has two seasons that are six months each: rainy and dry. In general, the rainy season is from May to October and the dry season from November to April.

Table 1-1 shows the mean monthly rainfall, the mean temperature, mean wind velocity and mean relative humidity recorded over the past 54 years (1944-1997, excluding the period between 1947-50 that has no rainfall data) in the Central District, as registered by the meteorological station at Toncontin Airport.

Table 1-1: Climatic Statistics Registered at Toncontin Airport Meteorological Station (1944-1997)

Category/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (Mean)
Mean Monthly Rainfall (mm)	6.5	3.7	9.7	38.0	146.8	160.9	81.9	96.5	178.7	112.9	33.3	9.7	875.3
Mean Monthly Temperature (°C)	19.5	20.4	22.1	23.4	23.5	22.7	22.1	22.3	22.2	21.5	20.4	19.5	21.6
Mean Monthly Wind Velocity (Knots)	8.1	8.0	7.6	7.2	6.0	5.4	6.3	6.1	5.2	6.0	7.4	8.0	6.8
Mean Monthly Relative Humidity (%)	72	67	62	61	68	76	74	74	78	79	78	76	72

Source: Records from the Meteorological Station, Toncontin Airport, 1998.

The wettest day recorded during this period was in May 1959, with 109.0 mm of rainfall. August 1995 saw the highest rainfall amount with 432.9 mm of rain in that month. In 1955, precipitation was 1,274.3 mm for that year alone, which is the highest amount registered since records began. The highest monthly temperature registered was 37.8 °C in April 1973, and the lowest was 3.9 °C in January 1956.

1.1.3 Topography

Honduras is a mountainous country, with a topography and soil quality that is favorable for the development of forests.

The Study Area is basically mountainous lying at an elevation between 900 masl (area between Barrio El Chile and Buenos Aires) and 1,535 masl (area between El Picacho and Piliguin). However, most of the urban area is located between 1,000 and 1,300 masl.

According to a survey conducted by METROPLAN on 457 barrios and housing developments in the Central District, 27% of the area has a natural slope gradient between 15% and 60%; (Table 1-2) this poses a strain on waste collection activities, because collection vehicles are not intended to ascend gradients exceeding 20%.

Table 1-2: Classification of Gradients in the Barrios of the Central District

Gradient Classification	Number of Barrios	%
up to 15%	26	6
15 to30%	50	11
30 to 45%	40	9
45 to 60%	34	7
Flat	307	67
TOTAL	457	100

Source: METROPLAN, AMDC, 1998

Such topographical features also hinder the installation of other basic public services, like water supply and sewerage, since SANAA has established a maximum elevation service of 1,150 masl.

Historically most of the inhabited highlands have been located in the Tegucigalpa side and most of the inhabited lowlands have been in the Comayaguela side.

This is a result of the mining community established in Tegucigalpa at the end of the 16th century without any basic groundwork to build a city. The Spanish pioneers randomly constructed houses at the foot of hills, the Grande or Chiquito river banks, and the summit of the La Leona hill. The outskirts were inhabited by the black slaves, while Comayaguela was a town inhabited by native indians, whose livelihood depended on agriculture and livestock rearing. As the villages expanded, they took on a more appropriate forward looking urban layout.

However, at present as the lowlands have already become saturated, the remaining highlands of both cities are increasingly in demand, especially by the low income population. This will further increase the number of inhabited steep areas and thus bring about more problems in supplying basic public services, especially those related to waste collection.

1.1.4 Geological Conditions

The geology of the Study Area consists of sedimentary rocks from the Valle de Angeles formation, at the east-central part of the Central District, including most of the area traditionally regarded as the business center of Tegucigalpa and Comayaguela. These rocks are characteristically layers of red shale, limolite, sandstone and quartz conglomerates. The origin of these rocks correspond to the beginning of the tertiary period of the Cenozoic Era, some 65 million years ago.

From the south through to the north-east of the area, old clastic sediments alternate with flows of riolite, known as the Jutiapa formation. It tapers at the west-central part of the Central District and widens to the south and north-east. This formation corresponds to the end of the tertiary period.

Volcanic areas dominate the west with alternating andesite and basaltic rocks from the end of the tertiary and beginning of quaternary periods, respectively, including several volcanic cones, the most relevant being the Pedregal Lagoon.

Because of the geological and topographical conditions many barrios are prone to landslides, earth collapses, settlements, and floods during the rainy season, which promotes local migration to other areas of the Central District. METROPLAN has classified such areas as follows (Table 1-3).

Table 1-3: Classification of Barrios by Degree of Risk

Degree of Risk	Regulations	Number of Barrios	%
I (light)	Certain types of construction permits can be issued with due consideration.	43	10
II (middle)	Construction permits may be given under the supervision of engineers.	63	14
III (high)	Construction authorizations are not issued, but people can continue living there.	60	13
IV (extreme)	No one is allowed to continue living there, also no new constructions are permitted.	6	1
Rest		285	62
TOTAL		457	100

Source: METROPLAN, AMDC, 1998

1.2 Socioeconomic Conditions

1.2.1 National Economy

a. Historical Background and Economic Trend Until 1996

a.1 Historical Background

The collapse in 1938 of the Federal Republic of Central America, and the re-establishment of Honduras as an independent republic, gave rise to a social structure that is largely impoverished due to the progressive inequitable distribution of wealth under despotism.

The nation's abundance of mineral resources such as gold, silver and lead attracted many American financiers to invest in the country from the middle of the nineteenth century. By the twentieth century, large-scale banana plantations were being developed. Not only did banana production support the national economy at that time, but also contributed to the formation of the basis for social overhead capital. The economy became increasingly dependent on the United States, as the US became the leading investor, covering the fields of mining and agricultural development. Financial assistance from the U.S. was bolstered when the Government of Honduras endorsed U.S. presence to back the armed separatists' (Contras) uprising against the Sandinista Administration in Nicaragua. This furthered the American influence on domestic politics. When investments from the United States significantly declined after the Velvet Revolution in the 1990s, the government started to rely on international organizations, e.g. IDB, and assisting countries such as Japan and Spain, for financial assistance.

a.2 Economic Trend before 1997

a.2.1 GDP Trend

The average growth rate during the Callejas Administration (1990-1993) was 3.8%, and being 6.2% in its the last year. However, the economic growth rate seriously plummeted in 1994 under the succeeding Reina Administration, as droughts during that year compelled the government to delay the plan for a long period which resulted in negative growth of -1.4%. Although the growth rate recovered in the following year to 4.3%, it fell to 3.7% in 1996. The average economic growth rate from 1994 to 1996 was 2.2%. Economic growth in 1995 and 1996 was largely due to the expansion of the mining industry, public utilities, and financial services. Public utilities such as electricity, gas and water supply showed a total increase of 15.4% in 1996.

Consequently, within the four-year period from 1992 to 1996, industrial growth was largely attributed to the service industry, particularly the heightened contribution of the financial and public utilities sectors.

Table 1-4: Changes in the Industrial Structure

(Unit: million Lps. in 1978 price)

	1992		1996		1996/92
		%		%	
Agriculture, Forestry, Fishing	1,413	27.8	1,628	26.9	1.152
Mining	83	1.6	108	1.8	1.301
Manufacturing	765	15.1	935	15.5	1.222
Construction	284	5.6	252	4.2	0.887
Public Utilities	130	2.6	184	3.0	1.415
Transportation	441	8.7	517	8.6	1.172
Trade, Restaurant &Hotel	529	10.4	653	10.8	1.234
Finance, Insurance, Real Estate	402	7.9	615	10.2	1.530
Home ownership	334	6.6	399	6.6	1.195
Government	291	5.7	286	4.7	0.983
Services	406	8.0	468	7.7	1.153
Total	5,078	100.0	6,045	100.0	1.190

Source: "CIFRAS 92-94", BCH
"Memoria 1996", BCH

a.2.2 Public Sector Growth Trend

The most significant contribution of the Reina Administration (1994-1997) to the nation's economy was succeeding in trimming financial deficits incurred by the public sector to 2.9% of the GDP in 1996. The public sector (SPNF) deficit grew to 10.2% (in 1993) of the GDP during the Callejas Administration. The Reina Administration's financial deficit reduction policies centered on: (1) curtailment of expenditures by cutting public spending and retrenching government employees, (2) reinforcement of restraints on lending, and (3) augment of revenues by increasing taxes and reinforcing tax collection capabilities. As can be seen from the table below, revenue of the central government in 1996 was 2.1 times the 1993 figure, while the percentage of GDP showed a 0.5 % decrease to 19.0%. While the expenditure in 1996 was about 1.9 times the 1993 figure, as a percentage of GDP, the expenditure was successfully reduced from 20.8% in 1993 to 18.1% by the end of 1996.

Table 1-5: The Changes of Central Government Finance

Item	1993		1996		1996/93
	million Lps.	% of GDP	million Lps.	% of GDP	
Current Revenue	3,770	19.5	7,922	19.0	2.10
Current Expenditure	4,016	20.8	7,535	18.1	1.88
Capital Balance	-2,765	14.3	-1,084	2.6	0.39
Deficit(-)	-3,011	15.6	-1,471	3.5	0.49
cf. GDP		19,317		41,649	2.16

Source:"CIFRAS 92-94", BCH
"Memoria 1996", BCH

a.2.3 International Balance of Payment Trends

The international balance of payment showed a surplus as the increase in export volume surpassed the increase in import volume, and due to the increase in transfer income.

Table 1-6: Changes in Balance of Payment

(Unit: million US$)

Item	1993	1994	1995	1996	1996/93
Export	1,214	1,367	1,751	1,939	1.597
Import	1,760	1,946	2,194	2,411	1.370
Balance of Trade	-545	-579	-443	-472	
Transfer	218	211	248	275	1.261
Balance of Current Account	-328	-368	-195	-197	
Capital Account	207	242	207	189	0.913
Errors & Omission	-72	106	-	136	
Global Balance	-193	-20	12	128	

Source: "Memoria 1996", RHSHCP
"Memoria 1996", BCH

Nonetheless, foreign debt increased from US$3.693 billion in 1993 to US$4.086 billion in 1996, 92% of which was incurred by the public sector.

a.2.4 Prices and Employment

The annual inflation rate grew from 10.7% in 1993 to 23.8% in 1996, resulting in the devaluation of Lps. from 6.57 in 1993 to 11.84 to US dollar in 1996.

After falling sharply in 1994, the rate of unemployment soared and was almost equivalent to the 1993 figure in 1996.

Table 1-7: Changes in Unemployment Rate

(Unit: %)

	1993/March	1994/October	1995/May	1996/April
Open unemployment	4.7	2.8	3.2	4.6
Visible unemployment	2.5	2.0	1.3	2.2
Invisible unemployment	29.1	26.3	26.4	27.2
Underemployment	36.3	31.1	30.9	34.0

Source: Direccion General de Estadisticas Censos

The following table shows the major indicators of the Honduran economy.

Table 1-8: Major Economic Indicators

		1993	1994	1995	1996	1997
Nominal GDP	Million Lps.	19,317	24,770	32,626	41,171	52,872
Real GDP Growth Rate	%	6.1	-1.3	4.1	3.7	4.5
Per capita GDP	US$	560	537	615	601	673
Central Government Deficit (GDP %)	%	15.6	8.2	4.2	3.8	2.8
Consumer Price Index	% of Increase	10.7	21.7	29.5	25.3	12.8
Unemployment	%	4.7	2.8	3.2	4.6	4.0
External Debt	Million US$	3,693	4,083	4,243	4,123	4,095
Average US$ Exchange Rate	Lps.	6.57	8.51	9.47	11.84	13.14
Population	1,000	5,248	5,422	5,603	5,789	5,981

Source: Memoria 1996, RHSHCP
Memoria 1996, BCH
Honduras en Cifras 1995-1997, BCN

b. Economic Trend in 1997

Economic indicators in 1997 show the trend of economic improvement as follows.

- GDP growth rate: 4.5% per year
- Inflation rate: 12.5% per year
- Foreign currency reserves: US$293.3 million, 68.6% higher than the previous year
- Government Deficit: Lps.588.5 millions, equivalent to 1% of the GDP

b.1 Production

The growth in production in 1997 was 4.5% of the GDP. In particular, finance sector (9.2%), public utilities (7.6%), manufacturing industry (6.1%), and agricultural industry (3.2%), showed the most significant growth.

As shown in Figure 1-1, agricultural production showed a 4.9% increase as of November, despite the fact that it held level from January to November, showing an increase of only 0.7% from last year. Conversely, mining production from January to November widely surpassed the previous year's figure at an increase rate of 11.9%, but fell to -5.9% as of November. The manufacturing industry quickly recovered from April and showed a growth of 15.6% in November alone. Production in this sector from the months of January to November showed a 10.3% increase from the previous year.

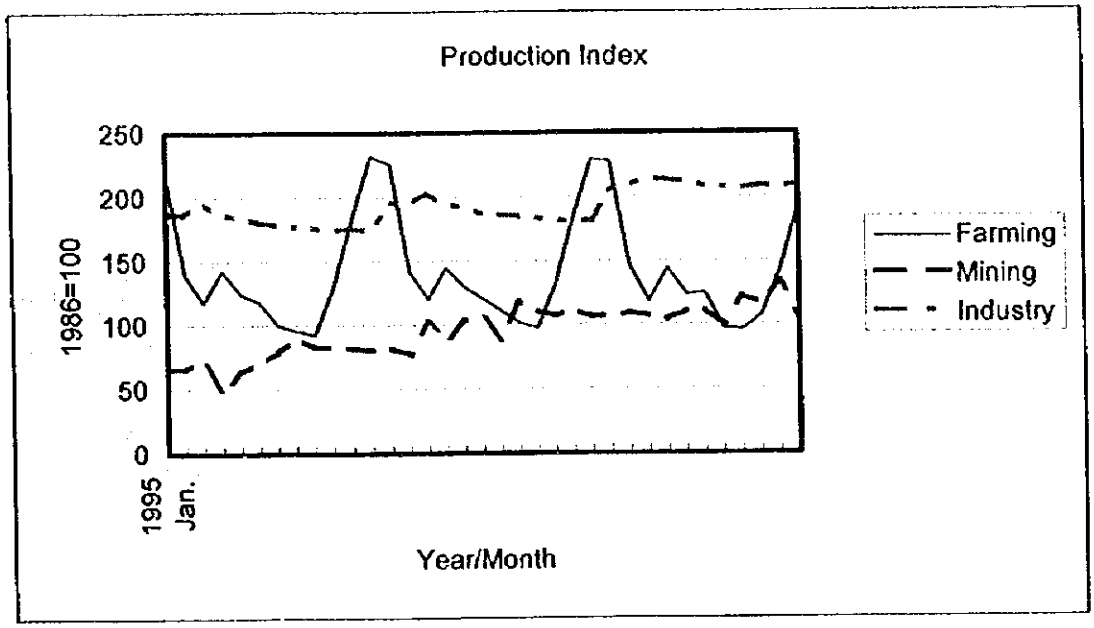

Figure 1-1: Changes in Production Index

Source: Boletin Estadistico Noviembre, 1997, BCH

b.2 Price

Food prices rose in July, from the previous month, reaching a plateau at 2.4%; at the end of December, the consumer price index closed at 1,099 (1978 = 100), up 12.8% from the previous year.

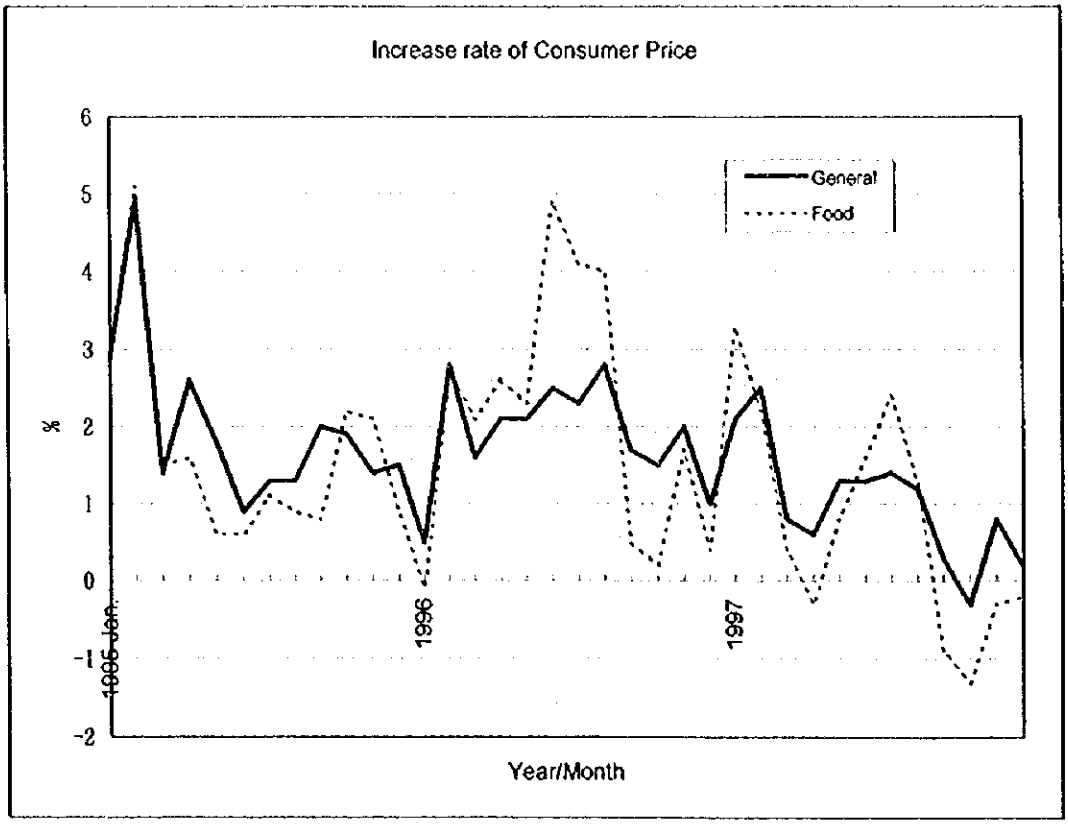

Figure 1-2: Price Increase Rate

Source: Boletin Estadistico Noviembre, 1997, BCH

b.3 Exports

The total export amount in 1997 reached US$1,535.6 million in FOB price.

Despite the decrease in export volume, the coffee export amount from January to November was up 15.1%, as coffee prices showed a 45% increase from the previous year. On the other hand, the decrease in the volume of bananas for export is reflected in the export amount, which was down 17.0% between January and November, in comparison to the same period in 1996. Overall, for the year 1997, exports exceeded imports resulting in an addition to foreign reserves of US$ 499 million, which is twice the figure in November of the previous year.

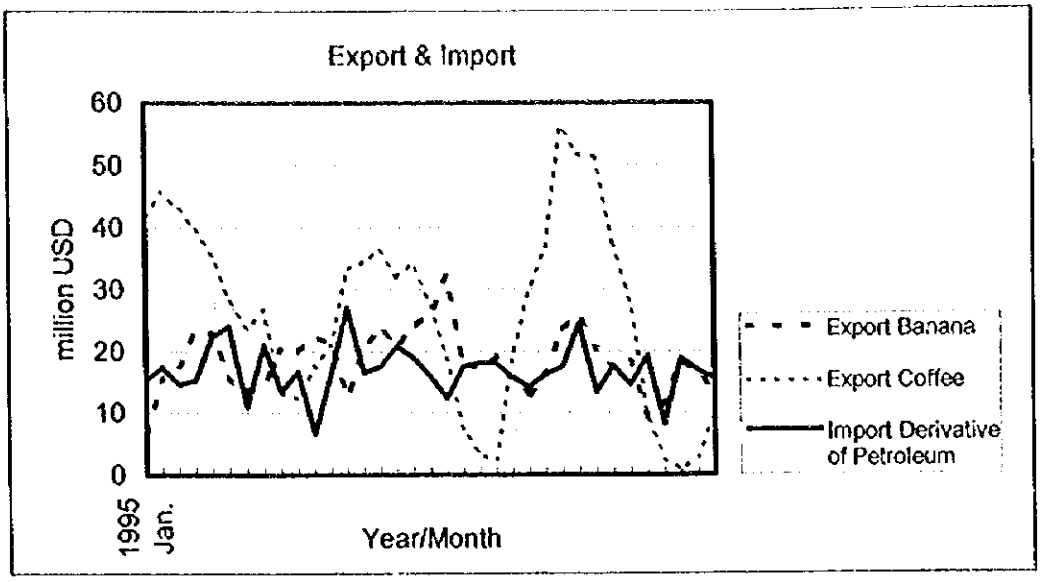

Figure 1-3: Major Exports and Imports

Source: Boletin Estadistico Noviembre, 1997, BCH

b.4 Interest Rate

In spite of the continuing depreciation of the Lps., the interest rate for loans from financial institutions fell by 1.45% from its peak in August and reached 32% on average in December.

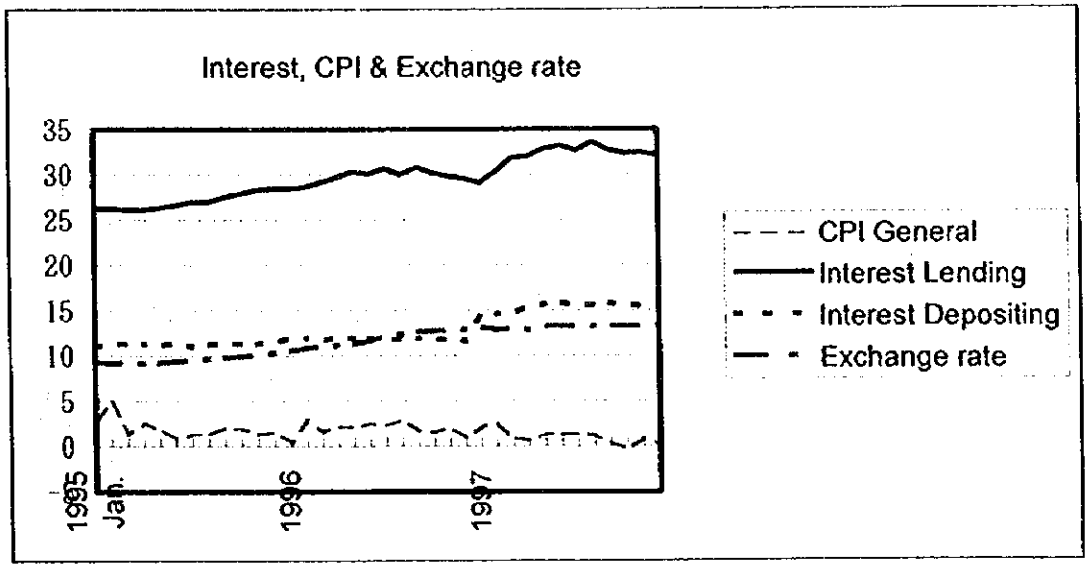

Figure 1-4: Interest Rate and Exchange Rate and the Increase Rate of CPI

Source: Boletin Estadistico Noviembre, 1997, BCH

c. Economic Development Plan

The president, Flores, advocated social reforms during his presidential campaign and the social reconstruction policy was included in the "New Agenda". Although the new agenda has not yet been approved as a national plan, it indicates the basic policy of the new administration and consists of: 1) preamble (new agenda for Honduras for

the year 2000), 2) action plan, and 3) project funding. The program of the new administration is outlined below.

1) The new agenda covers the economic, social and political sectors, as well as democratization and modernization.

2) The new agenda proposes to improve education, labor productivity, and income as preconditions for national development.

3) The economic agenda aims at economic growth and development through foreign and domestic policies. Accordingly, a production capacity that will enable the exportation of surplus goods will be established.

4) The economic agenda covers foreign policies, domestic policies and policies per sector.

5) Foreign policies cover trade and policies relevant to the international balance of payments and the management of debts. In particular, efforts will be concentrated on the acquisition of direct foreign investments for the development of the production sector.

6) Domestic policies are relevant to national finances, currency and credit sector, exchange rates, financing issues, national debts, employment, salary, stabilization of prices, technology, and competitive markets, in order to promote domestic savings and investment as well as to improve the production of large, medium and small-scale companies.

7) The economic policies per sector focus on the national economic activities, and are relevant to investments, natural resources and the environment, agricultural and manufacturing industries, forestry, mining and energy, medium and small-scale industries, infrastructure, tourism, and urban and rural development.

8) The social action plan consists of social and cultural policies that propose the elimination of poverty, improvement of education and public health conditions, among others.

The new administration targets an annual mean economic growth rate of 6% until 2001. Although areas such as the reinforcement of power services and the decentralization of water supply services to regional public corporations are covered for economic development, nothing concrete has been made for solid waste management. Moreover, to realize the new agenda, the new administration requires a capital of US$ 750 million.

1.2.2 Regional Economy

a. General Conditions

Banks, trading companies, hotels, and government institutions in Honduras are mostly concentrated in the national capital, Tegucigalpa. Most large-scale factories are located in San Pedro Sula, in the northern region, while food manufacturing industries are located close to the capital. Although Honduras has modern commercial facilities such as supermarkets and shopping arcades, mini-marts and general stores still predominate.

Table 1-9: Number of Businesses by Economic Activity in the Central District

Economic Activity		Number of Business
Trade	Mini-market	4,961
	Convenience store	1,570
	Liquor shop	851
	Butcher	304
	Others	2,955
Service	Workshop	459
	Beauty salon	398
	Grinder	311
	Others	2,142
Restaurant & Hotel	Restaurant	683
	Hotel	113
	Others	194
Finance & Insurance		538
Manufacturing		89
Construction		97
Miscellaneous		6,213
Total		21,878

Source: Computer center of the AMDC

b. Gross Regional Domestic Production (GRDP)

The GDP of Honduras has been calculated, but the GRDP is not known due to lack of estimates and relevant basic data are still unpublished. For the formulation of the SWM master plan, it is necessary to estimate the GRDP to determine the financial viability of the project. However, the data acquired on economic activities by region is limited to household accounts. Therefore, in this section, GRDP is estimated using the data on number of employees by income and economic sector.

The GRDP of the Central District was calculated using the following equation:

$$GRDPi = GDPi \times \frac{\Sigma Air_{ij} \times Nr_{ij}}{\Sigma Ain_{ij} \times Nn_{ij}}$$

where:

GRDPi; GRDP of Sector(I)

GDPi: GDP of Sector (I)

Airij: Average income of income level (j) of Sector (I) in Tegucigalpa's Central District

Nrij: Number of employees of income level (j) of Sector (I) in Tegucigalpa's Central District

Ainij: Average income of income level (j) of Sector (I), nationwide

Nnij: Number of employees of income level (j) of Sector (I) nationwide

The results of the calculation is shown in the following table.

Table 1-10: 1997 GRDP of the Central District by Economic Activity

	GRDP (1,000 Lps.)	Share of GDP (%)	Reference: Number of Employee (people)	Reference: Share of Whole country (%)
Agriculture, Forestry, Fishing	62	0.5	1,479	0.2
Mining	94	10.2	538	12.5
Manufacturing	2,100	22.0	68,713	19.4
Construction	783	28.9	23,613	27.1
Public Utilities	1,454	44.6	2,793	44.3
Transportation	725	31.8	14,270	30.0
Trade, Restaurant & Hotel	1,487	23.7	81,606	22.2
Finance, Insurance, Real Estate	2,680	52.2	20,601	48.6
Home ownership*	1,101	37.4		
Government*	1,140	37.4		
Services	1,983	37.4	107,609	30.1
Total	13,609	25.5	321,222	15.6

Note: The GRDP of Home ownership and that of Government were estimated using the share of Services in the whole country.

c. Income

Workers in the Central District earn an average income of Lps.1,747 per month (national average of Lps.1,319 /month). The head of a family earns a monthly average of Lps. 3,415 (national average of Lps.2,608 /month). According to the public opinion survey, the average expenditure of low-income households is Lps. 1,990 /month, while the middle-income and high-income households spend a monthly average of Lps. 3,250 and Lps. 6,879, respectively. Making the assumption that expenditure is equal to income, based on the income of the family head, the distribution of population by income level is 50% in the low-income group, 30% in the middle-income group and 20% in the high-income group.

Table 1-11:Distribution of Income in Central District in 1997

Monthly Earnings (Lps.)	Reported Employees			Reported head of house		
	Number	per cent (%)	Cumulative(%)	Number	per cent (%)	Cumulative(%)
Less than 100	1,990	0.6	0.6	578	0.4	0.4
101 - 250	8,556	2.8	3.4	1,247	0.8	1.2
251 - 500	28,284	9.2	12.7	5,833	3.7	4.9
501 - 750	20,371	6.7	19.3	17,692	11.3	16.2
751 - 1,000	63,624	20.8	40.1			
1,001 - 1,500	70,691	23.1	63.2			
1,501 - 2,000	41,676	13.6	76.8	53,748	34.3	50.5
2,001 - 2,500	17,724	5.8	8.6			
2,501 - 3,000	15,823	5.2	87.7			
3,001 - 4,000	12,168	4	91.7	47,147	30.1	80.6
4,001 - 5,000	9,709	3.2	94.9			
5,001 - 7,500	7,505	2.5	97.3	22,079	14.1	94.7
7,501 - 10,000	4,084	1.3	98.7			
1,0000 and over	4,089	1.3	100.0	8,249	5.3	100.0
Not Declared	14,928	excluded		10,172	excluded	
Total Number	321,222	100.0		166,745	100.0	
Total Income(1,000) (Lps.)	535,204			534,675		
Average Income (Lps.)	1,747			3,415		

Source: "Programa de Encuesta de Hogares", Secretaria de Industria, Comercio y Turismo, June, 1997

1.2.3 Administration

The Republic of Honduras is divided into 18 departments, that are divided into municipalities, villages and barrios.

The government is exercised by three supreme powers: executive, legislative and judicial. The highest authority is held by the President who is elected by direct vote, every 4 years. A second term in office is not allowed. At the same time, there are three vice-presidents. The legislature is integrated by 128 seats who are elected during the presidential elections. According to the population each department has right to elect certain number of members. The Supreme Court is integrated by 9 members who are named by the Legislature.

The executive power is exercised by through the ministries, among them is the Ministry of Government, which hierarchically precedes the municipal administrations of the country through the department's governors, who act as intermediaries between the executive power and the municipalities.

At the same time, the municipalities are autonomous and administrated by councils directly elected by the people (Law of Municipalities, Article 3).

The organization chart of the AMDC, as of March 1998, is shown in Figure 1-5.

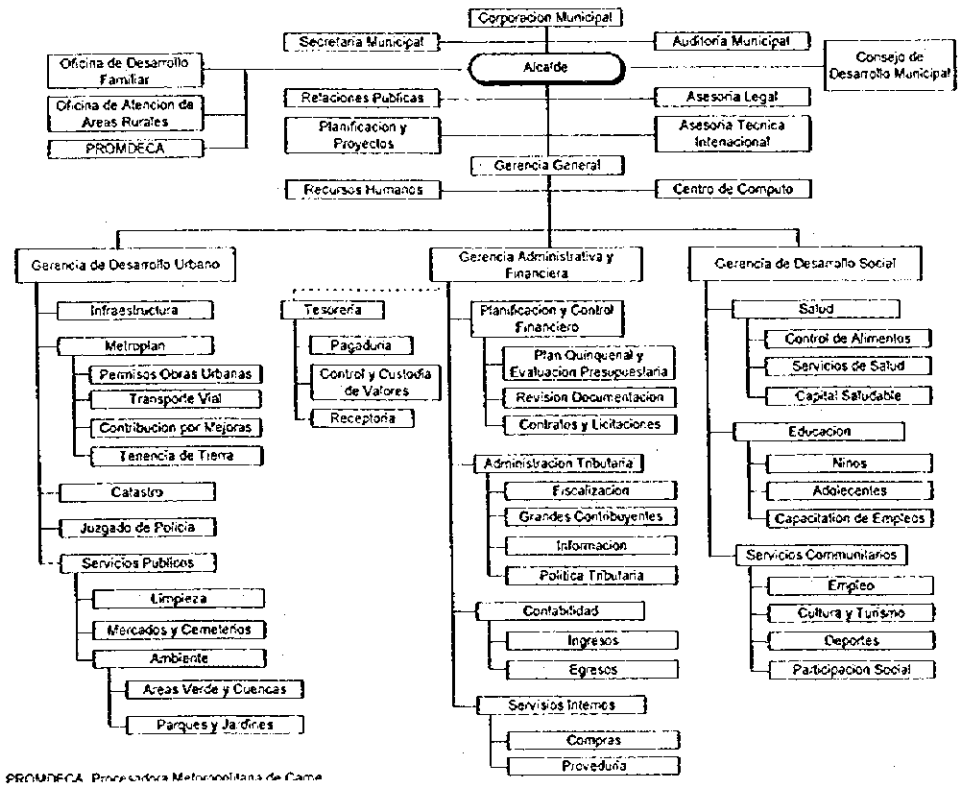

Figure 1-5: Organization Chart of the AMDC as of March 1998

1.2.4 Demographics

1.2.4.1 Background

In this study, a thorough investigation on the population data and their projections for Honduras and the Central District has been conducted, due to there being several sources and the conflicting results they provide.

a. Honduras Population

The sources of data examined here are as follows:

1) National Census of Population and Housing, 1988.

The last National Census of Population and Housing was executed in 1988 by the Directorate of Statistics and Census (DGEC). According to the individual who conducted the census and still is in office, the preliminary findings were widely published but the final results were kept only for the library of the DGEC together with two or three other institutions.

Some of the volumes are shown in Table 1-12.

Table 1-12: Publication Status of the National Census 1988

Title	Date	Status
1. Total population and number of households per Department and Municipality.	October, 1989	Final
2. General characteristics on education and economics, per Department.	December, 1989	Preliminary
3. Characteristics on population on geography, migration, and social background	August, 1990	Preliminary
4. General characteristics of population and households per barrios("Barrios" and "Colonias") of the Central District	December, 1990	Preliminary
5. Basicinformation of the municipalities of Honduras	January, 1991	Final

Source: Censo Nacional de Población y Vivienda, 1988. Dirección Gral. de Estadísticas y Censos, SECPLAN.

Previous volumes to October 1989 have not been available. However, the one published on this date include adjustment factors to be used considering the population and household which may have not been included in the census. Such factors are shown in Table 1-13.

Table 1-13: Adjustment factors for population and households, 1988's Census

Place	Adjustment Factor for Population	Adjustment Factor for Household
Central District	1.0687	1.0326
San Pedro Sula	1.0611	1.0189
Other urban places	1.0500	1.0209
Rural Area	1.0382	1.0192

Source: Censo Nacional de Población y Vivienda, 1988. Dirección Gral. de Estadísticas y Censos, SECPLAN, Octubre 1989.

Information found in some volumes were incomplete, for example the final urban and rural population of Honduras after applying the adjustment factor is unknown.

However, in the more recent publications, a larger number of preliminary volumes were published without the corresponding corrections, therefore, many studies and

works on population use these preliminary results as a base data for their corresponding projections.

A comparison of population values for these works is shown in Table 1-14.

Table 1-14: Several base data and their projections of population for Honduras

Publication	Base data 1988	Projection 1998	Projection 2010
1) Proyecciones de Población para los años 1989-2000, por Departamento. DGEC.1988.	4,248,561	6,038,803	
2) Perfil Ambiental de Honduras, SECPLAN, 1989	4,376,839		
3) Plan de Acción Ambiente y Desarrollo, SEDA, 1993	4,418,721		
4) Proyecto SECPLAN/OIT/FNUAP-HON/90/P03. Políticas de Población, Pobreza y Empleo. Enero,1996.	4,475,728	5,901,239	7,648,997
5) Present Study (officially adjusted final value from National Census 1988)	4,443,721	5,935,308	8,400,000

As can be observed, variations in the projections occur because of the different base data and growth rate values used in the calculations.

b. Population of the Central District

Register of population is undertaken by three sources as follows.

b.1 National Census of Population 1988. DGEC. 1989-1991

It listed 365 barrios in the 1988 census.

b.2 List of barrios in the Central District. Department of Cartography. DGEC. 1990-1994

It has listed 511 barrios in the last update performed during the 1990-1994 period. Revision of the information has only been done in what is regarded to be a small number of districts, however, the population is usually less than that registered by the National Census of 1988.

Currently, it is not clear whether the difference in number of barrios (146, i.e. > 40%) is due to an increase in the number of barrios from the time the census in 1988 was conducted or that some of them were not accounted for due to the illegal land property condition or other factors. The underlying reason may be a combination of both aspects.

The Central District is divided into five large regions, each one having a number of barrios as follows (see Table 1-15):

Table 1-15: Number of Barrios in the DC according to DGEC

Regions	Cartography (DGEC) Barrios Number	Population 1990-94
1. El Pastel (North-West)	167	214,074
2. El Picacho (North-Center)	78	65,501
3. Kennedy (South-East)	147	170,622
4. Loarque (South)	38	34,306
5.Toncontin (South-Center)	81	68,145
TOTAL:	**511**	552,648

It has been found that the population does not agree with the data provided by the official National Census of 1988 which was of 576,661 inhabitants for the urban area of the Central District. Thus for the period of 1990-1994 the natural increase in population should give higher results than it. The staff in charge of updating belonging to the same institution that compiled the National Census is at present examining the cause of the different results. One explanation is that the National Census of 1988 (and the previous) was performed with special financing as a short term project, but the ongoing revisions are carried out over a long period because of the lack of resources such as vehicles, fuel and staff. Therefore, only a few of the barrios, and not the whole population can be updated at one time.

It is worthy to mention that the AMDC classifies the regions in Tegucigalpa in the same way as the "Plan de Arbitrios", however by December 1997 the number of barrios was considered to be 476 which is 35 barrios less than the DGEC's classification. The barrios are grouped in Cadastre Zones or Sectors; there are 29 such sectors for the urban area.

b.3 Register of Barrios; Central District Department of METROPLAN, AMDC.1997

The Department of METROPLAN registered 614 barrios in the Central District, however it only provides population data for 353 barrios and some others with basic public services. The registered population indicate a total of 429,771 inhabitants, updated according to them for the year 1988. Thus the population data for each barrio is different to those provided by the National Census as well as the Cartography Department of the DGEC.

In summary it can be observed that the sources of population data give different values for each barrio as well as for the whole Central District (Table 1-16).

Therefore, only the data from the Department of Cartography of the DGEC will be used as a basis for the classification of the regions in 511 barrios, as it seems to be the most up-to-date in comparison to others. Regarding to the population only is used to have a general idea of the population concentration regions.

The population data for the barrios in the Central District to be used in this study will be that of the National Census 1988.

Table 1-16: Different Population Data for Barrios in the DC

Barrio	Source of Population Data		
	Dirección Gral. de Estadísticas y Censos (DGEC, SETCO*)		METROPLAN (AMDC), 1988
	National Census of Population 1988	Department of Cartography, 1990-94	
Bo. Abajo	893	641(180)	640(247)
Bo. Belén	3,323	3,071(812)	3,066(812)
Bo. Buenos Aires	3,615	3,614(1,004)	3,621(865)
Bo. Casamata	1,175	1,015(265)	1,015(248)
Bo. Concepción	2,609	2,336(738)	2,219(743)
Bo. El Pastel	1,087	861(210)	561(169)
Bo. El Rincon	1,172	1,007(248)	1,015(714)
Bo. Villa Adela	3,542	1,811(574)	3,292(925)
Bo. Morazan	4,136	3,595(995)	3,555(1,055)
Col. Kennedy	19,995	19,085(3,817)	18,232(3,758)
Bo. La Ronda	1,049	764(307)	760(257)
Col. 21 de Octubre	3,326	3071(656)	3,074(642)
Col. Palmira	1,199	458(335)	1,171(366)

Note: No. of households in parenthesis
Sources: 1) National Census, 1988. DGEC.2) Department of Cartography, 1990-94 DGEC. 3) Dept. of METROPLAN, AMDC, 1997. * On 1988 this institution was called SECPLAN

1.2.4.2 Other Studies on Population of the Central District

Furthermore, considering the problems in selecting the population data for the Central District as a whole, it is worthy to mention some additional works that have used different base data and also have made different projections (Table 1-17).

Such variations have mainly occurred because of the different base data and growth rates selected. However, the average value of the various sources is 1,332,123 citizens, which is similar to the value estimated by this study.

Table 1-17: Various base data and projections of population for the Central District

Publication	Base data (1988)	Projections	
1) Proyecciones de Población para los años 1989-2000, por Departamento. DGEC.1988.	585,686	1998	2010
2) Las 100 ciudades y comunidades mayores de Honduras, OPS/OMS, Mayo, 1995.	539,590	916,209	
3) Proyecto SECPLAN/OIT/FNUAP-HON/94/PO2. Políticas de Población, Pobreza y Empleo. Enero, 1996.	576,661	828,553 (1997)	
4) Proyecciones de Población 1995-2010, FNUAP, 1998.	576,661	806,593	
5) Mejoramiento del Sistema Vial Urbano en Tegucigalpa JICA, Nov. 1996.	539,530	806,000	1,478,590
6) Encuesta Permanente de Hogares, DGCE, 1997		827,383 (1997)	
- La Honduras de Hoy y del Mañana, USAID,SECPLAN,SEDA,Ministerio de Salud,SRN,AHONPLAFA,1995			1,500,000
- SANAA, Aguas Negras, 1992			1,393,900
- Urban Transportation, 1995			956,002
7) Present Study	576,661	848,859	1,350,000

1.2.4.3 Analysis of Population of Honduras and Central District

In this study the historical data from 1791 are taken into account for both the Central District and the whole of Honduras. Regarding the data for 1988, the adjusted final values are used (Table 1-18, Table 1-19, Figure 1-6, and Figure 1-7).

Table 1-18: Population of Honduras and its Growth Rate(1791-1988)

Year	Urban	G.R. (%)	Rural	G.R. (%)	Total	G.R. (%)
1791	----	----	----	----	96,421	----
1801	----	----	----	----	128,453	2.91
1881	----	----	----	----	307,289	1.10
1887	312,319	----	19,598	----	331,917	1.29
1895	----	----	----	----	398,877	2.32
1901	----	----	----	----	543,741	5.30
1905	----	----	----	----	500,136	-2.07
1910	----	----	----	----	553,446	2.05
1916	----	----	----	----	605,997	1.52
1926	----	----	----	----	700,811	1.46
1930	262,815	-0.40	591,369	8.25	854,184	2.22
1935	290,509	2.02	671,491	2.57	962,000	2.41
1940	----	----	----	----	1,107,859	2.86
1945	348,043	1.82	852,499	2.42	1,200,542	2.24
1950	424,453	4.05	944152	2.06	1,368,605	2.66
1961	437,818	0.28	1,446,947	3.96	1,884,765	2.95
1974	833,179	5.07	1,823,769	1.80	2,656,948	2.68
1988	1,893,339	6.04	2,550,382	2.42	4,443,721	3.74

Source: 1) Censos de Población y Vivienda Levantados en Honduras de 1791 a 1974 (reedición), Junio, 1981. Dirección Gral. de Estadísticas y Censos, Secretaría de Economía. 2) Censo Nacional de Población y Vivienda, 1988. Dirección Gral. de Estadísticas y Censos, SECPLAN, Diciembre 1990.

It can be observed that the growth rates for the period prior to 1930 are not steady and in some cases are negative. Considering the lack of technology it may be assumed the results had a large margin of error, specially when considering the rural census, due to the poor access. However, considering the small populations in that period the effect on the projections is deemed to be negligible.

Table 1-19: Population of the Central District and its growth rate(1791-1988)

Year	Urban	G.R. (%)	Rural	G.R. (%)	Total	G.R. (%)
1791	----	----	----	----	5,431	----
1887	12,585	----	----	----	12,585	0.88
1901	----	----	----	----	29,789	6.35
1905	----	----	----	----	27,623	-1.87
1910	----	----	----	----	28,949	0.94
1916	----	----	----	----	32,621	2.01
1926	----	----	----	----	32,505	-0.04
1930	27,573	1.84	19,502	----	47,075	9.70
1935	34,900	4.83	23,098	3.44	57,998	4.26
1940	----	----	----	----	76,499	5.69
1945	55,755	4.80	30,707	2.89	86,462	4.07
1950	72,385	5.36	27,563	-2.14	99,948	2.94
1961	134,075	5.76	30,866	1.03	164,941	4.66
1974	273,894	5.65	31,493	0.15	305,387	4.85
1988	576,661	5.46	47,881	3.04	624,542	5.24

Source: 1) Censos de Población y Vivienda Levantados en Honduras de 1791 a 1974 (reedición), Junio, 1981. Dirección Gral. de Estadísticas y Censos, Secretaría de Economía. 2) Censo Nacional de Población y Vivienda, 1988. Dirección Gral. de Estadísticas y Censos, SECPLAN, Diciembre 1990.

By plotting these historical population data for the Central District as well as for the whole country, a resulting exponential curve of population is obtained. An extrapolation of the curve give the projected population for the target year 2010.

From these data the increase in growth rate can be quantified; the projected population for the intermediate ranges can be found by using the following equation:

$Pp = Pb\ (1+r)^n$

Where Pp=Projected population
Pb=Base population
r = Growth rate per year
n= Number of years

The generated values are listed in Table 1-20.

Table 1-20: Projected Population of the Central District and Honduras(1989-2010)

Year	Central District (Urban)	Honduras (Total)	Central District/Honduras
1988 (Base)	576,661 Growth rate=3.94%	4,443,721 Growth rate=2.94%	12.98%
1989	599,394	4,574,214	13.10%
1990	623,022	4,708,538	13.23%
1991	647,582	4,846,807	13.36%
1992	673,111	4,989,137	13.49%
1993	699,646	5,135,645	13.62%
1994	727,226	5,286,457	13.76%
1995	755,894	5,441,697	13.89%
1996	785,692	5,601,495	14.03%
1997	816,665	5,765,987	14.16%
1998	848,859	5,935,308	14.30%

The projected urban population growth rate of 3.94% for the Central District is slightly less than the previous values of 4.8% to 5.76% during the last few decades. Also the value does not deviate from the latest trends of other major cities in Honduras where cities like San Pedro Sula and its surrounding areas has been targeted by migrant workers and their dependents, attracted to the introduction of large free zones where many multinationals have located their factories. In the case of the Central District, although similar free zones, with the corresponding development of industrial areas are being introduced in the mid-term, its expansion will not reach the magnitude of San Pedro Sula, where the largest harbor and airport in Honduras are located to reinforce the export of manufactured products.

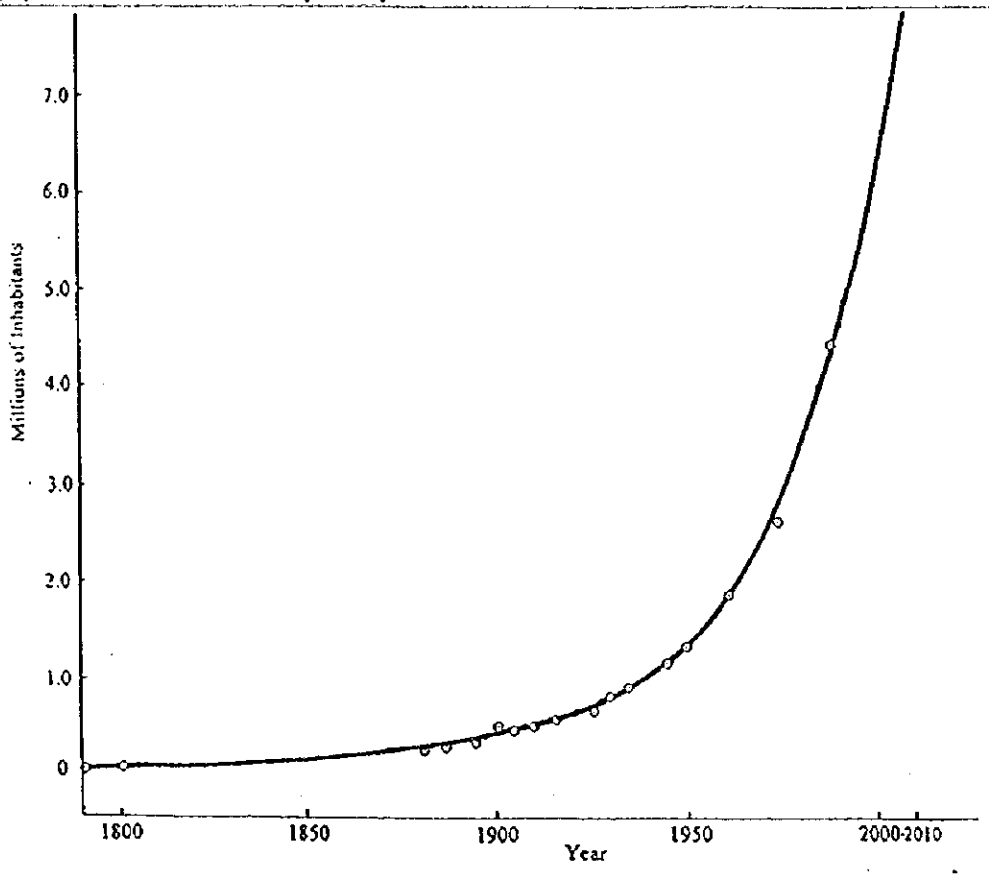

Figure 1-6: Record of Honduras Population (1791-1988) and its Projection

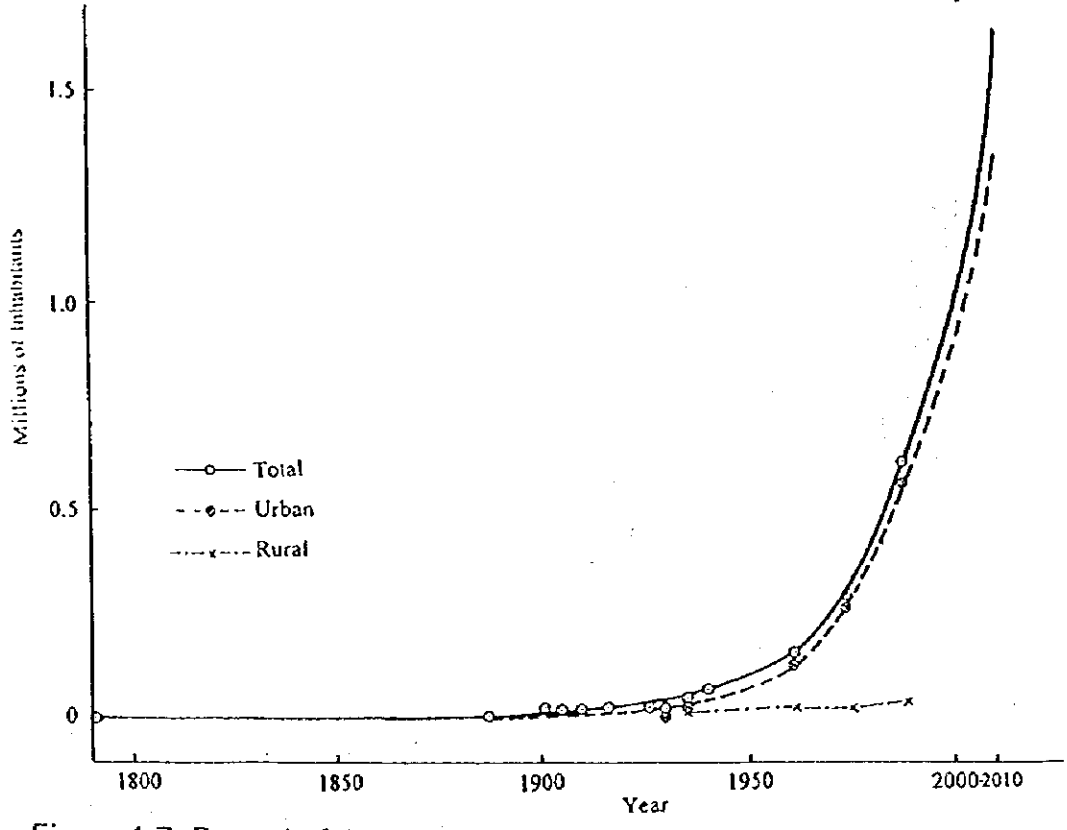

Figure 1-7: Record of the Central District Population (1791-1988) and its Projection

1.2.4.4 Classification of Barrios and Population by Income Level in the Central District.

Taking the previous data and supplementary studies as a basis, a classification of the population and the category of districts by income level was performed.

a. Classification of Population by Income Level

A classification of the population by income level was performed by using the data provided by the Program of Multipurpose Survey of Households of the General Directorate of Statistics and Census[1]. The survey was distributed to a population of 166,745 persons of which 156,573 answered the questions for households with five ranges of monthly income. The analized results are summarized in Table 1-21.

Table 1-21: Classification of Population by Income Level in the Central District

Category	Range	No. of Persons	%
Low	0-2,500 Lps.	79,098	50
Middle	2,501-5,000 Lps.	47,147	30
High	5,001 Lps.or more	30,328	20
Total		156,573	100

Sources: Adapted from Programa de Encuesta de Hogares de Propósitos Múltiples, Dirección General de Estadísticas y Censos, Junio 1997.

According to these results the present population can be classified as follows (Table 1-22):

Table 1-22: Classification of population by income level (1998)

Category	1998
Low	424,429
Middle	254,658
High	169,772
Total	848,859

b. Classification of Barrios by Income Level

Due to the lack of studies related to this topic, the classification of barrios of the Central District was performed by the Study Team in collaboration with the Cleansing Department, according to the different categories of residential areas currently being used (Table 1-23).

Table 1-23: Classification of Barrios by Income Level in the Central District

Zone	Total Barrios	Low(%)	Middle(%)	High (%)	Total(%)
El Pastel	167	80	16	4	100
El Picacho	78	45	46	9	100
Kennedy	147	29	29	42	100
Loarque	38	29	71	0	100
Toncontin	81	37	52	11	100
Total	511	49	34	17	100

Source: Social Promotion Service, Cleansing Department. Public Services, AMDC, 1998

[1] page 203, Table 32: "Households by monthly income level according to main characteristics of the household head, Central District, June 1997"

1.2.5 Industrial Trends

a. General

There are 21,878 businesses established within the Central District, comprising industries related to retail outlets, commerce and services. According to the data at the AMDC, the businesses are divided into 37 different types totaling 326 units as outlined in Table 1-24.

Table 1-24: General Industries in the Central District (April, 1998)

No.	Type	Number
1	Alcohol Distillery	1
2	Grain dryer	1
3	Carpenter	127
4	Mechanic's workshop	11
5	Tire Retreader	8
6	Printer	78
7	Manufacturer of industrial equipment	4
8	Confectionery industry	1
9	Meat processing	2
10	Packaging factory	1
11	Coffee industry	1
12	Mineral water treatment plant	2
13	Textile factory	2
14	Tortilla factory	8
16	Shoe factory	9
17	Apparel factory	16
18	Pencil factory	3
19	Sawmill	2
20	Furniture factory	13
21	Wood pulp factory	1
22	Factory of wood pulp crafts	1
23	Chemical plant	4
24	Glass and porcelain factory	4
25	Petroleum processing facility	1
26	Clay product factory	2
27	Cement factory	1
28	Brick factory	2
29	Metal refinery	1
30	Metal processing factory	1
31	Hat factory	2
32	Battery factory	6
33	Plastics factory	6
34	Signboard factory	1
35	Match factory	1
36	Ice cream factory	1
37	Cookie and cracker factory	1
TOTAL:		326

b. Industries Operating Under Special Legislation

Besides those mentioned above, in Honduras there are three types of industries that operate under special laws mainly for the purpose of promoting foreign investment, export and utilization of the local labor force.

The industries are known as RIT, ZIP and FTZ as explained in detail below; in general they are collectively known as "maquilas" or "maquiladores" (manufacturing /assembling industries), comprising approximately 210 multinationals from USA, Taiwan, China, Hong Kong, Singapore, Macao, Pakistan, and Korea, etc.

Apparel accounts for 90% of the goods manufactured for export (in the ZIP and FTZ). Most companies operate under Clause 807 of the US customs regulations that allows for duty-free re-importation, back to the US, of clothing assembled in a Caribbean Basin country using US raw materials.

In 1996, Honduras was already the top exporter of textiles in Central America and was second in Latin America after the Dominican Republic and ranked fifth worldwide.

Other goods manufactured in Honduras are shoes, furniture, wood ornaments, refrigerators, and fan belts for car engines. Other export oriented commodities are fabric or leather bags, electrical appliances and components, vinyl and wooden shutters, medium to large sail and motor boats, sails and other marine articles, light metal parts and automobile sub-components.

Some general data of these industries are shown in Table 1-25.

Table 1-25: General Situation of Industries Under Special Legislation (RIT, ZIP, FTZ)

CONCEPT/YEAR	1989	1990	1991	1992	1993	1994	1995	1996	1997
Export(US$million)	87	113	196	365	506	646	921.1	1,219.5	1,659.0
Industrial Parks and Free Trade Zones	1	3	5	6	7	9	13	15	17
Industrial Buildings	16	35	49	67	147	175	182	192	323*
Number of employees	8,300	17,500	24,500	33,500	42,000	50,000	65,000	76,423	86,490
Added Value (US$ million)	30.9	85.1	91.1	124.6	156.2	186.0	241.8	284.3	390
National Investment (US$ million)	22.2	66.6	111.1	133.3	155.5	200.0	288.6	333.0	N.A.
Foreign Investment (US$ million)	32.3	70.4	101.7	139.1	284.5	356.3	386.7	416.2	N.A.
Salaries (US$million)	8.6	18.2	31.8	43.6	54.6	100.0	136.5	160.5	119(?)

* At present there are 405 buildings under construction.
Source: Honduras Association of Maquiladores

b.1 Industries Under the Legislation of "Temporary Import Regime"(RIT)

The "Temporary Import Regime" (RIT, Regimen de Importación Temporal) was established through Decree No.37 in December 20, 1984. The purpose of this law is to stimulate and provide an incentive for exportation by promoting the creation of a greater number of jobs.

Under this law, import of the following goods are tax-exempt (customs excise, consular, sales tax, etc.):

(a) Raw materials, partially assembled products, containers and other goods that are assembled, transformed, modified or physically incorporated into products exported to countries outside the Central American region.

(b) Machinery, equipment, tools, spare parts, and accessories, that are used exclusively to assemble, transform, modify or produce goods aimed for export to non-Central American countries.

Under this law the Ministry of Industry and Commerce (previously the Ministry of Economy) has registered 475 enterprises in the whole country up to March 1998. Most of these industries are established in medium to large scale cities in Honduras.

Their activities include: crop cultivation, production of furniture and electrical components, shrimp cultivation, assembling of garments, etc.

In the Central District there are about 44 such industries operating in the following fields (see Table 1-26):

Table 1-26: Enterprises under the Regime of Temporary Import in the Central District (March/98)

No.	Name of Enterprise	Activity/Exported Commodity
1	Agricola y Agroindustrial FALEV, S.de R.L.	Hadeen Mango
2	Agropecuaria San Jose, S.A.de C.V.	Coffee grains
3	Chesnut Hill Farms Honduras, S.A.de C.V.	Fruits and vegetables
4	Confecciones Monzini, S. de R.L. de C.V.	Clothes
5	Cressida Industrial, S.A. de C.V.	Palm oil products
6	Derivados de Madera, S.A.	Furniture and lumber
7	Diamond Plastics, S.A. de C.V.	Plastics
8	Diseños promocionales, S.A. de C.V.	Clothes
9	Electroconductores de Honduras, S.A.(ELCOHSA)	Electrical appliances
10	Exportadora comercial	Coffee beans
11	Exportadora de plasticos hondureña, S.A. de C.V.	Plastic containers
12	Exportadora Zelaya, S.de R.L. de C.V.	Cultivation and processing of coffee
13	Fabrica de Camisas Maya y Atlantida	Shirts
14	Fabbrica de Confites y Chicles Venus, S.A.de C.V.	Confectionery
15	Fosforera Centroamericana	Matches
16	Fundacion de Instituciones Benéficas San Jose del Mariol	Women's clothing
17	Habanos Cigars	Hand-rolled Cigars
18	Handy Craft, S.de R.L.	Wooden products
19	Helechos International Honduras S.A.	Calaguala extract
20	Hondu Print S.A. de C.V.	Wax paper
21	Honduras Plywood S.A. de C.V.	Plywood sheets
22	Honduras Regiplast S.A. de C.V.	Plastic bags, sheets, rolls
23	Honduras Veneer S.A. de C.V.	Wood
24	HONIMEX S. de R.L. de C.V.	Bovine fetus serum, offal, gallstone
25	Ind. Manufacturera de Calzado Caprisa de C.V.	Sports shoes
26	Inversiones Progreso	Coffee beans
27	Maderas Procesadas Irias Lima S. de R.L.	Wood pieces for furniture
28	Manufactura de Componentes Electricos S.A. C.V.	Electrical wiring
29	Manufacturas Industriales Centroamericanas	Children's furniture
30	Manufacturas y Suelas S.A. de C.V.	Shoes
31	Paul O. Lawton y Compañía S.de R.L. de C.V.	Sweet gum
32	Procesadora Hondureña de Pinos, S.R.L. de C.V.	Wood for broomsticks
33	Procesadora Industrial del Mimbre (PRIMI)	Rattan furniture
34	Productos Acuaticos Industrializados S.A. de C.V.	Processed meat
35	Quimicas Magna S.A.de C.V.	Personal and health care product
36	Quiñonez Industrial S.R.L de C.V.	Waterproof cardboard boxes
37	Resineria Maya S.A.	Organic solvents
38	Servicios y Proyectos S.A. de C.V.	Clothes for men, women and children
39	Tecnologia de Calzado, S.A. de C.V.	Shoes made of synthetic materials
40	Tenería América S. de R.L.	Alligator skin and leather accessories
41	Textiles de CentroAmerica	Parts of shirts and pants
42	Textiles Rio Lindo S.A. de C.V.	Cotton
43	TRAMADE S.A. de C.V.	Lumber
44	Transformaciones de madera Velasquez S.A. C.V.	Wooden furniture

Source: Ministry of Industry and Commerce, Directorate of Productive Sectors.

Although detailed data concerning the number of employees and amount exported are not available in the related government offices, at present, the labor force involved in this sector is known to be about 17,000 employees nationwide.

b.2 Industrial Parks (ZIP: zones of industrial processing)

The Zones of Industrial Processing or Industrial Parks that have been authorized by the Ministry of Industry and Commerce, under Decree No.37-87, declared on April 7, 1987, are aimed to promote the use of local labor by the manufacturing and service industries for the sole purpose of exportation. They are granted full tax exemption (customs excise, income tax, municipal tax, etc.) and are required to generate at least 5,000 new jobs in a five year period. They are authorized by the government to operate in certain geographically defined areas.

The first industrial parks have been occupied in San Pedro Sula and neighboring cities such as Choloma, Bufalo, La Lima, Villanueva since 1990, where conditions for transportation by air, sea or land is favorable in comparison to other regions. The products are transported through Puerto Cortés harbor, SPS airport or the customhouse located at the boarder with Guatemala. At present, twelve (12) Industrial Parks have been created (1990 - 1997) including one in Comayagua City and Amarateca Valley within the Central District. The number of people employed in the ZIP's are distributed as shown in Table 1-27.

Table 1-27: Number of Employees in Industrial Parks in Honduras (April,98)

No.	Name of Industrial Park	No. Direct Employees
1	ZIP Choloma	10,078
2	ZIP San Miguel	5,700
3	ZIP Bufalo	8,500
4	ZIP Continental	4,401
5	ZIP Group "J" S.A	8,000
5	ZIP Buena Vista S.A.	9,500
7	ZIP Calpules	500
8	ZIP San José	4,130
9	ZIP Rio Blanco	1,800
10	ZIP El Porvenir	3,250
11	ZIP Comayagua	410
12	ZIP Amarateca	150
TOTAL:		56,419

Source: 1) Users of the Industrial Parks 1996, Ministry of Industry and Commerce, Directorate of Productive Sectors. 2) Information from the Honduras Association of Maquiladores

Textile is the main export commodity which comprises underwear, T-shirts, blouses, pants and shorts. The salary of factory workers (assembly workers, machinists, etc.) ranges between US$ 0.60 to 0.70 per hour. Factories have their own waste collection system and incinerator for scrap textile. The waste collection trucks make about 4 trips per day to the final disposal site.

The Industrial Park of Amarateca within the Central District, which is still in the process of completion, is located about 20 km north-east from the city center, just inside the Study Area boundaries. The development plan has been approved since 1994 by the former Ministry of Economy. The construction of 20 buildings for industrial purposes has been approved at a rate of about 2 buildings per year, until 2009. The area to be developed is approximately 2.75 ha, with a total area of 15.3 ha (22 Mz).

The design and construction of access roads and basic infrastructure began in 1994 and was completed in 1996. The industrial processing facilities were constructed between 1996-7. At present 2 buildings have been completed, one of which, a T-shirt manufacturing factory, is already partially operating, with about 150 employees.

About 10,000 people are going to be employed when fully in operation. The products are transported through either Tegucigalpa's Airport or Puerto Cortés harbor (to the north) and Henecán (to the south).

According to the administrators, the main problem they now face is the unreliable power supply; until recently there was at least one full day of power failure per week. This is because there is only one power plant, located in Col. Santa Fe, that supplies electricity to the whole of Tegucigalpa. Nevertheless, ENEE plans to construct a generation plant nearby in the future.

It is thought the Industrial Parks in Amarateca will not be fully operational until problems related to power supply have been rectified. Other utilities have already been installed, ready for use, such as water supply (groundwater), and telephone. Wastewater is treated before it is discharged into natural waterways. At present waste collection is conducted using a small dump truck, that makes one trip per month to the AMDC's final disposal site. There is an incinerator for textile scraps. The collection service is due to be expanded according to the enlargement of the Industrial Park.

In recent years, a plan to establish an Industrial Park within the urban area of Comayaguela was underway, however, because the proposed site was located inside the Los Laureles Dam watershed environmental permission was denied.

Thus the operation of the Industrial Parks within the Central District may proceed much more cautiously in comparison to that of San Pedro Sula. Also it is likely that only the first planned Industrial Park in Amarateca may be fully operational by the target year of the present study (2010).

b.3 Free Trade Zones (FTZ)

On July 21st, 1976, the Free Zone of Puerto Cortés was created under Decree No. 356. Later, the program was expanded to include areas of Amapala, Tela, Choloma, Omoa, Ceiba, the Central District, Choluteca, Danlí, Juticalpa, Santa Rosa de Copán, Santa Bárbara, and El Progreso.

The law authorizes the establishment of commercial and industrial corporations for export and related or complementary national and foreign activities. It allows the introduction of machinery, equipment, raw materials and accessories for the production and packaging of manufactured goods, all of which are exempt from payment of tariffs, charges and surcharges, consular rights, municipal and district taxes, income and sales taxes, consumption tax and also taxes and charges related to the activity of importing and exporting merchandise.

The number of people employed in the Free Zones is shown in Table 1-28.

Table 1-28: Number of Employees of Free Trade Zones in Honduras (April,98)

No.	Name of Free Trade Zone	No. Direct Employees
1	FTZ Victoria	150
2	FTZ Galaxy	400
3	FTZ CHIP	3,200
4	FTZ Puerto Cortés	5,000
5	FTZ Inhdelva	8,300
TOTAL:		17,050

Source: 1) Users of the Industrial Parks, Ministry of Industry and Commerce, Directorate of Productive Sectors. 2) Source: Information from the Honduras Association of Maquiladores

1.2.6 Education

Table 1-29 shows the illiteracy rates for the 18 departments. The illiteracy rate of the Central district is 7.0%, while the average illiteracy rates of whole country are 17.4% for urban and 42.4% for rural areas.

Table 1-29: Illiteracy rate for each department

(Unit:%)

No.	Department	Urban	Rural
1	Atlantida	13.3	38.1
2	Colon	21.1	36.0
3	Comayagua	17.4	38.0
4	Copan	26.4	53.4
5	Cortés	20.2	37.1
6	Choluteca	23.2	41.1
7	El Paraiso	20.3	44.8
8	Francisco Morazan	11.9	38.7
	Central District	7.0*	---
9	Gracias a Dios	0.0	34.7
10	Intibuca	16.1	44.6
11	Islas de la Bahia	9.0	11.8
12	La Paz	16.4	40.7
13	Lempira	25.2	55.8
14	Ocotepeque	22.6	45.4
15	Olancho	22.5	45.6
16	Santa Bárbara	30.1	48.5
17	Valle	24.6	38.4
18	Yoro	18.6	36.0
	TOTAL	17.4	42.4

Source: Censo Nacional de Población y Vivienda, 1988.
*Encuesta permanente de Hogares de Propósitos Múltiples, Junio 1997.

According to the same census, the literacy data for the Central District, belonging to the Francisco Morazan Department, are shown in Table 1-30:

Table 1-30: Literate Population for the Central District

Central District	Population 10 years or more	Literate Population					
		Total	1-3Years primary school	4-6 years secondary school	1-3 years secondary school	4-6 years secondary school	High education
Total	387,303	342,334	58,760	128,349	49,515	69,043	36,667
Male	174,696	157,147	27,047	58,503	23,521	27,168	20,908
Female	212,607	185,187	31,713	69,846	25,994	41,875	15,759

Source: Caracteristicas Generales de la Población y de las Viviendas por Barrios y Colonias del Distrito Central, Censo Nacional de Población y Vivienda, 1988,Tomo VI, Diciembre 1990.

From the previous table we find that the literacy rate is 88.4% in the Central District (90.0% male, and 87.1% female).

1.2.7 Community Structure

The urban area of the Central District is divided into 29 sectors. They are also divided into Barrios, that are located in the old urban area, or housing developments (Colonias), located in the new developments on the outskirts.

Some of the communities have organizations such as foundations (known as "patronatos") or associations ("asociaciones") or homemakers' clubs ("clubes de amas

de casa"). These organizations have a spokesperson who legally represent the communities before the authorities, for the purpose of requesting the execution of some public works or services.

1.2.8 Squatter Settlements

These are communities which usually are in the fringes of the urban area, and are in the earlier stages of integral development. They lack basic infrastructure such as access roads, water supply, sewerage, cleansing service, as well as some public facilities like schools, community centers, sport fields and health centers.

The number of squatter settlements began to increase from the 1960's, in comparison to previous periods. At present the expansion of squatter settlements continue, due to the following reasons:

- the precarious economical situation
- rural to urban migration
- excessive housing prices
- migration from other parts of the city where landslides and floods occur frequently.

The squatters usually settle on lands where the owners have no property titles. The people form their own organizations in order to seek assistance from the AMDC and to obtain legal rights to the land, and then proceed to look for financing and/or grants from national or international entities. In this way they execute basic services such as electricity, water supply, sewerage, etc. and finally become recognized as a developed urban area.

The present number of squatter settlements without any of the basic services is thought to be 47 out of 511 Barrios and Colonias of the Central District, representing 9% of the total. However, considering that some of the public services are already installed in some of these areas, the number of slums and semi-urban areas may rise to about 200 (40% of the total).

1.2.9 Religion and Customs

The Honduran Constitution guarantees the freedom of religion. Although for many decades, since independence in 1821, the official religion as stated by law, was Roman Catholicism, at present many others have been established, such as Evangelists, Saint of the Latter Days, Mormons, etc.

However, nearly 95% of the population still belong to the Roman Catholic Church. According to the Almanaque Mundial (World Almanac 1997) the various faiths in Honduras, today, are distributed as follows: Catholics 94.2%, Evangelists 1.3%, Eastern Orthodox 0.4%, Muslims 0.1%, Buddhists 0.2% and others 3.8%.

Some of the customs and celebrations practiced in Honduras have a religious symbol, such as Easter (March or April) and Christmas/New year (December/January). Other localized festivals such as the day of the Patron Saint of Teguchigalpa, Independence Day and International World Labor Day, as well as important events e.g. sports tournaments bring out a large crowd into the streets who often litter and create a transient increase in the amount of street waste generated. During festivities and

celebrations a large amount of waste is also discarded in public areas that originate from various decorations and other festive items, such as fireworks, palm leaves and confetti. These items accumulate in the streets and often add to the amount of waste produced in the city.

The ethnic division of the country is as follows: mestizo(mixed indian and european) 90%, indian 7%, white 1%, others (black; mulato; (mixed: european and black), zambo(mixed: indian and black)), 2%.

The official language is Spanish, however there are several local dialects like: miskito, garífuna, tawaka, pech, tolupán, xicaque, paya, lenca, sumo). The main language spoken by the foreign communities are English, Chinese and Arabic.

1.2.10 Public Health

The public health sector is integrated and its corresponding coverage is as follows: the Ministry of Health (50%), the Honduran Institute of Social Security (10%), the National Autonomous Service of Aqueducts and Sewerage, and some private institutions (10-15%).

The total coverage of the health system is about 75%, leaving 25% without any access to health services. As a result there are several areas with a high incidence of the following illnesses:

- Infant mortality
- Communicable diseases (infectious, respiratory)
- Nutrition related illness

Besides these traditional illnesses, cholera was introduced to Honduras at the beginning of the 90's that is still not eradicated; it has only been controlled by health campaigns and environmental hygiene. However, during March 1998, the illness re-appeared in the eastern region (La Mosquitia) killing at least 12 people.

1.3 Urban Structure

1.3.1 General Conditions

a. Historical Review

By 1578, Tegucigalpa had been a base of gold and silver mining settlements, the authorities of Guatemala from which it depended, decided to enhance the city to a "High Mayorship" ("Alcaldía Mayor"). Its first name was "Tusgalpa" meaning "silver hill" (cerro de plata). Due to the abundance of water and forest it centralized the domain of several neighboring Indian towns where there were mines like Santa Lucía, Cedros, El Corpus, San Antonio de Oriente and Yuscarán.

After many years of mining exploitation by the Spanish, the distribution of houses in the village expanded randomly. Later on, the city began to radiate with the churches at the center.

In 1762 it received the status of "Real Villa de San Miguel de Tegucigalpa y Heredia".

In 1791, when the first national population registry was compiled, Honduras was organized as 35 "curatos", and Tegucigalpa and Comayaguela were towns ("pueblos") of the Tegucigalpa "curato", been the first its head town.

Up to that time the capital of Honduras was Comayagua. Tegucigalpa became the capital in 1880 during the Government of Marco Aurelio Soto when it was moved to the present location because of the vicinity to El Rosario mines at San Juancito town.

In 1897 the city of Comayaguela was raised to the category of "city" and in the following year, it was integrated as a part of the capital city of Honduras.

In 1901 Tegucigalpa and Comayaguela appeared as one of the 25 municipios comprising the Department of Tegucigalpa.

In 1938 President Tiburcio Carías Andino merged both municipalities forming the "Central District" as one municipality of the Tegucigalpa Department. The name of this Department was finally changed in 1943 to "Francisco Morazan Department" as registered in the National Census from 1945.

b. Present Situation

At present, according to the "Plan de Arbitrios" (Tax Plan) of the AMDC for 1998, the Central District covers an area of 1,396.5 Km^2, through 59 sectors. Of these, 29 sectors are located in the urban (201.5 km^2) and 30 sectors in the rural areas. At the same time the urban area is divided into 5 areas as follows: El Pastel, El Picacho, Kennedy, Loarque, and Toncontin.

1.3.2 Land Use Conditions

At present the sole analysis on the land use conditions of the Study Area available is in relation to the Study of Improvement of the Urban Traffic System in Tegucigalpa, elaborated on 1996 under the cooperation of JICA, acting as a counterpart to the AMDC.

According to this study, land use in the Central District is divided into 5 categories. The largest is the open areas (68.5 Km^2) without any construction, including rivers, streams, steep slopes and forestry. However, the risk of landslides in slopes with a gradient over 30%, environmental obstacles like location of watersheds, etc. limit the usable land to about 20% (14.23 Km^2) of the total open area.

The following are residential areas, with an average density of 196 persons/ha. The commercial area includes small and large businesses in the center or housing developments. The public area include schools, hospitals, government buildings, parks and recreational centers, excluding military installations.

The existing land use condition in the Central District is shown in Table 1-31 and Figure 1-8.

Table 1-31: Present Land Use Condition in the Central District

Land Use	Open	Residential	Public	Commercial	Industrial	Total
km^2	68.5	34.4	5.4	9.9	0.7	118.9
(%)	57.64	28.94	4.54	8.30	0.59	100.00

Source: Improvement of the Urban Traffic System in Tegucigalpa, JICA, Nov. 1996

According to the above mentioned study, the scarcity of land which can be developed, implies that it will be quickly consumed after the year 2005.

The same study recommends the enlargement of land available for urban construction by using the following proposals:

- Relocation of Toncontin airport out of the city (for example in the zone of Talanga, where a Feasibility Study has already been performed by JICA in 1979). It would provide about 59 ha of land for commercial and residential use.
- Relocation of the military installations out of the city. It would provide about 300 ha.
- Transfer of government offices and concentration of its activity. Many of the activities of the governments that requires constant communication among the departments can be located out of the capital in order to obtain more space. At the same time the Government Civic Center zone (Centro Civico Gubernamental) has enough space to provide the necessary office space for the government.

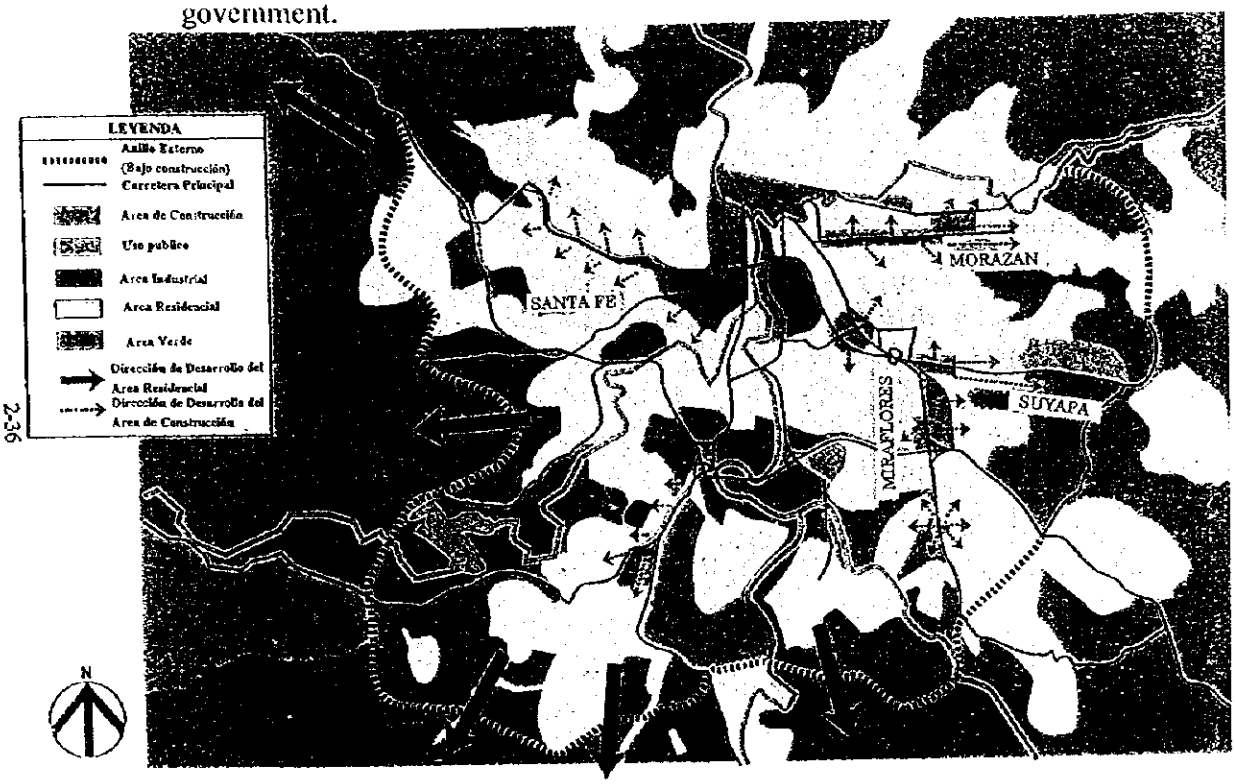

Figure 1-8: Present Land Use Conditions in the Study Area

(Source: Improvement of the Urban Traffic System in Tegucigalpa, JICA, Nov. 1996)

1.3.3 Mass Transit

In the city of Tegucigalpa there is only transportation by roads, there is no rail service due to the mountainous topography of the city.

The Metropolitan Development Plan (METROPLAN) of the AMDC in 1975 established five categories for the urban road network, defining design criterions as shown in Table 1-32. The five categories are defined as follows:

I) Regional Distributor: Has the purpose of accelerating the traffic from national, regional and metropolitan districts to the urban area, and are part of the national road network.

II) Main Distributor: Has the purpose of channeling the traffic to and from the city, connecting the regional distributors with the urban network.

III)Sectoral Distributor: Distributes the traffic into residential, industrial and business areas (including the center).

IV)Local Distributor: Serves to connect the traffic starting and ending in the barrios or other specific areas.

V) Access Road: Provides access to plots, connecting it with the local distributors.

Table 1-32: Basic Urban Road Design Criteria in the Central Distr\ct

Category	Designation	Design Speed (Km/h)	Max. Long. Gradients
I	Regional Distributor	80	6 %
II	Main Distributor	60	8 %
III	Sectoral Distributor	50	8 %
IV	Local Distributor	40	10 %
V	Access Road	30	12 %

Source:Reglamento de Zonificación General METROPLAN, AMDC.1975.

1.3.4 Residential Classification

In 1975, METROPLAN of the AMDC divided residential areas to be developed into 8 types (R-1 to R-8). Four of these types are for one-family use and four for multi-family use. It also specifies the net density per hectare, dimensions of the plot, and parking requirements (Table 1-33). Sub-urban developments (U-R) are regulated and must have a minimum plot area of 1,000 m^2. Further sub-division of these developments is prohibited.

Table 1-33: Residential Classification in the Central District

Type	Condition	Net Density (Inh/ha)	Minimum Area (m^2)	Front length (m)	Occupation Factor	Construction Index	Front/ Depth	Parking (Vehicles)
R-1	one-family	150	400	15	0.5	1.0	1:3	2 >240m2 const. area 1 if less
R-2	one-family	400	150	10	0.6	1.0	1:3	1
R-3	one-family	600	100	8	0.8	1.5	1:3	1
R-4	one-family	800	60	6	0.8	1.5	1:3	0
R-5	multi-family	1,000	60 400	6 15	0.3-0.7 0.3-0.7	2.5 2.5	1:3 1:3	1 1
R-6	multi-family	700	60 400	6 15	0.5-1.0 0.5-1.0	7.0 7.0	--- 	1 1
R-7	multi-family	700	---	---	---	---	---	---
R-8	multi-family	2,000	---	---	0.25	1.0	---	1/8
U-R			1,000		0.2	0.4		

Source:Reglamento de Zonificación General. METROPLAN, AMDC.1975.

Finally another classification of population center acknowledge by METROPLAN, is the "invasions" or illegal settlements, which is land appropriated by a group of people living in slum areas within the Central District. The register from 1965, covers about 85 barrios (15% of total), however it is estimated that about half of them have already been legalized and are under development, acquiring several basic public services.

A summary of the actually registered types of residential areas in the Central District are shown in Table 1-34.

Table 1-34: Register of Residential Classification in the Central District

Type	Number of Barrios	%
R-1	72	12
R-2	75	13
R-3	61	10
R-4	274	47
R-5	3	1
R-6	-	-
R-7	-	-
R-8	1	0
U-R	13	2
Invasion (from 1965)	85	15
TOTAL	584	100

Source: METROPLAN, AMDC.1998.

1.4 Financial Conditions

1.4.1 Financial Status of the Central Government

Table 1-35 shows the net calculation of the public finances (SPNF) in Honduras, with the exclusion of transfers between the central government, decentralized institutions and the local governments.

Table 1-35: Public Sector Finances in 1997

(Unit: Million Lps.)

	SPNF	Central Government	Decentralized Institutions	Local Governments
Current Revenue	17,955	10,352	8,411	760
Current Expenditure	13,736	9,864	5,200	601
Capital Revenue	222	3	435	877
Capital Expenditure	5,059	2,605	2,041	1,296
Recovery of Interests	29	391		
Deficit (-) or Surplus (+)	-589	-1,723	1,606	-260

Source: Memorial 1997, BCH

The SPNF deficit in 1997 was 65% less than the previous year, at Lps.589 million (1.0% of the GDP). Although financial conditions were in the red until 1995, the decentralized institutions recorded a surplus in 1996, and the deficits of the central and local governments were reduced as well. The ensuing sections detail the financial condition of the central government.

a. 1997 Revenue and Expenditure

The revenue and expenditure in 1997 showed a deficit of Lps. 1.7 billion (2.8% of the GDP). The 1997 deficit was 5% lower than 1996 (Lps.1.8 billion). This is because current revenues increased by 30.6% while current expenditure increased only 28.8%. Foreign loans covered the 82% difference.

b. 1997 Tax Revenues

The tax revenue for 1997 was Lps.1,680 million higher than the previous year, as it totaled Lps.8,652 million. Direct taxes contributed Lps.2,512 million, indirect taxes Lps.3,984 million, and tariffs a total of Lps.2,156 million. Income tax makes up 91% of the direct taxes. 58% of the indirect taxes is attributed to tax on general sales.

c. Budget of Related Ministries

The table below shows the changes in budgets of the Ministry of Health and the Ministry of Natural Resources and Environment.

Table 1-36: Changes in the Budget of Related Ministries

(Unit: Million Lps.)

Year	1996	1997		1998
Ministry	Executed	Budget	Executed	Budget
Total	10,881	12,998	13,477	15,439
Ministry of Health	1,005	1,137	1,187	1,337
Ministry of Natural Resources and Environment	398	690	173	403

Source: Memoria 1996, Republica de Honduras Secretaria de Hacienda y Credito Publico
La Gaceta, 31 December 1997 and 31 December 1996 Information from Ministry of Finace

1.4.2 Financial Status of the Local Government

a.1 Overview

Table 1-37 shows the changes in revenue and expenditure of the AMDC. Reliability of these data are questionable due to the recent political transition in January 1998.

Table 1-37: The changes in the AMDC Budget

(unit: 1,000 Lps)

	1995	1996	1997			1998
	executed	executed	approved (a)	executed* (b)	(b/a) %	Executing Budget
Revenue	125,794	153,491	253,900	184,854	72.8	290,420
- Current	109,279	124,785	n.a.	156,860		211,420
- Capital	16,515	28,706	n.a.	27,994		79,000
Expenditure	133,362	181,923	253,900	202,130	79.6	313,677
- Head & Staff	n.a.	44,059	51,233	55,098	107.5	81,455
- Public work	n.a.	45,004	64,833	57,775	89.1	110,839
- Urban and social development	n.a.	35,427	56,396	53,233	94.4	38,500
- Transfer	n.a.	7,180	10,714	11,579	108.1	35,500
- Public debt	n.a.	50,253	70,724	24,445	34.6	47,383
Balance	-7,566	-28,432	0	-17,276	60.8	-23,257

Note: The figures from the budget executed in 1997 were reported by the former municipality.
Source: Financial Department of AMDC

In 1997, while the revenue only reached 73% of the budget, the expenditure amounted to 80% of the budget, leading to a deficit of Lps.17 million. In comparison with 1996, although the shortfall in revenue remained at 60%, the deficit was for the third consecutive year. As a result, as of February 1998, the deficit amounted to Lps.389 million, which is equivalent to twice the revenue in 1997. Since the executing budget for 1998 shows the same tendency, the financial reconstruction of the AMDC is an urgent issue.

a.2 Present Situation and Problems Related to Municipality Tax Collection

In this section, the amount of fixed property tax and business income tax billed in 1997 were compared with the actual amount collected. Regarding personal income tax, the potential taxable amount was calculated by multiplying the number of those in employment per income level by tax rates per income level. For the business income tax, 75% of the amount billed in 1998 was assumed as the potential taxable figure in 1997. Using the same method as the property tax and business income tax calculations, the potential waste collection fee figures were calculated. Regarding other taxes, 75% of the estimated amount of tax to be collected in 1998 was assumed to be the potential taxable amount. Table 1-38 shows the results of the collection rate obtained from these comparisons.

Table 1-38: The Comparison of Potential of Tax Charged and Tax Actually Collected in 1997

Items		Potential (1,000 Lps.)	Executed (1,000 Lps.)	Collection Rate (%)
1.Direct tax		137,377	83,324	60.7
- Property tax		50,550	19,694	39.0
- Personal income tax		21,200	9,818	46.3
- Business income tax		65,252	53,812	82.5
- Cattle tax		375	0	0.0
2.Indirect tax		53,250	22,073	41.5
- Vehicle registration tax		22,500	6,955	30.9
- Other indirect taxes		8,250	2,308	28.0
- Recovery & Fines		22,500	12,810	56.9
3.Public service fees		42,396	31,364	74.0
- Waste collection fee	with property tax	14,440	7,033	48.7
	with business income tax	17,456	12,833	73.5
- Other service fees*		10,500	11,524	109.8
4.Rental fee & others		18,750	20,099	107.2
- Market		4,500	88	2.0
- Others		14,250	20,011	140.4
Total current revenue		251,773	156,860	62.3

Note: *The figure includes fees for firefighters.
Source: Financial Department of A.M.D.C.

The following points were clarified from the above table:

1) Only 39% of the amount billed for property tax was collected. The Cadastre Section sent bills for 1997 together with taxes on property, waste, and firefighters. In Tegucigalpa, 125,112 residences are subject to property tax, however, only 64,399 homes are resided by the owners (The total firefighter tax billed was 4 million Lps. and the collection rate was 126.5%.).

2) In 1997, 46% of the personal income tax was collected.

3) The business income tax collection rate was 83%. Monitoring the collection of business income tax is difficult since it operates under a declaration system. In 1998, Lps.83,853,667 were billed to 14,186 companies.

4) Compared with the above, 49% of the waste collection fee was collected by joint billing with property tax, and 74% with business income tax. This illustrates that the enhancement of the efforts to collect property tax secures 1.6 times the finances of the current waste collection fee. Furthermore, if collection measures for the business income tax were more rigorous, Lps.30 million can be secured as a financial source.

Since the collection of municipal taxes has compelling force, the low collection rate of property taxes indicate that follow-up systems for unpaid bills are not in place. Unless this aspect of fee collection is improved, the reconstruction of the municipal finances will be an impossible task.

1.4.3 Taxation System

a. National Taxation System

a.1 Overview

In this section, the structures of the present national taxation system are summarized.

The national taxation system in Honduras is composed of:

- **direct taxation;** such as taxes on income, ownership, net activities. However, income tax is the major source of direct taxation.
- **indirect taxation;** such as taxes on production, consumption, sales, and special services. Taxes on production, consumption, and sales are divided into two categories: tax related with production, consumption, and sales of beer, liquor (including rum), petroleum products, soft drinks and cigarettes, and general sales tax.
- **taxes on international trade** including customs tariff and export tax.

a.2 Income tax

Income tax is levied on income gained through commercial activities or provision of labor regardless of whether they are companies or individuals. Revenues of individuals are subject to progressive taxation as shown in Table 1-39.

Table 1-39: Income Tax Rate as of February, 1996

Range of Annual Income		Income Tax Rate
From	To	%
Lps. 0.01	Lps.50,000.00	0
Lps.50,000.01	Lps.100,000.00	10
Lps.100,000.01	Lps.200,000.00	15
Lps.200,000.01	Lps.500,000.00	20
Lps.500,000.01	Lps.1000,000.00	25
Lps.1,000,000.01	and over	30

Note: Severance payment, vacation bonus, "13th Month Pay", and "14th Month Pay" are tax exempt.
Source: "Ley del Impuesto sobre la Renta", DEI

Profits made through business activities are also subject to progressive taxation as shown in Table 1-40. There are some controversial conjectures that this system dissuades the companies from making better performances.

Table 1-40: Net Profit Tax Rate

Yearly Income	
Lps.0 - Lps. 100,000	15%
Lps.100,001 - Lps. 500,000	35%
Lps.500,001 - Lps. 1,000,000	35% plus 10% on anything over Lps.500,000
Lps.1,000,000 and over	35% plus 15% on anything over Lps.1,000,000

Source: "Ley del Impuesto sobre la Renta", DEI

a.3 Sales Tax

In June 1998, the general sales tax rose from 7% to 12% and that for alcohol and cigarettes increased from 10% to 15% as well.

a.4 Export Tariffs

Export tax is 1% of FOB price. However, tax on bananas is scheduled to be canceled. Tax rates for customs tariff vary depending on the goods. However, tax rates are to be lowered gradually according to different categories by 2000 based on the Central American Agreement.

b. Local Tax

Local tax can be classified into local tax, fees, and contributions under the municipality law. In Tegucigalpa's Central District, there is a broad spectrum of fees that are imposed. There are 30 types of service fees and if rental fees are included, there are 47 types of fees. Major municipality taxes related with waste fees are examined in this study.

b.1 Property Tax

The property tax is a local tax imposed on real estate and houses. Property valuations are reviewed every five years. In urban areas, the tax rate is 0.35% of the valuation amount. However, for property resided by the owner, a property value of up to Lps.100,000 is exempt. Property tax is generally collected in August. Waste collection fee for households is jointly billed with the property tax.

b.2 Personal Income Tax

Personal income tax is the local tax imposed on an individual's income. It is different from the national income tax and is levied on income of Lps.1 and upwards. As shown in Table 1-41, personal income tax follows a progressive taxation system.

Table 1-41: Tax Rate of Personal Income Tax

Range of Annual Income		Per thousand
From	To	
Lps.1.00	Lps.5,000	1.50
Lps.5,000.01	Lps.10,000	2.00
Lps.10,000.01	Lps.20,000	2.50
Lps.20,000.01	Lps.30,000	3.00
Lps.30,000.01	Lps.50,000	3.50
Lps.50,000.01	Lps.75,000	3.75
Lps.75,000.01	Lps.100,000	4.00
Lps.100,000.01	Lps.150,000	5.00
Lps.150,000.01	and over	5.25

Source: "Plan de Arbitrios", La Gaceta, 27,Dec.,1997

b.3 Business Income Tax

The business income tax is a local tax imposed on the revenue generated through a company's activities and the tax rates are variable depending on the revenue as shown in Table 1-42. Except for the residential waste collection fee, the waste collection fee shall be collected together with the business income tax every month.

Table 1-42: Tax Rate of Business Income Tax

Range of Annual Income		Per thousand
From	To	
Lps.0.01	Lps.500,000	0.30
Lps.500,000.01	Lps.10,000,000	0.40
Lps.10,000,000.01	Lps.20,000,000	0.30
Lps.20,000,000.01	Lps.30,000,000	0.20
Lps.30,000,000.01	and over	0.15

Source:Reglamento de Ley de Municipalidades, 1993

1.5 Environmental Policy

1.5.1 National Environmental Action Plan

On 1993 the Secretariat of Environment (SEDA), developed the Environment and Development Action Plan.

The Action Plan identified the main environmental problems as water and soil pollution, and solid waste disposal. The pollution is produced by physical and chemical pollutants, which solid waste is one. As a result, contamination of water and soil by biological agents promote the spreading of infectious diseases and others transmitted by mosquitoes and flies like malaria, dengue, etc.

Thus the objectives of the Action Plan are to reduce the concentration of pollutants in the water and soil, through prevention and mitigation programs and to promote programs and pilot projects for manual sanitary landfills at a municipal level. Also the Action Plan aims to provide health and sanitation services to a larger portion of the population, such as: basic sanitation, water supply, collection and disposal of solid waste.

1.5.2 Organizations Concerned

The institutions concerned with the solid waste management are the following:

- Municipality of the Central District (AMDC)
- Secretariat of Public Health and Social Welfare (SSP)
- Secretariat of Natural Resources and Environment (SERNA)
- Secretariat of Government and Justice, and the municipalities
- National Service of Aqueducts and Sewerage (SANAA)
- National Enterprise of Electricity (ENEE)
- National Agrarian Institute (INA)
- Honduran Forestry Development Corporation (COHDEFOR)

Some community based and private institutions as well as NGO's also have promoted and executed hygiene and sanitation activities such as seminars, workshops and publicity campaigns to raise public awareness on the risks related to environmental pollution. Among these institutions are:

- Honduran Ecological Association (Asociación Ecológica Hondureña)
- Committee for the Conservation and Improvement of the Environment
- Rotary Club (Club Rotario)
- Lions Club

- Chamber of Commerce and Industry
- Junior Chamber
- PHYSYS
- PEPSI
- A CURACAO
- Telesistema Hondureño
- TACA International

1.5.3 Legislation

Environmental legislation has been consolidated since the publication of the General Law of Environment in 1993 (Decree 104-93) and its by-laws (Decree 109-93). It enabled the creation of the Secretariat of Environment, which in 1997 was combined with the Secretary of Natural Resources, forming the Secretariat of Natural Resources and Environment (SERNA).

Regarding solid waste collection, the Environmental Law promotes the municipalities to adopt a system of collection, treatment and final disposal of waste, including the possibilities of re-utilization and recycling (Art. 67).

Other laws that take environmental issues into account are:

- Law of Municipalities (Decree 134-90) and its by-laws (Ac. 018-93).
- Regulations on the National System of Environmental Impact Evaluation, and the forestry and agricultural related laws.
- Sanitation Code, Decree 65-91 (Código Sanitario, Decreto 65-91):

Regarding solid waste, the sanitation code states that is the municipalities' obligation to organize, contract and bear responsibility for the cleaning, collection, treatment and final disposal of waste (Art. 52).

It also states that the operation of final disposal sites require prior authorization by the corresponding municipality with the approval of the Public Health Secretariat (Art. 53).

- Sanitary Regulations on Environmental Sanitation (Reglamento Sanitario de Saneamiento Ambiental)
- Police Law
- Law of AMDC Taxes ("Plan de arbitrios" de la AMDC)

1.6 Public Utilities

1.6.1 Water Supply

The national water supply coverage rate steadily rose during the 1985-95 period, from 62% in 1985 to 77% in 1995. The improvement has been greater in rural areas with an increase from 45% in 1985 to 66% in 1995 (Table 1-43). The lack of coverage in the urban areas (9%) correspond to the marginal or slum areas.

Table 1-43: Water Supply Coverage, 1985-95

Item	1985		1990		1995	
	persons	%	Persons	%	Persons	%
National						
with water supply	2,763,562	62	3,089,817	65	4,211,815	77
without water supply	1,724,289	38	1,665,723	34	1,250,980	23
Urban Area						
with water supply	1,514,623	86	1,705,180	88	2,207,188	91
without water supply	248,617	14	230,325	12	218,293	9
Rural Area						
with water supply	1,206,316	45	1,384,637	49	2,004,627	66
without water supply	1,505,672	55	1,435,398	51	1,032,687	34

Source: Honduras 2005: Construyendo nuestro progreso, Proposal. UDAPE, Feb. 1998.

In the Central District SANAA supplies services to 81,614 clients. In the Central District, those who have no access to SANAA's services, are supplied by the private sector (water tankers and wells), that is much more expensive and of poorer quality than SANAA's service.

1.6.2 Sewerage

In the period between 1985 - 1995, the sewerage service has covered a larger population than water supply, expanding from 59% in 1985 to 82% in 1995 nationally. Also the improvement has been greater in rural areas with an increase from 38% in 1985 to 71% in 1995 (Table 1-44). The 5% deficit in coverage of urban areas correspond to the marginal or slum areas.

Table 1-44: Sewerage Service and Sanitation, 1985-95

Item	1985		1990		1995	
	Persons	%	Persons	%	Persons	%
National						
with sewerage serv.	2,631,434	59	2,924,657	62	4,453,610	82
without sewerage ser.	1,843,794	41	1,830,883	38	1,009,185	18
Urban Area						
with sewerage serv.	1,548,125	88	1,728,406	89	2,293,690	95
Latrine or blind well			674,078	35	1,078,034	41
without sewerage ser.	215,115	12	1,850,371	39	131,791	5
Rural Area						
with sewerage serv.	1,083,309	38	1,196,251	41	2,159,921	71
without sewerage ser.	1,628,679	62	1,646,272	59	877,393	29

Source: Honduras 2005: Construyendo nuestro progreso, Proposal. UDAPE, Feb. 1998.

1.6.3 Roads

Table 1-45 shows the present road conditions in the Central District.

Table 1-45: Classification and Condition of Roads in the Central District

Category	TOTAL	Paved Network						Unpaved
		Concrete Blocks (Adoquin)	Hydraulic Concrete	Asphaltic Concrete	Simple Sealed Surface	Stone Paving	Total Paved	
Primary (km)	77.83	----	2.62	75.21	----	----	77.83	----
Secondary(km)	343.18	36.18	73.51	151.56	0.18	6.66	268.09	75.09
Tertiary (km)	251.38	4.05	15.27	7.17	----	1.89	28.38	223.00
Total (km)	672.39	40.23	91.40	233.94	0.18	8.55	374.30	298.09
Share	100%	5.98%	13.60%	34.80%	0.03%	1.27%	55.67%	44.33%

Source: Infrastructure Division, AMDC, March,1998 (unpublished data).

According to the table unpaved roads occupy a large proportion of the total (44%), which is mainly concentrated in the areas that have a steep gradient where access for collection service trucks is hindered. Also most of the paved roads observed are of asphalt concrete.

1.6.4 Priority Ranking for Infrastructure Investments

According to a study currently undertaken by METROPLAN to ascertain the present infrastructure conditions in the barrios of the Central District, water supply is the most widespread covering a larger number of barrios, followed by street lighting, primary schools and sewerage (Table 1-46). The least common are health centers, middle schools and community centers.

Table 1-46: Ranking of Present Infrastructure Investments in the Central District

	Sewer-age	Water Supply	Latrine	Street Lighting	Health Center	Kinder-garden	Primary School	Middle-High School	Community Center
Barrios No.	192	373	135	283	23	183	200	77	80

Source:METROPLAN, AMDC, 1998

Chapter 2

Waste Generation Amount Survey

2. Waste Generation Amount Survey

2.1 Objective

Knowledge of the amount of waste generated and its physical properties is essential for the development and design of integrated solid waste management systems.

The objective of the Waste Generation Amount Survey is to obtain the total amount of municipal solid waste (MSW) currently being generated daily in the urban area of the Central District.

The waste amount estimate is then applied to the waste stream (section 4.2), that is used to comprehend the current flow of waste and to make future projections.

2.2 Methodology

In order to calculate the amount of waste generated, residential and non-residential sources were examined separately. Emphasis was placed on the determination of the amount of residential waste generated, as this generally comprises the largest portion of MSW. Physical collection and analysis were the main methods used to determine residential WAGRs, while secondary sources were used to determine the non-residential WAGRs.

Major methods used in this study to estimate the amount of municipal solid waste generated in the Central District are:

- The Waste Amount and Composition Survey: employed to estimate residential waste generation rates.
- The Survey of Disposal Amount: used to verify seasonal variations in generation.
- Questionnaires and interviews: used to determine generation amounts from non-residential sources and to estimate the amount illegally disposed.
- Results of relevant recent studies: used to verify residential and non-residential generation estimations.

2.3 Waste Amount Generation Rates (WAGR) for Residential Waste

Waste amount generation rates (measured in grams of MSW/capita/day) for households in the Central District were estimated by undertaking the Waste Amount and Composition Survey (WACS). As the name suggests, the WACS estimates the amount of waste generated as well as the composition of MSW.

a. Initial Planning of WACS

The WACS was undertaken from the 9th to the 16th of February 1998, for households and markets of the Central District.

Because it is generally accepted that waste generation is proportional to level of income (i.e., higher incomes result in higher generation rates), it was desirable to undertake the WACS in areas representative of the income differences within the Central District. The urban region of the Central District is distinctly divided into three classes of residential areas: high, middle, and low income areas. So following a physical inspection of the Central District and discussions with counterpart staff, the following three *colonias* were selected as being representative, and surveyed.

Table 2-1: Sampling Areas and Points

Sampling Areas	Waste Category	No. of Points
Colonia Palmira	High Income	20
Colonia Lempira	Middle Income	20
Colonia Suazo Córdova	Low Income	20

The number of points (20 households) was selected to ensure that the accumulated size of the working sample would be large enough to give reliable and representative results. While on the other hand, the number of points that could be selected was limited somewhat by available resources.

The next step was to select households representative of the areas chosen, i.e., poor looking households were not chosen in high income areas and alternatively rich households were not selected in poor areas.

In the days leading up to the survey the survey team visited selected households to request cooperation and to gain the confidence of residents. More time was required in high income areas where the collection system appears to operate well. These residents, satisfied with their current service, were not sure why such a survey was necessary and may have been suspicious of the motives of the survey. During these initial visits a questionnaire was also filled out to obtain basic information necessary for the survey, such as the number of people that would be residing in the household during the survey period, whether they had regular collection service, recycling and disposal methods, etc.

b. Surveying

The first day of the survey, a Monday, was used as a trial run. Households, particularly in low income areas where service was irregular, had the chance to discharge any waste that may have accumulated. The trial also helped in sorting out other problems, such as a household who decided at the last minute not to participate.

Then on each of the following seven days between 7:00 a.m. and 3:00 p.m. the survey team visited each of the 60 households to collect bags of waste. The bags were immediately tied with different color string to identify the generation source, then weighed and recorded.

c. WACS Results

From the recorded weights and number of occupants per house, the residential WAGRs were calculated. The mean WAGRs for residential waste and a summary of statistical analysis are shown in Table 2-2.

The statistical analysis shows that the data tend to be peaked and slightly skewed, with a tail tending towards the positive. The positive Kurtosis indicates concentrated results (a sharp peak). While in regard to skewness, in general, some degree of positive skewness is common with solid waste generation data[1]. It therefore is assumed that the data are reliable.

Table 2-2: Statistical Analysis of WACS Data

WASTE CATEGORY	Low	Middle	High
Mean	262 grams	274 grams	433 grams
Kurtosis[2]	37.95	3.15	5.19
Skewness[3]	5.12	1.44	1.92
90% Confidence Limits	±53grams	±38grams	±57grams

d. Verification of WAGRs

The WAGRs were then compared to rates obtained for other cities in Latin America, and also to those obtained by other studies carried out in the Central District:

- the recent IPES-IDNS (1996) study entitled *Produccion y Gestion de los Residuos Solidos Urbanos en La Ciudad de Tegucigalpa*, December 1996;
- a paper presented at the 12th Central American Congress on Sanitary and Environmental Engineering by JORGE A. RODRIGUEZ, entitled *Procesamiento Estadistico de Datos Para Determinar La Generacion de Basuras per Capita en el Distrito Central*, April 1979.

Table 2-3: Residential WAGRs from other Studies

Unit: g/cap/day

Waste Category	IPES-IDNS wet season, 1996	Rodriguez wet season, 1978	Managua[4] dry season, 1994	Asunción[5]
High Income	673	646	682	961
Middle Income	-	387	628	-
Low Income	387	268	657	-

Compared to these WAGRs (Table 2-3) the rates obtained in this study appear to be lower, the results of the IPES-IDNS study, the Rodriguez paper, and the Managua study are all approximately greater by 50%.

However, when comparing results it should be noted that the previous waste generation surveys done in the Central District were carried out towards the end of the rainy season; IPES-IDNS undertook their survey in September of 1996, and Rodriguez surveyed in August-September of 1978. While this study was carried out in February, which is in the middle of the dry season.

---

[1] Tchobanoglous, George. Integrated Solid Waste Management. 1993.
[2] Degree of Peakness. Zero indicates normally distributed data. A positive result indicates peaked data and a negative result indicates that the curve is flat.
[3] Zero indicates normally distributed data. A positive result indicates data skewed so that the tail trails of to the positive direction.
[4] Kokusai Kogyo. The Study on the Solid Waste Management System of the City of Managua, Final Report. May 1995.
[5] Kokusai Kogyo, The Study on the Solid Waste Management for the Metropolitan Area of Asunción in the Republic of Paraguay, March 1994.

The difference in the WAGRs is therefore assumed to be a result of seasonal variation. This was further confirmed on inspection of Cleansing Department disposal records.

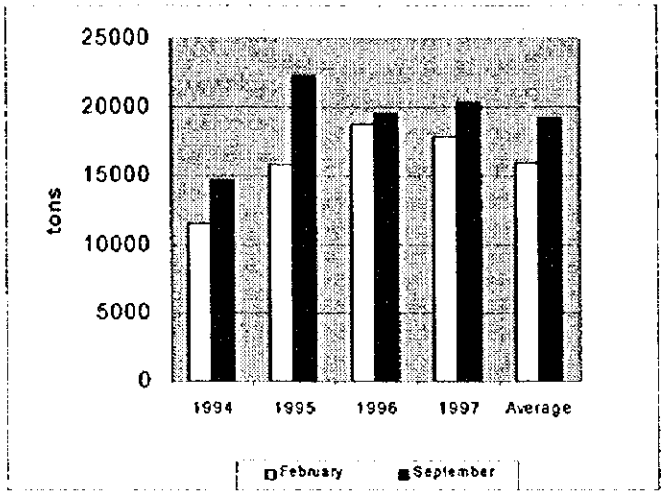

Figure 2-1: Comparison of February and September Monthly Disposal Amounts

Although there are many factors that may influence the Cleansing Department disposal records, and disposal amount is not necessarily representative of generation amount, Figure 2-1 clearly indicates that collection in September is greater than in February, on average 21% more in September. The apparent consistency of the data confirms the assumption that residential WAGRs vary according to the time of year.

The difference could be attributed to a number of factors, one being that February is just after Christmas and people have little money left over and are not consuming as much as usual. Also, most Hondurans are catholic (97%) and February sees the beginning of lent, a traditional time of fasting leading up to Easter.

Moreover, this year one of the worst droughts in recent history has hit Honduras. In the southern part of the country farmers lost crops, which accounted for nearly 15% of Honduras' yearly production[6]. Less produce has made it to the market and therefore is not being consumed at the usual rates. Lower yields also mean that incomes are lower and there is less money to purchase goods with (Agriculture accounts for 28% of the GDP, more than 60% of the labor force and two thirds of exports[7]). Hence, this year's generation rates could be lower than usual.

Because we are interested in obtaining average values and not seasonal variations, the WAGRs obtained in the WACS were multiplied by a factor of 1.25. The magnitude of this factor was approximated based on the discussion above and confirmed when the generation amount was put into the context of the "waste stream" (see section

[6] Honduras This Week, pg 1, Feb 28, 1998
[7] CIA World Fact Book

4.2), which also takes into account collection, recycling, illegal dumping, and disposal amount.

e. Calculation of Residential Generation Amount

To determine the total amount of residential MSW the seasonally adjusted WAGRs shown in Table 2-4 are multiplied by the proportion of population in each waste category to give the amount of residential waste generated in the Central District.

Population proportions are calculated in Chapter 2. However, these populations were based on income bracket (see below) and not the proportion of the population residing in high, middle, and low income areas.

INCOME BRACKET	MONTHLY INCOME
Upper income bracket	> 5,001 Lps
Middle income bracket	between 2,501 and 5,000 Lps
Lower income bracket	< 2,500 Lps

Therefore, this study assumes that the mean generation of MSW in each area surveyed is equal to the mean generation of the respective income bracket. The POS (Question 1-6) confirmed the validity of this assumption by asking residents what is their monthly expenditure. It was found that the mean expenditures of high, middle and low income areas corresponds with the respective income brackets shown above.

The total amount of residential waste is shown in Table 2-4.

Table 2-4: Total Daily Residential Waste Generation

Waste Category	WAGR gr/cap./day	% of total population	Proportion of population	Waste generation amount tons/day
High income/upper bracket	541	20	169,772	92
Middle income/middle bracket	343	30	254,658	87
Low income/lower bracket	328	50	424,430	139
Weighted average	375	TOTALS	848,859	318

2.4 Determination of Commercial, Restaurant, Institutional, Market and Street Sweeping WAGRs

The determination of WAGRs for commercial enterprises, restaurants, markets, and institutions were estimated from the results of the POS. Managers of commercial enterprises, institutions, restaurants, and markets were asked how much solid waste their establishment generates. Averages of representative non-residential sources are shown in the Table 2-5.

Table 2-5: Average WAGRs according to POS data

Waste Category	Unit	WAGRs
Commercial	g/establishment/day	3,270
Restaurant	g/restaurant/day	24,900
Institution	g/employee/day	217
Market	g/stall/day	3,670

This method of determining the waste generation amount is rough, as many places do not keep precise records, and answers were given in terms of barrels, drums, bags, or truckloads per day. Thus to confirm the results obtained by the POS, the results were compared to data obtained from similar projects recently carried out in other Latin American cities (Table 2-6).

Table 2-6: Non-Residential WAGRs for other Latin American Cities

Waste Category	Unit	Asuncion[8]	Managua[9]	Leon[10]
Commercial	g/establishment/day	3,186	991	2,254
Restaurant	g/restaurant/day	31,958	15,166	16,457
Institution	g/employee/day	78	59	155
Market	g/stall/day	5,961	3,750	3,090

Even though Honduras has a GDP per capita similar to Nicaragua's, Honduras' Central District is more developed than the Nicaraguan cities; there are many more large supermarkets, shopping centers, fast food franchises, hotels, banks, etc. The shopping districts of the Central District are busier. People in the Central District are more likely to shop at supermarkets as well as in the main shopping centers and dine at restaurants than Nicaraguans, who are more likely to buy their goods from markets. It is therefore reasoned that the non-residential WAGRs in the Central District are higher than in the Nicaraguan cities.

On the other hand, Asuncion is more developed and GDP per capita is higher than the Central District. Therefore as a broad guideline, the actual non-residential WAGRs of the Central District are expected to lie somewhere between the WAGRs of Asuncion and the Nicaraguan cities.

a. Commercial Waste

Commercial waste includes waste discharged by retail and wholesale outlets (excluding market stalls), minimarkets, gas stations, printing shops, small workshops computer stores, supermarkets, hotels, beauty parlors, etc. The composition of the waste is varied but generally consists of packaging and container materials, used office supplies, and food wastes.

The unit used here to calculate generation amount is kilograms/establishment/day. According to the results of the POS question concerning the amount of waste discharge per day, the average discharge per shop is 3,270 g/establishment/day. This result appears reasonable when compared to the above data for other Latin American cities and therefore will be adopted as the WAGR for commercial waste.

The total number of commercial establishments in the Central is 17,504[11].

b. Restaurant Waste

There are 1,810 restaurants in the Central District[12]. This number includes all eating places, cantina bars, restaurants, cafeterias, etc.

[8] Ibid., Paraguay, 1994
[9] Ibid., Managua, 1995
[10] Kokusai Kogyo, The Study on the Improvement of Urban Sanitation Environment of Principal Cities in the Republic of Nicaragua, Final Report, 1997
[11] AMDC Computer Center, Quantity of Businesses by Economic Activity
[12] Ibid.

The WAGR of representative restaurants (24,900 g/restaurant/day) obtained from the POS results falls between the WAGRs for Asuncion and Nicaragua; 24,900 g/restaurant/day is therefore adopted.

c. Institutional Waste

Institutional waste consists of waste that originates from offices such as government ministries and departments, banks, lawyers' offices, real estate agents, accountancy firms, schools, hospitals, etc. It therefore consists of predominantly paper.

As is generally the case there exists an enormous variation in the sizes of different institutions in the Central District so a more suitable unit for the calculation of generation amount is expressed as grams/employee/day of waste.

The figure of 217 grams/employee/day calculated from POS results is significantly higher than figures of other Latin American cities. Therefore a lower figure is adopted, 100 grams/employee/day, as this is a more reasonable figure when comparing to WAGRs of other Latin American cities.

The number of employees working in this sector is 131,003[13].

d. Market Waste

This includes waste generated from one of the four main markets in the Central District. Market wastes consists mainly of food and produce waste, grasses, and other organic packaging materials.

The largest market San Isidro-Colon is chosen as being the most representative. In fact this market contains approximately 30% of all stalls in the Central District.

The unit used to calculate the generation amount is the number of market stalls. The value of 3,670 grams/market/day obtained by the POS and the data from other Latin American cities correspond.

There are an estimated 5000 stalls in all markets in the Central District.

e. Street Sweeping

Street sweeping waste includes all waste generated by the cleaning of streets, parks, and public places. Waste mainly consists of litter, soil, dust, and vegetation.

The street sweeping WAGR was determined by examining the amount currently collected and disposed. Each day the Cleansing Section assigns areas that need special attention in regard to cleansing (special routes). These areas include major streets and boulevards, markets, and other public areas where there are large amounts of uncollected litter.

During the week of the WACS, on average 180 km of road per day were cleaned resulting in a total of 28.53 tons of waste collected. It is therefore assumed that the WGAR of the street sweeping operation is 158.5 kg per km.

[13] Director General of Statistic and Census, Employees in the Central District

2.5 Summary of Results

The generation amount from all sources has been tabulated in Table 2-7.

Table 2-7: Generation Amount of MSW

Waste Category	Unit	WAGR	Number	Waste generation amount tons/day
Residential Waste				
High income	g/capita/day	541	169,772	92.9
Middle income	g/capita/day	343	254,658	87.4
Low income	g/capita/day	328	424,430	139.1
Total Residential				**318.4**
Non-Residential Waste				
Commercial	g/establishment/day	3,270	17,504	57.2
Restaurant	g/restaurant/day	24,900	1,810	45.1
Institutional	g/employee/day	100	131,003	13.1
Market	g/stall/day	3,670	5,000	18.4
Street Sweeping	kg/km/day	163.9	180	29.5
Total Non-Residential				**162.3**
Total Waste Generated Per Day				**480.6**

A population of 848,859 translates into a residential WAGR of 375 g/person/day and a MSW WAGR of 564 grams per Central District citizen per day.