Table 2.1.2 Annual Precipitation in Maputo City

RAINFALL(Total、mm/Month)

Year	Jan.	feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	Ave.
1990	325.6	52.4	163.3	17.5	25.3	1.1	0.4	24.3	1.0	31.5	28.7	210.1	881.2	73.4
1991	116.5	103.8	92.6	10.5	18.1	40.2	14.3	0.1	14.0	6.4	58.5	111.5	586.5	48.9
1992	44.3	36.0	29.7	1.2	9.8	21.9	8.7	0.5	2.9	6.0	73.0	307.5	541.5	45.1
1993									1.5	90.5	46.0	99.5	237.5	59.4
1994	112.2	31.1	47.0	52.3	11.2	7.0	0.1	10.5	14.4	76.8	48.5	47.0	458.1	38.2
1995	109.7	47.6	66.9	22.6	73.8	13.3	1.3	33.1	1.7	108.0	53.7	109.2	640.9	53.4
1996	308.4	189.2	36.4	53.2	84.3	5.3	11.5	11.9	0.8	3.2	44.0	146.1	894.3	74.5
1997	139.5	88.2	84.6	27.7	69.0	19.8	71.6	33.0	63.0	79.3	273.0	61.0	1009.7	84.1
1998	365.5	52.1	96.9	37.6	3.0	0.0	4.9	1.7	28.5	73.0	164.6	136.7	964.5	80.4
1999	100.4	263.8	97.8	65.8	9.2	14.6				161.5	162.6	124.2	999.9	111.1
2000	234.8	502.1	364.8	59.8	30.7	4.5	13.8	2.4					1212.9	151.6
Ave.	185.7	136.6	108.0	34.8	33.4	12.8	14.1	13.1	14.2	63.6	95.3	135.3	1053.4	74.6

RAINFALL(Max.、mm/day)

Year	Jan.	feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	Ave.
1990	112.6	16.2	70.8	8.0	24.7	0.7	0.2	16.6	1.0	11.9	20.2	75.2	358.1	29.8
1991	41.0	58.6	39.5	5.5	8.4	24.4	14.3	0.1	9.1	2.6	19.3	48.0	270.8	22.6
1992	33.0	19.1	14.3	1.2	9.8	16.9	7.2	0.5	2.1	2.9	24.7	134.0	265.7	22.1
1993									0.9	30.3	18.6	58.1	107.9	27.0
1994	61.2	15.6	20.1	28.2	4.9	7.0	0.1	10.5	14.4	39.0	26.5	20.0	247.5	20.6
1995	105.3	15.5	18.7	7.8	30.3	13.1	1.3	17.6	1.5	54.0	24.5	32.4	322.0	26.8
1996	77.7	150.6	22.4	22.9	46.3	5.3	4.9	6.5	0.8	1.2	38.1	61.0	437.7	36.5
1997	28.3	42.5	32.9	14.6	27.4	18.7	61.6	27.1	17.0	24.6	111.3	26.4	432.4	36.0
1998	197.8	18.8	48.5	14.8	3.0	0.0	2.6	1.4	10.5	17.9	54.4	40.7	410.4	34.2
1999	29.0	53.1	29.3	30.1	3.9	9.1				124.5	49.2	45.5	373.7	41.5
2000	93.7	243.0	80.3	19.2	16.4	1.8	7.0	1.5					462.9	57.9
Ave.	78.0	63.3	37.7	15.2	17.5	9.7	11.0	9.1	6.4	30.9	38.7	54.1	461.1	32.3

Source: National Meteorology Institute

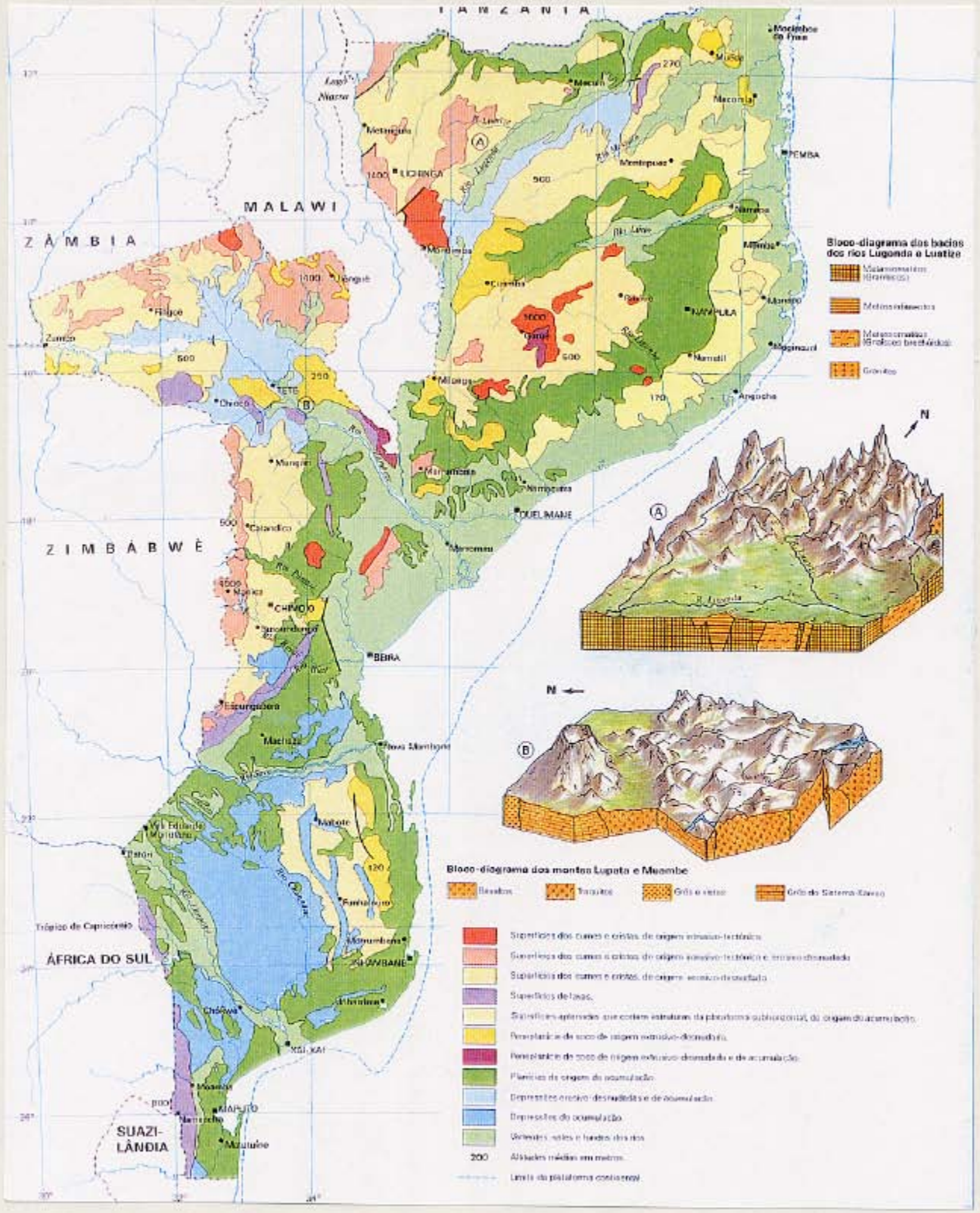


Figure 2.1.2 Geological Map

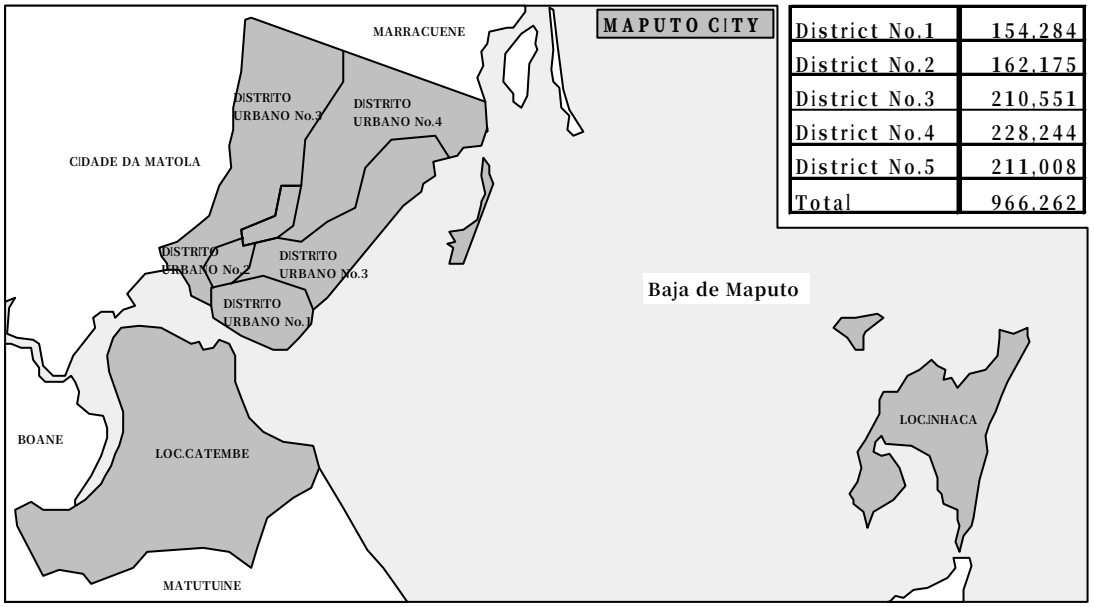
Source : ATRAS GEOGRÁFICO VOLUME 1 2a edição, revista e actualizada, Ministério da Educação

2.2 SOCIO-ECONOMIC CHARACTERISTICS

2.2.1 Administrative Structure of Municipal Council of Maputo

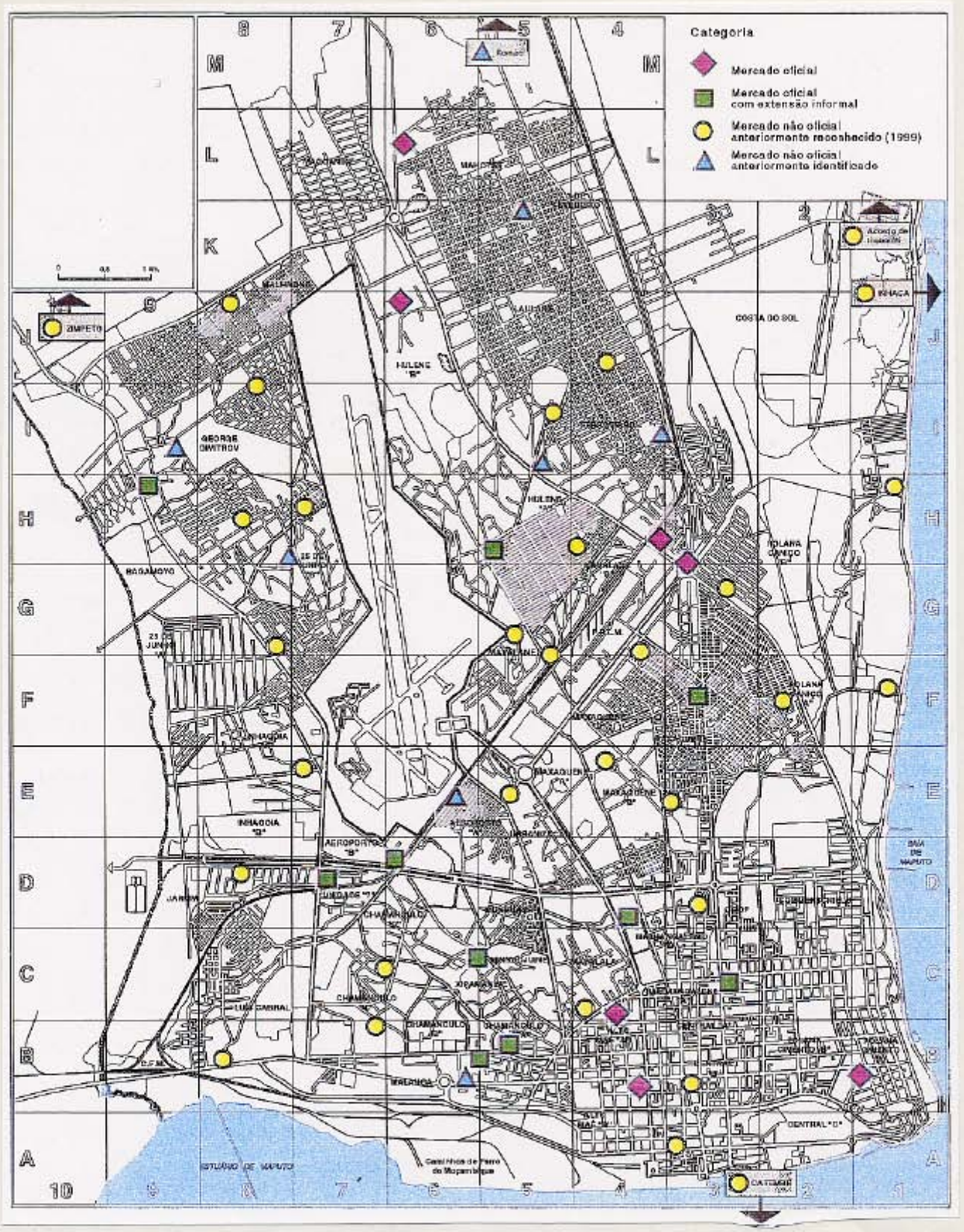
Maputo consists of five districts named as "Urban District No.1", "Urban District No.2", "Urban District No.3", "Urban District No.4", and "Urban District No.5." (See Figure 2.2.1)
Public and cultural facilities are shown in Figures from 2.2.2 to 2.2.6.
Urban District No.1 includes the old city and municipal office, embassies, major educational facilities and hospitals, and a commercial area. Most of the cultural facilities are located in this district.

Urban District No.2 is located on the western side of Urban District No.1, in which the Road and Bridge Department and Water and Sanitation Department, which are in charge of this project, locate their offices. Urban District No.3 on the northern side of Urban District No.1 contains a lot of private markets. Urban District No.4 on the further northern side of Urban District No.3 contains public markets. Urban District No.5 is on the western side of Maputo and in the neighborhood of Matola. There are several private markets and three universities.
In line with a decentralization policy, the Government of Mozambique is delegating a great deal of administrative authority to Maputo. The Municipal Administrative Organization revised in November 2000 is shown in Table 2.2.1.



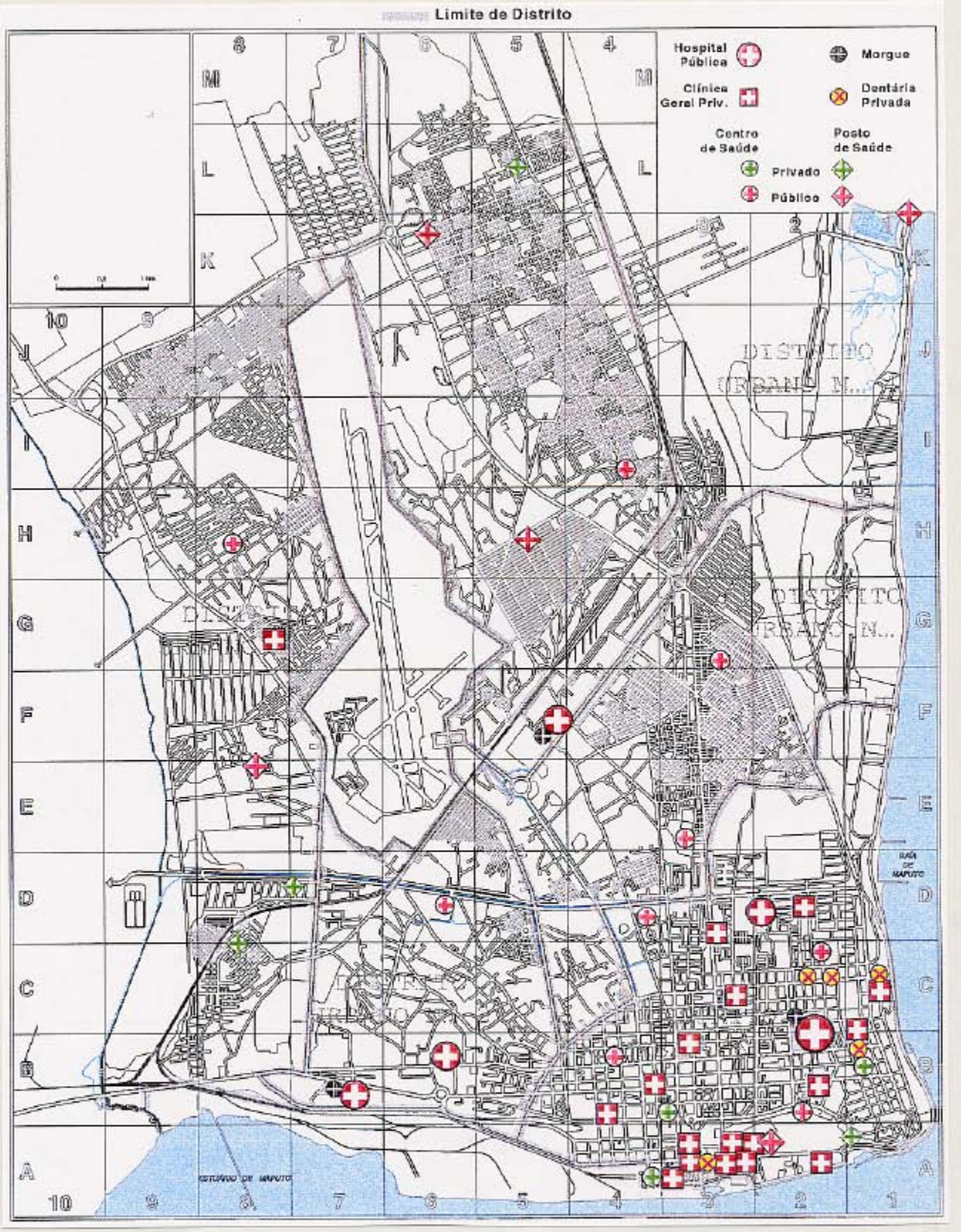
Source : Anuário Estatístico 1998 Cidade de Maputo, Instituto Nacional de Estatística

Figure 2.2.1 Location of administrative districts and population



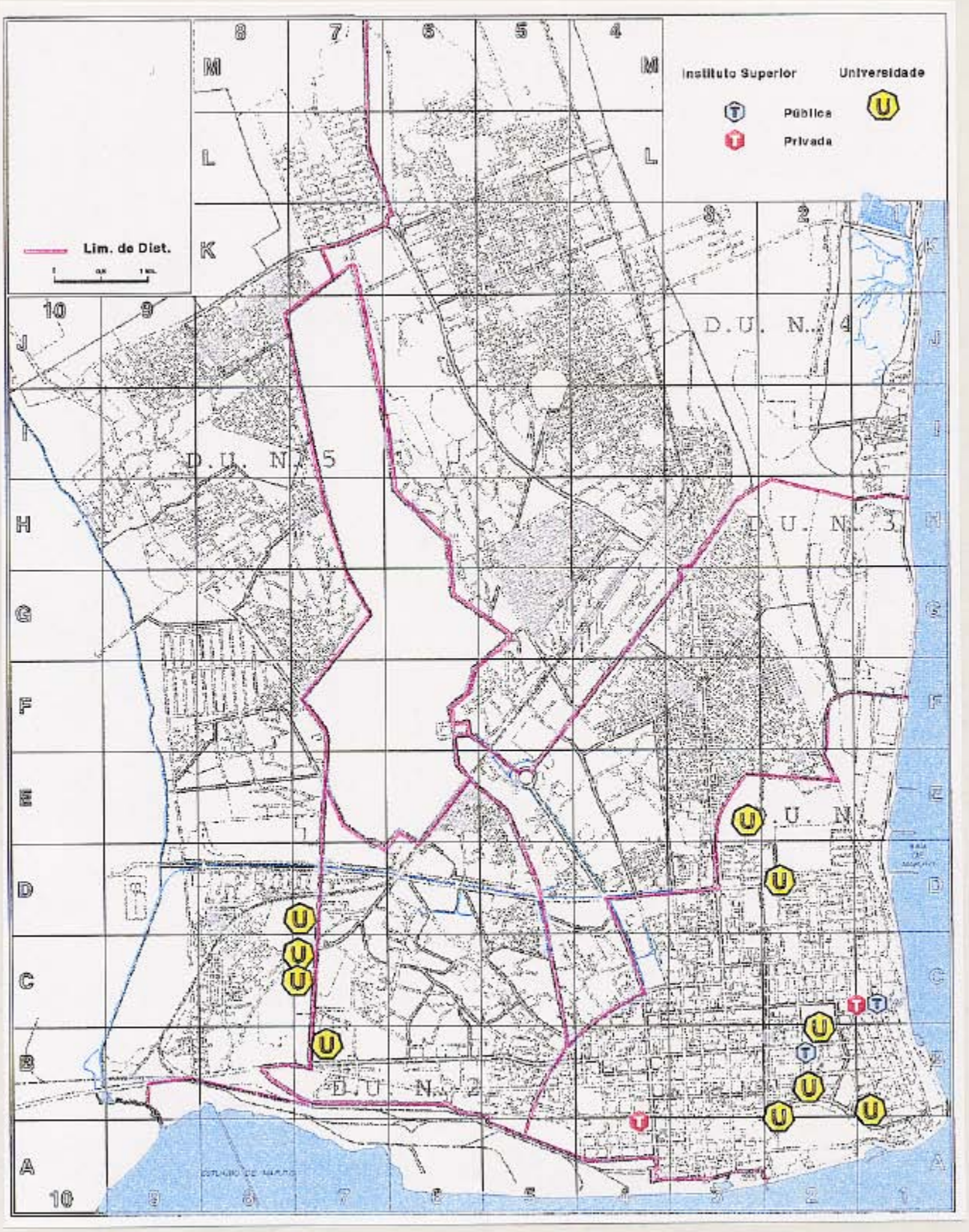
Source: Conselho Municipal de Maputo Gabinete dos Serviços Municipais de Endereçamento

Figure 2.2.2 Location of Commercial Facilities (Market)



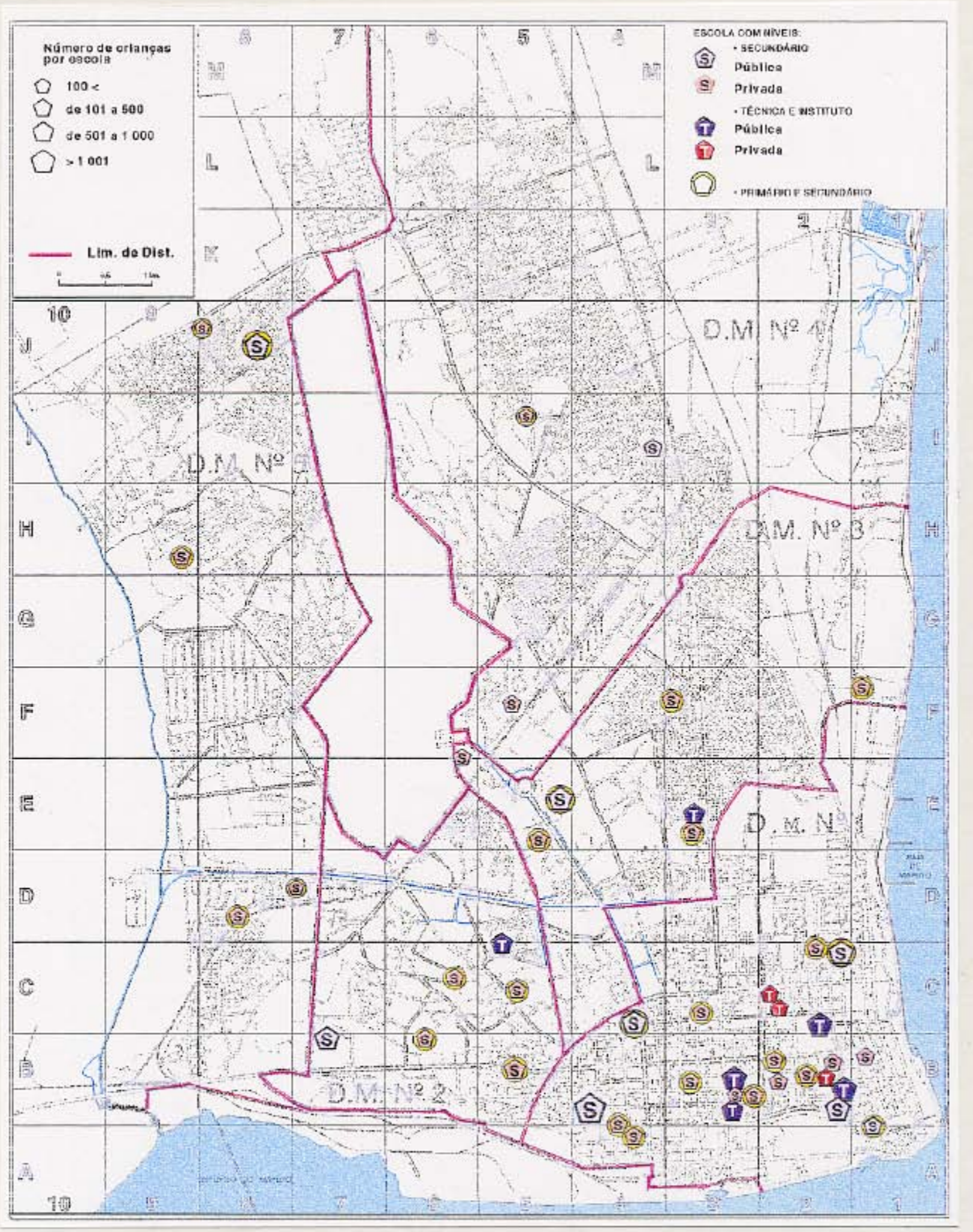
Source: Conselho Municipal de Maputo Gabinete dos Serviços Municipais de Endereçamento

Figure 2.2.3 Location of Medical Facilities



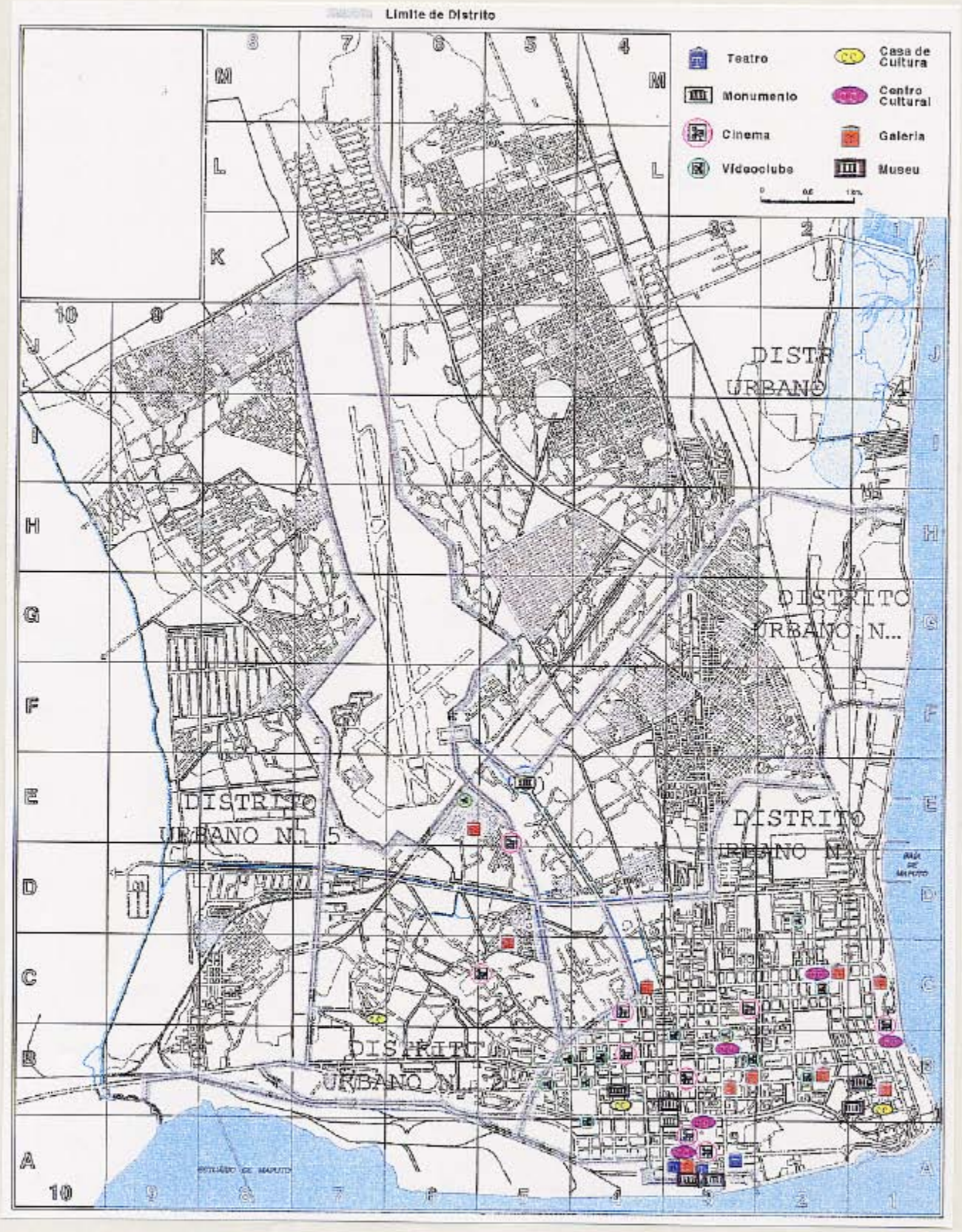
ource: Conselho Municipal de Maputo Gabinete dos Serviços Municipais de Endereçamento

Figure 2.2.4 Location of Educational Facilities (University and Institute)



Source: Conselho Municipal de Maputo Gabinete dos Serviços Municipais de Endereçamento

Figure 2.2.5 Location of Educational Facilities (Primary, Secondary and High School)



Source: Conselho Municipal de Maputo Gabinete dos Serviços Municipais de Endereçamento

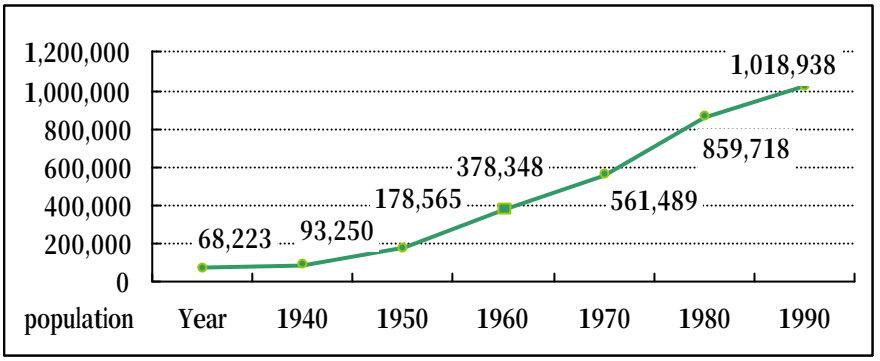
Figure 2.2.6 Location of Public and Cultural Facilities

Table 2.2.1 Organization of the Municipal Council of Maputo

Denomination of the Directorate	Director's Name	Physical Location	Councillor's office in charge
Municipal Directorate of Human Resource Management	Bernardete Bernardo Magalhães de Araújo	Municipal Hall	President of the Municipal Council
Municipal Directorate of Economy and Finance	Roberto Mito Albino	Municipal Hall	Economy and Finance
Municipal Service Directorate of Roads and Bridges	Missael Macolua Cumbe	Intersection between Av.de Angola and Via Rápida para Machava	Municipal Infrastructures
Municipal Service Directorate of Water and Sanitation	José Américo Ronda	Via Rápida para Machava	Municipal Infrastructures
Municipal Service Directorate of Salubrity and Cemeteries	Xavier Domingos	Camp of the Municipal Council in Xipamanine	Public Health, Salubrity and Cemeteries
Municipal Service Directorate of Markets and Fairs	Orlanda Agostinho Alexandre da Fonseca	Av. Karl Marx - UTA Building	Supply, Markets, Fairs and Green Zones
Municipal Service Directorate of Parks and Gardens	Niranj Sacarlal	Tunduru Garden	Parks and Gardens
Municipal Service Directorate of Works and Publicity	Carlos Manguel	Av. Fernão de Magalhães - Warehouse of the Municipal Council	Planning and Urban Land Management
Municipal Service Directorate of Construction and Urbanization	Eunice Gilda Chirindza	Av. 24 de Julho - Intersection with Av. Amí lcar Cabral	Planning and Urban Land Management
Municipal Service Directorate of Address	Teresa Antonio Macuacua Chissequere	Av. Karl Marx - UTA Building	Planning and Urban Land Management

2.2.2 Population

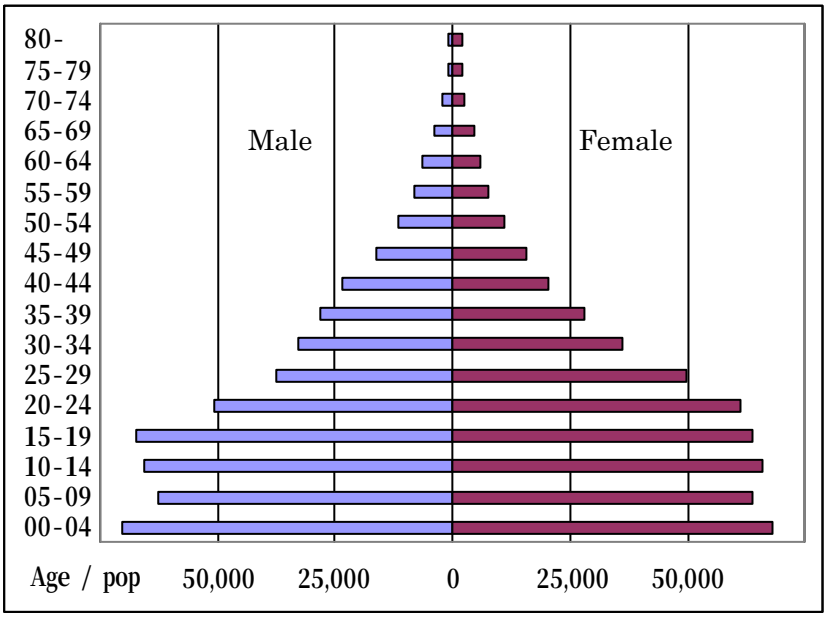
As the capital of Mozambique, Maputo city receives more population than any other cities. According to the latest statistical record (1998), Maputo has its population of 997,268 (488,352 for male and 508,916 for female), which accounts for 6.1% of the total population of the country. According to the projected statistics, Maputo expects more than 1 million populations in the year of 2000. (See Figure 2.2.7)



Source : Anuário Estatístico 1998 Cidade de Maputo, Instituto Nacional de Estatística

Figure 2.2.7 Trends of Population Growth in Maputo

The pyramid chart of Maputo's population in Figure 2.2.8 indicates that most of city dwellers are young ages under 30, which accounts for 72.8% of the total population. Although it is a typical structure of the developing countries, the pyramid shape of Maputo seems to be more advanced if compared with a rural area, where the slope of the pyramid tends to be steeper, i.e. the infant mortality tends to be higher in a rural area.



Source : Anuário Estatístico 1998 Cidade de Maputo, Instituto Nacional de Estatística

Figure 2.2.8 Age structure of population in Maputo in 1998

Most of the city dwellers are native Mozambican (98.4%), and the second majority group "Portuguese" is far behind as it possesses only 0.4% of the total population. The first language is Portuguese followed by some native languages.

Table 2.2.2 Races, Religion and Languages in Maputo

Race	%	Religion	%	Language	%
Mozambican	98.4%	Cathoric	20.8%	Portugues	31.8%
Portuguese	0.4%	Zinonism	39.4%	Xichangana	28.7%
Indian	0.1%	Muslims	4.4%	Xironga	17.5%
Pakistan	0.1%	Protestant	9.3%	Xitsuwa	2.4%
Others	0.6%	Others	22.4%	Others	18.7%
Not-known	0.4%	Not known	3.7%	Not-known	0.9%
TOTAL	100.0%	TOTAL	100.0%	TOTAL	100.0%

Source : Anuário Estatístico 1998 Cidade de Maputo, Instituto Nacional de Estatística

Workforce population of Maputo in 1997 is 300,959, in which the largest sector is commercial (35.9%) followed by public service (12.9%), industrial (9.8%), and agriculture (9.6%). Details are shown in Table 2.2.3.

Table 2.2.3 Workforce Structure in Maputo in 1997

	Male	Female	Total	%
Agriculture & Fishery	9,506	19,479	28,985	9.6%
Material Industry	5,899	143	6,042	2.0%
Manufactual Industry	23,875	5,652	29,527	9.8%
Energy	2,113	313	2,426	0.8%
Construction	17,866	672	18,538	6.2%
Transport & Communication	19,525	1,846	21,371	7.1%
Commercial & Finance	52,147	55,976	108,123	35.9%
Public Service	26,995	11,753	38,748	12.9%
Others	18,628	17,979	36,607	12.2%
Not-known	6,790	3,802	10,592	3.5%
TOTAL	183,344	117,615	300,959	100.0%

Source : Anuário Estatístico 1998 Cidade de Maputo, Instituto Nacional de Estatística

If simply compared with the estimated workable population aged from 20 to 59 (around 439,000), the unemployment rate can be roughly estimated to 31%. This estimate of unemployment rate, however, seems to be overvalued since population aged from 20 to 59 contains some physically handicapped and hospitalized, and workforce size in agriculture in the census tends to be underestimated since a lot of rambling small-scale farmers may be missed in the census survey. To estimate the correct unemployment rate of Maputo is a hard task to do since there is no reliable data at this stage, but the national statistical office of Mozambique estimates the national unemployment rate of economically active population at 19.1% in 1998. Therefore, the unemployment rate of Maputo is also assumed around 20%.

2.2.3 Socio-Economic trend

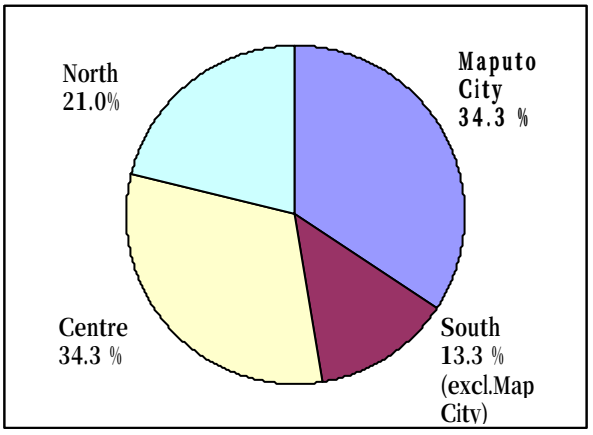
Maputo plays the leading role in the socio-economic development of Mozambique. According to the latest UNDP study on Human Development Index, Maputo enjoys the highest HDI and GDP per head compared to other parts of Mozambique. (See Table 2.2.4) HDI consists of three important aspects of development such as life expectancy, education (literacy and school enrolement), and average income.

Table 2.2.4 HDI and Socio-Economic Indicators of Maputo and Other Areas in 1998

Province	HDI	Life Expectancy	Literacy rate (adult)	School enrolement	GDP per head (US$)
South	**0.427**	**50.6**	**61.0**	**49.6**	**460**
Maputo city	0.602	59.0	85.0	66.1	1,340
Maputo province	0.407	52.1	65.7	62.1	174
Inhambane	0.304	47.5	45.8	33.3	170
Gaza	0.301	47.0	47.3	36.8	147
Centre	**0.266**	**40.7**	**37.3**	**45.9**	**185**
Manica	0.337	44.5	42.3	81.2	184
Sofala	0.302	42.8	43.8	30.4	306
Tete	0.284	44.3	33.2	60.1	158
Zambezia	0.173	37.5	29.7	11.9	126
North	**0.212**	**40.6**	**28.1**	**23.5**	**159**
Niassa	0.225	42.7	31.0	32.4	120
Cabo Delgado	0.202	39.9	25.0	28.8	143
Nampula	0.198	40.4	28.3	9.2	166
National	**0.282**	**42.9**	**39.5**	**33.2**	**237**

Source: UNDP 2000

Maputo's high status of development is accounted for its high GDP. Indeed, the GDP of Maputo city accounts 34% of the national GDP of Mozambique, which is the level close to that of Botswana, Swaziland and Egypt. As seen in the Table 2.2.4, the large gaps of HDI and GDP between Maputo city and Maputo province indicates that the rich socio-economic condition is attained merely in the urban area.



As described in the previous section, that Maputo city counts for 6% of total population, of that population statistically produces as much as 52% of Mozambicans, around 8.6 million.
The spearheaded economic status of Maputo city's dwellers is attributed mainly to the difference of productivity among main economic activities. Table 2.2.5 shows an interesting

picture of structures of economic activities in Maputo city and whole national economy.

Table 2.2.5 Comparison of economic activities in share of GDP in 1998

	Maputo City (A)	National (B)	A-B
Agriculture	0.1	22.7	-22.6
Livestock	0.2	2.3	-2.1
Forestry	0.5	2.5	-2.1
Fisheries	0.1	3.3	-3.2
Mining	0.2	0.3	-0.1
Manufacturing	13.2	10.0	3.3
Electricity and Water	0.7	2.4	-1.7
Construciton	18.2	8.2	10.0
Transport (communication	14.3	10.1	4.2
Commerce	30.7	22.2	8.5
Restaurants and hotel	1.1	1.0	0.1
Public Administration	4.3	3.1	1.2
Finance and insurance	1.4	1.0	0.4
Real Estate and business	5.1	3.7	1.4
Education Service	2.3	1.6	0.6
Health Service	0.7	0.5	0.2
Other services	6.9	5.0	1.9
TOTAL	100.0	100.0	0.0

Source: UNDP 2000

A reader can visualize a clear difference of Maputo city which is heavily depending on commerce and other urban-related economic activities such as construction, while the Mozambican economy has been relying on agriculture. Besides, agriculture is accounted for only 0.1% in Maputo city.

It is instantly understandable that value added by agriculture is very little compared with high valued commercial activities, which prevail in the urban area, Maputo city. By concentrating on commercial activities, the Maputo city can realize the extreme high GDP per head. This unbalanced regional economy is a typical phenomenon in developing countries in Africa, where polarization of economic activities tends to be stimulated by an unbalanced deployment of infrastructure.

Regarding the average income, a special consideration is needed for Maputo city which treat more than 6 times of GPD per head compared to other region. The government agreed on July 25th to increase the national (urban) minimum wage by 26% in nominal terms to MT568,980 (US$37) per month, but the lowest salary in Maputo tends to be higher , according to the Study Team's informal survey. There is no reliable data on this matter, but according to informal interviews by the Study Team, average monthly salaries for unskilled and skilled labor in Maputo are roughly estimated to MT700,000 (US$50) and MT280,000 ($US200) respectively.

2.3 ROAD FACILITIES

2.3.1 Road Facility Items

The followings are the one that outlined the problem regarding the road facilities in Maputo city. These problems shall be quantified and evaluated through Road and Structural Inventory Investigation.

1) Road Facilities

a) Road Signs / Paintings

- Guide Signs

There are a few guide signs in Maputo city, but not enough. In some places, the traffic looks for their destination and reducing speed. It seems to be causing of traffic congestions.

- Control Signs

At grade intersections, stop signs indicating the priority of passing. In some places, the visibility of signs is not preferable. It seems to be causing traffic danger.

- Warning Signs

The most of the road in Maputo city, there are no warning signs to control over speeding, unsuitable parking etc. It seems to be causing of traffic problems.

b) Information Facilities

Information facilities are not applied in Maputo city.

c) Lane Markings

On primary roads, lane markings are applied. But on the most of secondary roads, lane markings are not applied. It seems to be traffic conflicts with the narrowness of the road. Some of at grade intersections, the stop lines are applied but not enough.

2) Intersection Facilities

a) Road Signs / Paintings

The order of priority of traffic is being set up fundamentally in the unsignaled intersection of Maputo city, and the stop signs are established. However, visibility of signs is poor and also the stoppage line is not established. The order of priority of traffic seems to be confused at such intersections, and it seems to be the factor of the traffic accident.

Guide signs are established in a major trunk road, however it is insufficient in a most of city roads. In some sections, road markings such as centre line, lane marking etc, delaminate and be not repaired.

b) Information Facilities

Road information facilities are not established in Maputo city.

c) Turning Lane

Major intersections in Maputo city, turning lanes are not established and it seems to be a factor of traffic congestion.

d) Traffic Signal

There is the signal intersections of 27 places in Maputo city, still 2 places it has not been applied yet. Also, there is frequently that the signal stops the function by power failure and the traffic police is controlling the traffic.

There are no right turning signal phase, it seems to be a factor of traffic congestion due to difficulty of turning movement.

3) Traffic Safety Facilities

a) Guard Fence

Guard fences are established along the open drainage channels. However repair or maintenance works are insufficiently managed at some part of area.

b) Road Lighting

Road lighting facilities are sufficiently established on major roads.

c) Speed Hump

Speed humps are established in the place where is necessary to control speed, i.e residential areas or in front of school etc. However visibility of humps is poor in nighttime because notice signs or markings not to be established.

4) Drainage Facilities

Most major type of roadside drainage is L shaped gutter, V-shaped open channel. Water catch pits are established on road edge, however some of pits are buried with sand. The clogging of water pit becomes the cause water accumulate on the road.

5) Public Facilities

a) Bus Stop (Bus Bay)

Road shoulder of the width of about 1.5 m are being established in the main road of the Maputo city and be offering the stop space of buses. However, the stop of buses is inhibiting traffic in the road without shoulder or bus bay.

b) Car Parking

There is a roadside parking strip in the main road where the commercial facilities. Also, the parking space is established on the median. However, through traffic is obstructed by the vehicle that in and out from parking spaces or waiting. Furthermore there are the danger between through traffic and pedestrian due to crossing from median.

2.3.2 Inventory Survey

Some of information about existing conditions of roads or drainages have been collected from relevant organizations. Some of those are old or not updated, the latest information shall be collected through The Study. The road and structural inventory investigation has been undertaken..

2.3.3 Problems with Facility System

The analysis of the result of the road inventory survey is under way at present. After finish that, finding and consideration of the problem regarding the road facilities will be carried out.

2.3.4 The Direction Forward

The problem regarding the road facilities of the Maputo city shall be considered from 6 viewpoint that shown below. Result of the analysis shall be reflected into a future highway network maintenance plan.

- Arrangement of the appropriate future road network
- Solution of road congestions
- Improvement of road conditions
- Improvement of intersections
- Improvement of the traffic safety
- Improvement of the convenience of public transportation (i.e bus routes)

2.4 FINANCIAL REVIEW OF ROAD BUDGET

2.4.1 General

Since 1999's decentralization of central governance function to local governments, the Municipal Council of Maputo (MCM) takes a full responsibility of construction and management for urban roads in Maputo. Thus, in this financial review, the investigation will be conducted mainly with the MCM, rather than the national government. However, a source of information for accurate financial review is substantially limited since the financial department of the municipal government has been given the financial authority just after 1999, and it has been still on going at the developing process aiming to establish a more robust fiscal system. Thus all of existing financial reports seem to be prepared in ad-hoc manner, and data-within tends to be erratic and unreliable in terms of consistency.

It is, however, indispensable to understand the financial situation of the MCM in order to construct a proper action programme for implementation of the Master Plan. Therefore, the financial review in this section will focus on grasping the financial scale (i.e. budgetary thresholds) of the MCM, and it will examine current financial resources related to road development in Maputo.

2.4.2 Budgetary Process of the MCM

Department of Planning and Budget is the legitimate financial management office of the MCM. The municipal budgetary system is organized as described in Figure 2.4.1.

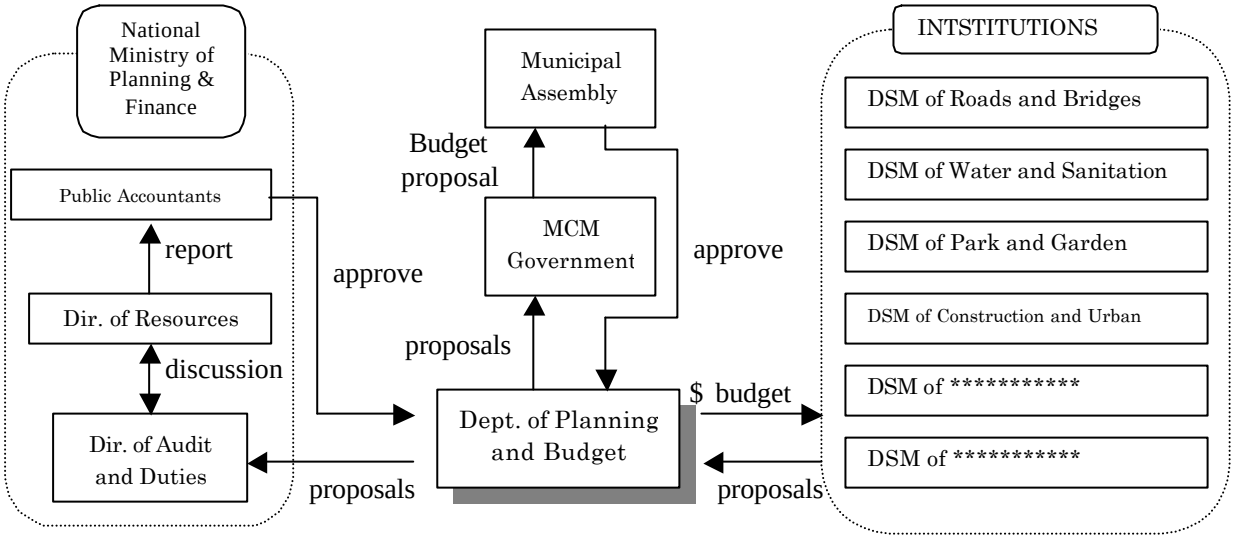


Figure 2.4.1: Financial System of MCM

DSM = Director of Municipal Service

2.4.3 Financial scale of the MCM

The financial statement of the MCM is described in Table 2.4.1.

Table 2.4.1 Financial Statement of the MCM in 1999 and 2000

REVENUE Unit: 000 Meticas

CODE	DESCRIPTION	YEAR 1999 EXECUTION	%	YEAR 2000 Budget plan	%
1	**CURRENT REVENUE**	**88,601,587**	**82.8%**	**71,360,626**	**81.9%**
13	**Current Revenue of Administration**	**88,601,587**	**82.8%**	**71,360,626**	**81.9%**
131	Taxes revenues	24,343,885	22.7%	13,019,495	14.9%
132	Non Taxed revenue	63,598,760	59.4%	58,078,877	66.6%
133	Consigned revenue	658,942	0.6%	262,254	0.3%
14	**OTHERS**	**0**	**0.0%**	**0**	**0.0%**
2	**CAPITAL REVENUE**	**18,413,632**	**17.2%**	**15,796,525**	**18.1%**
23	**Capital revenue of Administration**	**18,413,632**	**17.2%**	**15,796,525**	**18.1%**
231	Revenue of Untradable Goods	300,000	0.3%	360,000	0.4%
232	Services revenue	1,673,650	1.6%	1,530,125	1.8%
233	Other Capital revenue	16,374,466	15.3%	13,906,400	16.0%
234	Financial Activities	65,516	0.1%	0	0.0%
	TOTAL REVENUE	**107,015,219**	**100.0%**	**87,157,151**	**100.0%**

Expenditure

CODE	DESCRIPTION	YEAR 1999 EXECUTION	%	YEAR 2000 Budget plan	%
1	**CURRENT EXPENSE**	**52,307,124**	**59.3%**	**68,145,677**	**70.5%**
1.1	**Expense with personel**	**26,683,679**	**30.3%**	**38,980,835**	**40.3%**
1.1.1	Rewards and Salary	25,693,003	29.1%	33,994,486	35.2%
1.1.2	Other Rewards for Staff	990,676	1.1%	4,986,349	5.2%
1.2	**Goods and Service**	**25,071,745**	**28.4%**	**29,106,842**	**30.1%**
1.2.1	GOODS	16,879,690	19.1%	19,034,842	19.7%
1.2.2	SERVICES	8,192,055	9.3%	10,072,000	10.4%
1.4	**Current Transfers**	**87,653**	**0.1%**	**48,000**	**0.0%**
1.4.1	Public Administration	64,493	0.1%	48,000	0.0%
1.4.4	Transfers to foreign countries	23,160	0.0%	0	0.0%
1.6	**Other Current Expences**	**0**	**0.0%**	**0**	**0.0%**
1.7	**Finished Exercises (Other Salary)**	**464,047**	**0.5%**	**10,000**	**0.0%**
2	**CAPITAL EXPENSES**	**35,852,044**	**40.7%**	**28,559,000**	**29.5%**
2.1	**Capital Goods**	**30,286,168**	**34.4%**	**24,093,000**	**24.9%**
2.1.1	Construction	16,790,530	19.0%	5,200,000	5.4%
2.1.2	Machinery and Equipment	13,187,925	15.0%	17,153,000	17.7%
2.1.3	Other Capital Goods	307,713	0.3%	1,740,000	1.8%
2.2	**Capital Transfers**	**0**	**0.0%**	**0**	**0.0%**
2.3	**Other Capital Expenses**	**5,565,876**	**6.3%**	**4,466,000**	**4.6%**
	EXPENSES TOTAL	**88,159,168**	**100.0%**	**96,704,677**	**100.0%**
	SURPLUS= (REVENUE - EXPENSES)	**18,856,051**	**100.0%**	**-9,547,526**	**100.0%**

Source: Department of Planning and Budget

As seen in the above table, the MCM has collected its revenue of 107,015 million Meticas equivalent to around 8 million US$ in 1999, while the expenditure was 88,149,168 Meticas in 1999. Financial statement for year 2000 is still on the stage of final calculation, and it is not available at this moment, then the budgetary plan of year 2000 is used for this study as a proxy. In the 2000 plan, the revenue and expenditure of year 2000 were stated to be 87,157 million Meticas and 96,704 million Meticas respectively. If simply subtract the summed expenditure from summed revenue of 1999 and 2000, the accumulated surplus at the end of year 2000 is 9,308 million Meticas at the end of 2000. Therefore, if we simply rely on these financial statements, it seems that the MCM's financial condition is not in deficit and rather it produces a sort of surplus so far. The healthy picture of the MCM fiscal condition, however, will be changed a little bit after reviewing the rate of budget execution that is described later in this chapter.

In the financial statement, more than half of the revenue (59% in 1999 and 67% in 2000) has come from the category of "non taxed revenue", which includes revenues from granting various licenses, charging on various public services (e.g. garbage collection), and other non fiscal revenues. Majority of the "non taxed revenue" has been collected from the "other non fiscal revenues". This category includes some other types of revenues such as receiving the subsidies of the national government, which counts more than 20% of the total revenue. Thus, it seems that national government subsidy is playing a critical role in the MCM's fiscal structure.

Currently, there is no special tax related to road development collected by the MCM. In the total expenditure of 1999, about 34% were disbursed for capital goods, within which 16,790 million Meticas (equivalent to 19% of total revenue) was used for construction. In the budgetary plan of year 2000, however, this construction expenditure was decreased to about 5% (equivalent to 5,200 million Meticas) of the total expenditure. It is because the budgetary plan of year 2000 estimated the expected revenue in a very pessimistic view so that it decreased the construction budget rather than changing a stiff structure of recurrent expenses such as staff salary.

In the November of 2000, the budget plan was revised in the second time in the way that it increased the expected revenue from 87,157 million Meticas to 138,601 million Meticas, and it expanded the disbursement scale comparatively. One of reasons to the expansion of estimated revenue is attributed to the increase of the subsidy from the national government from 20,836 million to 47,056 million Meticas, including 20,000 millions for emergency fund.

However, according to the financial officer, the draft calculation of the actual revenue at this moment estimates down to 98,666 million Meticas for the year of 2000. This unstable manner has been frequently witnessed through the budgetary process of the MCM, that obviously make this financial review difficult to be accurate.

2.4.4 Budget for roads

To distinguish the "road budget" is not an easy task since there are several institutions or agencies to execute the investment of road construction and maintenance. In 2000, the number of road-related institutions has been increased to seven from four in 1999.
Table 2.4.2 shows the institutions related to roads in 1999 and 2000.

Table 2.4.2 Institutions related to roads

In 1999	In 2000
DSM of Construction and Urbanization	DSM of Construction and Urbanization
	DSM of Roads and Bridges
DSM of Urban Service	DSM of Salubrity and Cemetery
	DSM of Park and Garden
	DSM of Public works
DSM of Water and Sanitation	DSM of Water and Sanitation
DSM of Transport and Traffic	DSM of Transport and Traffic

*DSM = "Director of Municipal Service" Source: interviews with counterparts

While DSM of Road and Bridge is a main institution for road construction, each institution takes a particular part of road maintenance at its responsible field as shown in Figure 2.4.2.

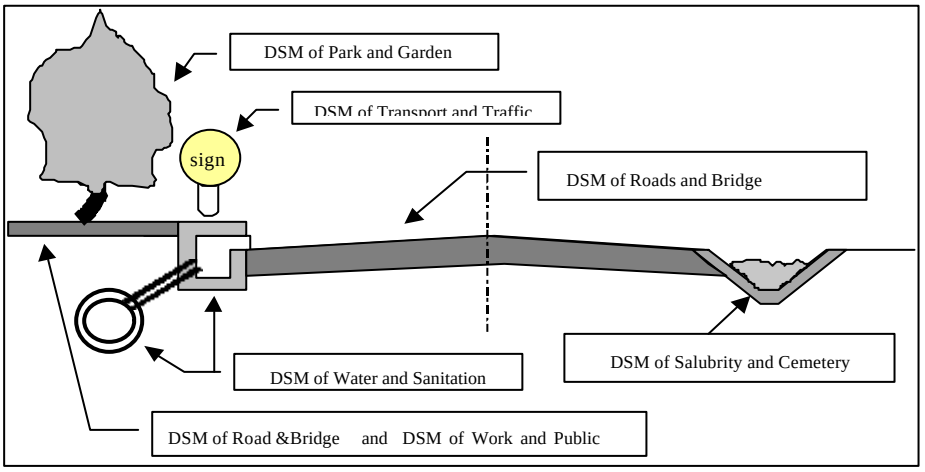


Figure 2.4.2 Jurisdictional Division for Road Maintenance among Institutions

Therefore, there is not any distinguished "road budget" prepared within the current financial

system, rather the road budget seems to be lumped sum with other budgets and distributed into these institutions, and the institutions disburse an amount of own distributed budget into road-related activities according to its own budgetary plan. The following table explains the budgetary disbursement within the institutions.

Table 2.4.3 Budget Disbursement within the Institutions in 1999

In one Thousand Meticais

COD	INSTITUTION	TOTAL	ROAD Related
0100	MAYOR'S OFFICE	9,040,397	
0110	MUNICIPALITY	2,346,052	
0300	MUNICIPALITY ASSEMBLY	6,533,586	
1110	MUNICIPALITY POLICE	6,733,958	
1510	DIRECTORATE OF URBAN SERVICES	37,605,788	37,605,788
2000	COM. OF SOCIAL REINTEGRATION	513,926	
2000	DIRECTORATE OF WATER AND SANITATION	1,485,135	1,485,135
2100	DIRECTORATE OF WORK	3,607,335	
3300	DIRECTORATE OF TRANSPORT AND TRAFFIC	974,814	974,814
3400	DIRECTORATE OF CONSTRUCTION AND URBANISATION	7,897,701	7,897,701
4000	DIRECTORATE OF EDUCATION	8,748,143	
4100	DIRECTORATE OF YOUTH CULTURE and SPORTS	1,435,926	
1500	DIRECTORATE OF SUPPORT AND CONTROL	803,697	
4300	DIR. OF SOCIAL ACTION COORDINATION	432,038	
	TOTAL	**88,158,496**	**47,963,438**

Source: 1999 Financial Report

Table 2.4.4 Budget Disbursement within the Institutions in 2000.

In one Thousand Meticais

			of Road Related institutions.	
COD	INSTITUTION	TOTAL BUDGET	TOTAL BUDGET	INVESTMENT BUDGET
0100	MAYOR'S OFFICE	8,751,132		
0110	MUNICIPALITY	8,713,860		
0300	MUNICIPALITY ASSEMBLY	10,119,230		
1100	MUNICIPALITY POLICE	9,880,774		
1500	DEPT OF HUMAN RESOURCE	1,830,410		
2000	DM FINANCE AND ECONOMIC	4,843,123		
2010	DMS MARKECT AND FAIR	11,674,189		
3300	DIRECTORATE OF TRANSPORT AND TRAFFIC	4,529,433	4,529,433	4,121,443
3400	DIRECTORATE OF CONST. AND URBANISATION	3,332,308	3,332,308	2,753,000
3410	DSM ROAD AND BRIDGE	22,897,524	22,897,524	20,235,484
3420	DIRECTORATE OF HEALTHY AND CEMETERY	28,750,255	28,750,255	6,630,000
3430	DSM WATER AND SANITATION	9,111,938	9,111,938	6,580,727
3440	DIRECTORATE OF GARDEN AND PARK	9,281,914	9,281,914	3,040,000
3450	DSM ENVIRONMENT PROTECTION COAST	3,028,273		
3460	ADDRESS DEPARTMEMT	1,324,590		
3470	DSM WORKS AND PUBLICITY	5,737,781	5,737,781	1,775,000
4000	LABOR AND EDUCATION	1,750,440		
4200	PUBLIC HEALTH	0		
4300	DIR. OF SOCIAL ACTION COORDINATION	120,000		
2100	DIRECTION OF WORK	1,800,000		
4100	YOUNG PEOPLE CULTURE AND SPORT	1,263,616		
xxxx	ADMINISTRATIVES UNITY	1,408,000		
xxxx	EMERGENCY OFFICE	2,250,000		
	Other Provisional Endowment	0		
	TOTAL	161,779,836	83,641,153	45,135,654

Source: Secondary Revised 2000 Budget

In 1999, about 47,963 million Meticas were disbursed to the four road-related institutions. In 2000, after institutional restructuring, the road-related institutions were increased from four to

seven, and the share of the budget has also been surged to 83,641 million Meticas, within which investment budget were summed to 45,135 million Meticas, according to the secondary revised budget plan.

The DSM of Road and Bridge is the primary body for the construction and maintenance of a main part of roads, while the DSM of Transport and Traffic is responsible for the installation and maintenance of complement items of road traffic such as safety bumps and traffic signs. Other road-related institutions attend just partly in the maintenance of roads, and their investment budget is not allocated directly to road development. Therefore, the financial scale of the road-related investment shall be estimated fairly by adding the investment of the DSM of Road and Bridge and the DSM of Transport and Traffic.

The DSM of Road and Bridge is the largest shareholder and is allocated 20,235 million Meticas for investment which is nearly the half of the total investment budget for the road-related institutions. The DSM of Transport and Traffic has expected to receive 4,121 million Meticas. Therefore, a sum of 24,356 million Meticas (equivalent to around 1.6 million US dollars at the year 2000's exchange rate of 15,237 Meticas per US$) is thought as the investment budget for road construction and maintenance.

2.4.5 Expenditure for Road Investment of Institutions

A healthy image of financial status of MCM will be substantially changed and stained by examining the implementation rate of the planned investment. Table 2.4.5(1), Table 2.4.5(2), and Table 2.4.6 show the number and budget of projects in the investment plan of each institution and its execution in 1999 and 2000.

For year 1999, two tables are produced because the 1999 plan contained a set of obviously unattainable road rehabilitation projects, which was not executed at all. That would paralyze the analysis of execution rates. Thus, a table excluding the rehabilitation plan is also prepared.

Table 2.4.5(1) Comparison of plan and execution in projects of road-related institutions in 1999 with all projects.

Unit: 000 Meticas

	DSM of Water and Sanitation	DSM of Construction and Urbanization	DSM of Salubrity and Cemetary	DSM of Urban Service	DSM of Transport and Traffic	TOTAL
ALL						
Planned Projects	20	84	3	4	5	116
Projects Budgets	10,667,600	75,854,400	3,395,748	275,000	3,300,000	93,492,748
Excuted Projects	16	5	2	3	2	28
Excuted Budgets	8,462,381	5,831,737	2,648,226	147,040	974,814	18,064,197
Road-Related						
Planned Projects	1	78	0	0	4	83
Projects Budgets	534,600	74,774,400	0	0	2,450,000	77,759,000
Excuted Projects	1	5	0	0	1	7
Excuted Budgets	155,699	5,831,737	0	0	153,626	6,141,062

Table 2.4.5(2) Comparison of Plan and Execution in Projects of Road-related Institutions in 1999 with Projects excluding the Road Rehabilitation Plan

Unit: '000 Meticas

	DSM of Water and Sanitation	DSM of Construction and Urbanization	DSM of Salubrity and Cemetary	DSM of Urban Service	DSM of Transport and Traffic	TOTAL
ALL						
Planned Projects	20	22	3	4	5	54
Projects Budgets	10,667,600	16,472,200	3,395,748	275,000	3,300,000	34,110,548
Excuted Projects	16	5	2	3	2	28
Excuted Budgets	8,462,381	5,831,737	2,648,226	147,040	974,814	18,064,197
Road-Related						
Planned Projects	1	16	0	0	4	21
Projects Budgets	534,600	15,392,200	0	0	2,450,000	18,376,800
Excuted Projects	1	5	0	0	1	7
Excuted Budgets	155,699	5,831,737	0	0	153,626	6,141,062

Source: 1999 Financial Report

Table 2.4.6 Comparison of Plan and Execution in Projects of Road-related Institutions until September of 2000

Unit: '000 Meticas

	DSM of Water and Sanitation	DSM of Construction and Urbanization	DSM of Road and Bridge	DSM of Public Work	DSM of Park and Garden	DSM of Salubrity and Cemetary	DSM of Transport and Traffic	TOTAL
ALL								
Planned Projects	14	4	24	10	17	6	7	82
Projects Budgets	10,679,727	1,470,000	15,925,484	1,690,568	3,003,616	6,240,000	4,421,443	43,430,838
Excuted Projects	6	2	11	3	15	3	3	43
Excuted Budgets	1,867,571	538,228	4,314,994	1,192,068	246,290	837,134	1,423,373	10,419,658
Road-Related								
Planned Projects	2	0	24	0	2	0	7	35
Projects Budgets	1,396,000	0	15,925,484	0	399,701	0	4,421,443	22,142,628
Excuted Projects	0	0	11	0	1	0	3	15
Excuted Budgets	690,891	0	4,314,994	0	202,458	0	1,423,373	6,631,717

Source: Secondary Revised 2000 Budget

As seen in the tables, only around a half of planned projects seemed to be actually implemented by the end of each year. In money terms, the execution rates have reached just around 30%. According to the officers in Department of Planning and Budget, there were unimplemented projects because the budget disbursement to institutions has been controlled and adjusted constantly by keeping a balance between the prioritization of various projects and the thresholds of current revenue. For example, the last devastating flood disaster caused a need for rehabilitation programmes, which gave a serious impact on the financial structure of the MCM.

Therefore, it seems that financial situation of the MCM is not wealthy at all, and the low execution rate indicates that the surplus on the financial statement is not necessarily to be real surplus of this immature city government. In a real term, the MCM is virtually in deficit in the sense that most of the needed projects are in the waiting list of the execution, and the waiting queue seems to be very long.

2.4.6 Financial considerations for the formulation of the Master Plan

While the Master Plan is expected to be the most advanced and effective plan in terms of capability of growing traffic demand in the future, there are several issues which the study team have to take into account in the formulation of the Master Plan from the financial point of view.

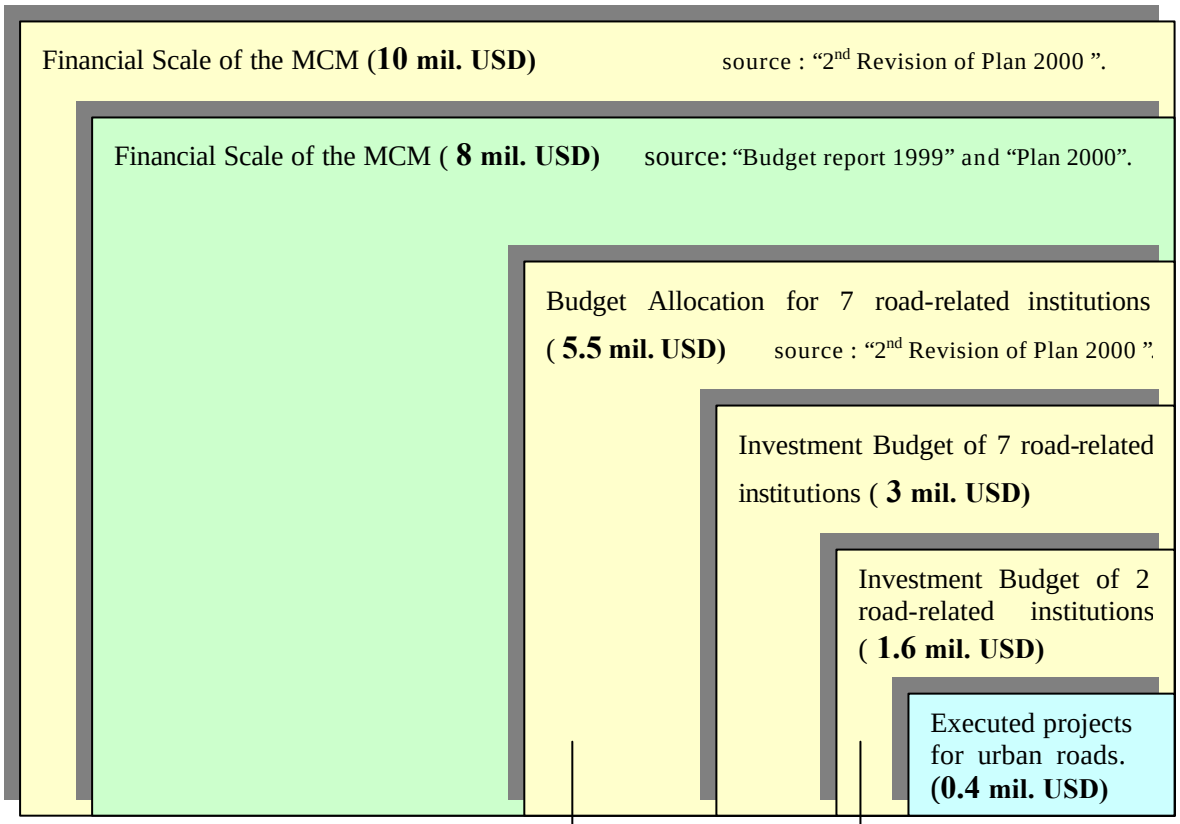
1) In conservative estimates, the MCM's financial scale is roughly estimated to be slightly lower than 100 billion Meticas which is equivalent to around 8 million USD.
2) In the latest figure "the 2nd Revised Budget Plan of 2000", the estimated total revenue is increased to be about 130 billion Meticas (equivalent to around 8.5 million USD) and the expenditure is stated about 160 billion Meticas (equivalent to around 10.5 million USD).
3) The MCM's financial statement is not in deficit on paper.
4) There is no preserved "road budget" within the financial category, and there are seven road-related institutions conducting road development and maintenance by their allocated budgets.
5) In the 2nd revised budget plan of year 2000 with 160 billion Meticas of the total expenditure, the seven road-related institutions deserve to receive roughly 84 billions Meticas (equivalent to around 5.5 million USD), within which around a half (45 billions Meticas) is intended for investment.
6) With more conservative (careful) estimates accounting only the DSM of Road and Bridge and the DSM of Transport and Traffic, the road-related investment budget seems to be estimated around 24 billion Meticas (equivalent to around 1.6 million USD)

7) However, if examining the execution rate of the project, less than a half of the planned projects have actually been implemented in 1999 and 2000.
8) The financial scale of executed projects in road development is estimated to be around 6 billion Meticas (equivalent to around 400 thousands USD) in 1999 and 2000, that would be the most conservative estimate for road-related investment budgets.

These summaries are visualized in Figure 2.4.3.

The reader might be confused by these contradict figures in erratic fashion, but this contradiction shows the reality which the MCM is now struggling. At least, none of these financial estimates indicates that the MCM is capable of covering all of the implementation cost of a comprehensive road network plan.

Therefore, the formulation of the Master Plan shall be carried out with considering the financial constraints of the MCM, and in the action programme of implementation, the financial arrangement shall be made with considering of external financial sources besides the MCM's resource. More discussions shall be presented later in this report.



List of road-related institutions

1. DSM of Roads and Bridges……a main institution for road development
2. DSM of Transport and Traffic……a main institution for road development
3. DSM of Construction and Urbanization
4. DSM of Salubrity and Cemetery
5. DSM of Park and Garden
6. DSM of Public works
7. DSM of Water and Sanitation

Note 1: Executed projects of 2 institutions are counted from "Mapa de execucao de orcamento de invetmento do mes de fevereiro/00" and "Fundamentacao da proposta da 2. Revisao do orcamento 2000".
Note 2: Exchange rates for 1999 and 2000 are 12,775 and 15,237 Meticas per US dollar respectively.

Source: Data collection by the study team.

Figure 2.4.3 An Image Map of Financial Scales of Road Investment of the MCM

2.4.7 Financial difficulties

While the MCM is not capable to cover up all of the implementation cost of the Master Plan, the maintenance of the roads shall be taken care by the MCM. However, from the context of previous financial reviews, there are several critical problems on the financing of the road development and maintenance in Maputo.

1) Flexible but unstable management in budgetary process

As explained in the previous section, there are a lot of unimplemented projects because of the "flexible" financial management in the MCM's fiscal policy. According to the officers in the department of planning and budget, the department allocates the budgetary disbursement and adjusts the budgetary plan along with prioritization of projects through their consideration of the corespondent situation. It may well be the case that the financial department has to manage the limited budget with flexibility, especially during the developing phase of budgetary process.

It is, however, controversial that this "flexible but unstable" financing manner continues to prevail within the financial department in future. This shortsighted emergency type of financing should be limited to be conducted, and it should be denounced especially for road development in Maputo, which requires rather consistency and sustainability targeting for the future in the long run.

The MCM is not in deficit technically on the financial statement report, which even shows a sort of surplus in 1999 and 2000. Meanwhile, if the execution rates of planned projects are carefully examined, it is obvious that a lot of projects are not actually implemented. This gap seems to tell that there must be rooms for improvement and some efficiency measures have to be introduced to the MCM's way of financial management.

2) The lack of stable financial resources for roads

Road development and maintenance needs constant financial backups. Most of the countries prepare purpose-oriented duties and tax for roads, such as fuel tax, vehicle registration duties, passage toll, etc. They are not only reliable sources for road development, but also theoretically plausible in terms of returns to beneficiaries, i.e. the road-users pay the tax for improvement of roads that they use.

In Mozambique, there are two types of road-oriented tax such as fuel tax and passage toll

system. Fuel tax is compulsory tax levied on fuel sales in Mozambique and passage tolls are collected at four roads (Cuchamano-Tete-Zobue, Beira-Machipanda, Beira-Chimoio-Tete-Zobue, and Namaacha-Maputo) and at four bridges (Zai-Zai, Tete, Save and Iiha).

Tax prices and revenues are presented in following Tables.

Table 2.4.7 Fuel Taxes and Market Prices in Mozambique

Unit : Meticas

	Gasoline	Diesel	LPG	Fuel	AVGAS
	litter	litter	kg	litter	litter
Market Price	9,150.00	8,850.00	9,925.00	5,900.00	15,715.00
Levied tax	3,307.80	1,825.00	284.00	328.00	1,997.80
Tax rate	36%	21%	3%	6%	13%

Source: Data collection by JICA Study Team

Table 2.4.8 Fuel Revenues and Disbursement to ANE

Unit: Billion Meticas

	1995	1996	1997	1998	1999
Fuel Tax Revenue	195.0	334.0	627.2	750.2	759.1
(go to ANE)	(88.7)	(145.1)	(247.3)	(285.0)	(291.0)
(Rates to ANE)	(45.5%)	(43.4%)	(39.4%)	(38.0%)	(38.3%)
Passage Toll Revenue	4.1	98.6	45.2	36.9	46.8
Road Tax TOTAL	199.1	432.6	672.4	787.1	805.9

Source: Data collection by JICA Study Team

The fuel tax was introduced as a purpose-oriented tax for road development and ANE (Administration of National Roads) is eligible to receive 80% of total fuel tax revenue, however, this regulation does not seem to be kept. This is because of the government fiscal policy to use the fuel tax as one of the financial resources to cover up a constitutive fiscal deficit. Meanwhile, all revenues from passage tolls go to ANE, although the amount is not as large as the fuel tax.

The MCM has not received any part of these road-oriented tax revenues, in spite of the fact that Maputo's vehicle drivers surely pay the fuel tax.

Table 2.4.9 Estimates of Fuel Tax Revenue from Maputo

	Vehicle-km	Litter/km	Daily Fuel Consumption (litter)	Annual Fuel Consumption (litter)	Tax levied on one litter (meticas)	Annual Fuel Tax Revenue (million Mt.)	
Car	949,556	0.15	142,433	42,730,020	3307.8	141,342	
Truck	823,039	0.30	246,912	74,073,501	1825.0	135,184	
Bus	415,043	0.20	83,009	24,902,550	2566.4	63,910	
					Total	340,436	mil. Mt.
Exchage rate 15,212 Mt / USD					*Total (USD)*	*22.4*	*mil. USD*

source: the Study Team's estimate

Table 2.4.9 shows an attempt to estimate the scale of fuel tax paid by Maputo's drivers. It is estimated that Maputo drivers would pay around 22 million USD of fuel tax a year, and it is around 40% of total fuel tax revenue. None of these fuel tax paid from Maputo is, of course, is used for roads in Maputo. Thus, the road development and maintenance in Maputo has to rely only on the unstable financial resource from the MCM.

In this difficult situation of the Mozambican government with continuous fiscal deficit, the fuel tax revenue is very attractive in order to cover up the deficit. It is, however, essential to preserve the fuel tax revenue as a purpose-related revenue aiming for road development, which needs consistency and sustainability with a comprehensive policy with reliable financial backup.

Moreover, the road tax revenue should be used much more with consideration of the taxpayers and road network. The taxpayers are, of course, the vehicle drivers including Maputo's drivers, and the road network can not be fully functioned without Maputo's road network. From these facts, it is simply unfair and inappropriate that the fuel tax revenue is used only on the national highway development and none is contributed to the development of the capital city's roads.

Road development is surely an indispensable key for national economic development as a main player in infrastructure. Thus it is the time for the government to consider the much more comprehensive policy of use of the fuel tax revenue.

3) A weak road management and budgetary planning body

Currently the road development and maintenance is managed by seven executing institutions within the MCM. Even though the DSM of Road and Bridge and the DSM of Transport and Traffic have leading roles, the road maintenance is carried out by different institutions without

any comprehensive road maintenance policy.

From this context, none of these road-related institutions is able to grasp extensively the whole information of road condition and its budget in order to undertake the comprehensive maintenance measures with efficient financial management.

It is one of the main purposes of this study to establish a maintenance strategy, but it is only effective when there is a responsible institution capable of executing the maintenance strategy with a consistent policy. Without the powerful and integrated executing body, any good plan is no more than a paper.

Therefore, it would call for the establishment of a leading institutional organization for road management through integration of the existing road-related institutions.

CHAPTER 3

PRESENT ENVIRONMENTAL CONDITION

CHAPTER 3 : PRESENT ENVIRONMENTAL CONDITION

3.1 INTRODUCTION

At an early period in the planning stage of a development project, execution of an Initial Environmental Examination (IEE) is required to evaluate environmental impacts that might arise from implementation of a project. The primary objective of IEE is to evaluate whether Environmental Impact Assessment (EIA) is necessary for the project or not. Accordingly, IEE is conducted for the following objectives.

1) To determine the scope of EIA, if the project is evaluated as requiring an EIA.
2) To examine countermeasures for mitigating effects of the project which require environmental consideration, if the project is evaluated as not requiring an EIA.

Environmental items for IEE shall be selected for use in analyzing and summarizing the environmental aspects of the project area, while taking into account the result of the environmental preparatory survey during the preliminary study. The items of IEE are shown below.

Table 3.1.1 Initial Environmental Examination

Social Environment	Natural Environment	Environmental Pollution
- Demography and Social Environment - Resettlement - Economic Activities - Road and Traffic - Public Facilities - Split of Community Cultural Property - Solid Waste	- Topography and Geology - Soil Erosion - Superficial Water - Ground Water - Flora and Fauna - Meteorology	- Air Pollution - Water Pollution - Noise and Vibration

3.2 LEGISLATIONS AND ENVIRONMENTAL POLICY

3.2.1 Laws and Environmental Administration in Mozambique

General awareness of environmental issues has not been nurtured enough in Mozambique, although the consciousness of environmental concerns is growing and the government has been developing its regulation on environment issues. Several environmental laws have been adopted from 1997 as follows:

- Law on Environment (1997)
- Law on Land Use (1997)
- Law on Wild Flora and Fauna in Forest (1999)
- General Guidelines for Environmental Impact Survey (2000)
- Regulations on the Procedure for Environmental Impact Assessment (1998)

The Ministry for Environmental Coordination (hereinafter referred to as MEC) is currently forming a guideline named "Guideline on Road Environment", which will be authorized in 2001.

In Mozambique, which does not have own established standards, environmental quality standards are generally referred to "world-standards" by the World Bank, the United Nations etc. Therefore, the study team shall also refer to the World Bank's standard of environmental quality for the project.

MEC, which was founded in 1992, is the administrative organ that carries out environmental administration. As an execution body of environmental protection for MEC, National Department for Environmental Impact Assessment is founded within the organization of MEC.

3.2.2 Regulations on the Procedure for Environmental Impact Assessment

MEC has prepared "Regulations on the Procedure for Environmental Impact Assessment", which describes the contents of EIA. Main contents are explained as follows:

(1) Proceeding

In order to begin the environmental impact assessment procedure, to promote the pre-assessment and formulate the specific terms of reference to guide the environmental

impact studies, the proposals shall present the following documentation to MEC:

- Description, location and characterization of the activity
- Executive summary of the project
- Data on the environment conditions at the place where the activity is to be implemented

(2) Pre-assessment

a) All activities not covered by the appendix to the present diploma, and capable of causing significant environmental impact, shall be subjected to a pre-assessment undertaken by MEC.
b) The purpose of the pre-assessment shall be to determine whether an environmental impact study is necessary or not.
c) When the pre-assessment indicates that the environmental impact of an activity or undertaking is already known, MEC shall issue the respective environmental license.

(3) Environmental impact study

a) Undertaking the environmental impact study and the monitoring programme is an obligation that is entirely the responsibility of the proposers of the activity.
b) The environmental impact study must contain at least the following:
- The delimitation and geographical representation of the area of influence of the activity, as well as its reference environmental situation.
- The description of the activity and its alternatives, in the planning, construction, operation and (in the case of a temporary activity) de-activation stages.
- The comparison of the considered alternatives and the forecast of the future environmental situation of the influence area in the event of adopting each alternative.
- The identification and assessment of mitigating measures.
- The undertaking environmental management programme, including the monitoring of impacts, and accident prevention and contingency plans.
- Identification of the team that drew up the study.

c) The environmental impact study must also contain a non-technical summary covering the main questions dealt with and the proposed conclusions, for purposes of public consultation.
d) The environmental impact study shall be presented to MEC, in the form of a report written in Portuguese.

(4) Assessment criteria

a) The results of the assessment of the proposed activity shall be determined on the basis of the following factors:
   - The number of covered persons and communities
   - The ecosystems, affected plants and animals
   - The location and size of the affected area
   - The duration and intensity of the impact
   - The direct, indirect, potential, overall and cumulative effects of the impact
   - The reversibility or otherwise of the impact

b) The environmental impact assessment shall be submitted to environmental quality standards and to the maximum tolerable levels of air contamination, water, soil and natural ecosystems.

c) Until specific national standards are adopted, the standards established by international conventions ratified by Mozambique shall be observed.

The procedure for environmental impact assessment is shown in Figure 3.2.1.

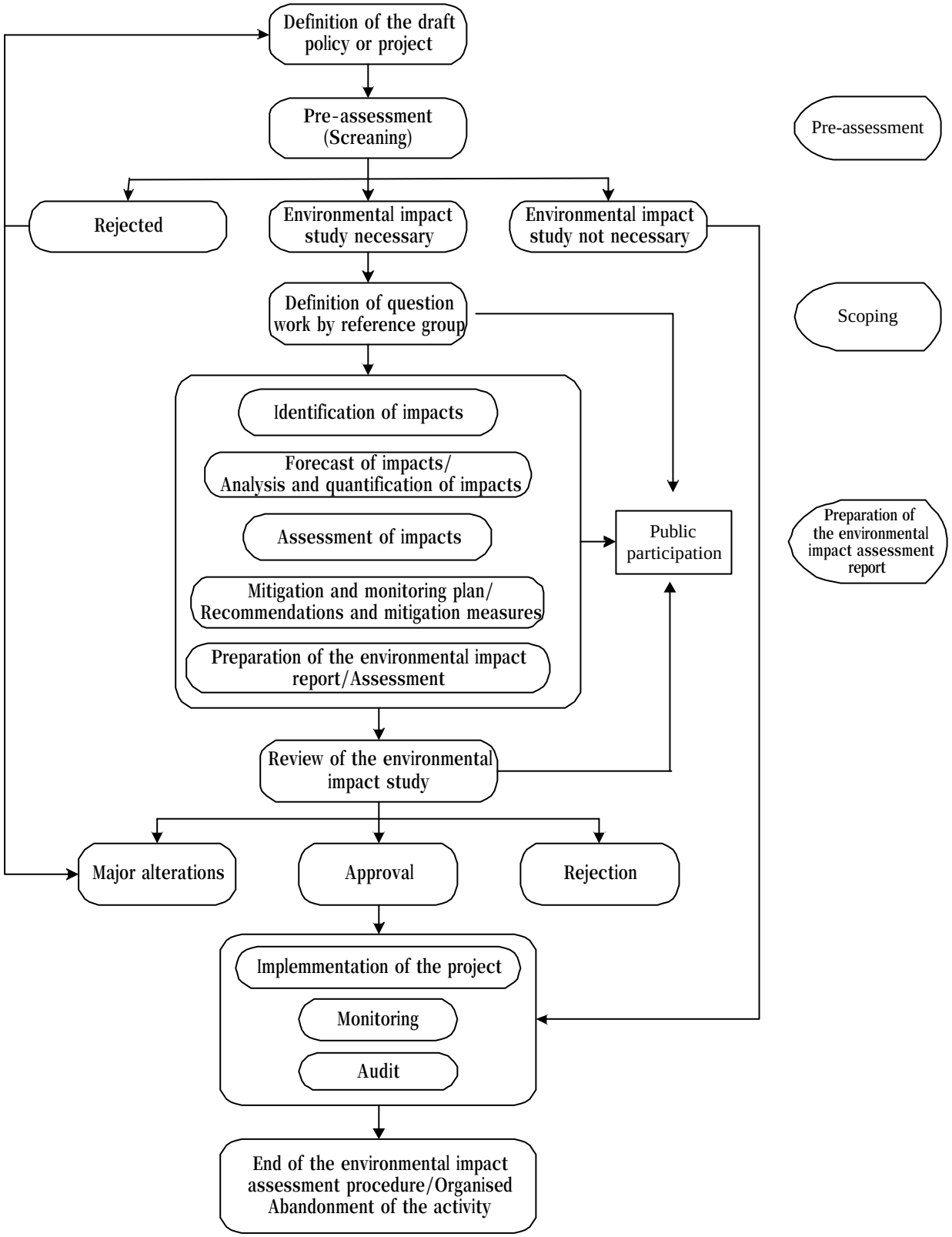


Figure 3.2.1 Environment Impact Assessment Procedure

3.2.3 Environmental Policy and Environmental Administration in Maputo

It has long been concerned that Maputo city has suffered for five environmental problems summarized as follows.

- The problem of water quality
- The problem of wastewater and draining facilities
- The problem of waste
- The Problem of soil, salt damage, slope failure, beach erosion
- The Problem of energy by self-supply

In order to address these problems, Maputo city has been working out an environmental strategy which is drafted, but summarized as follows.

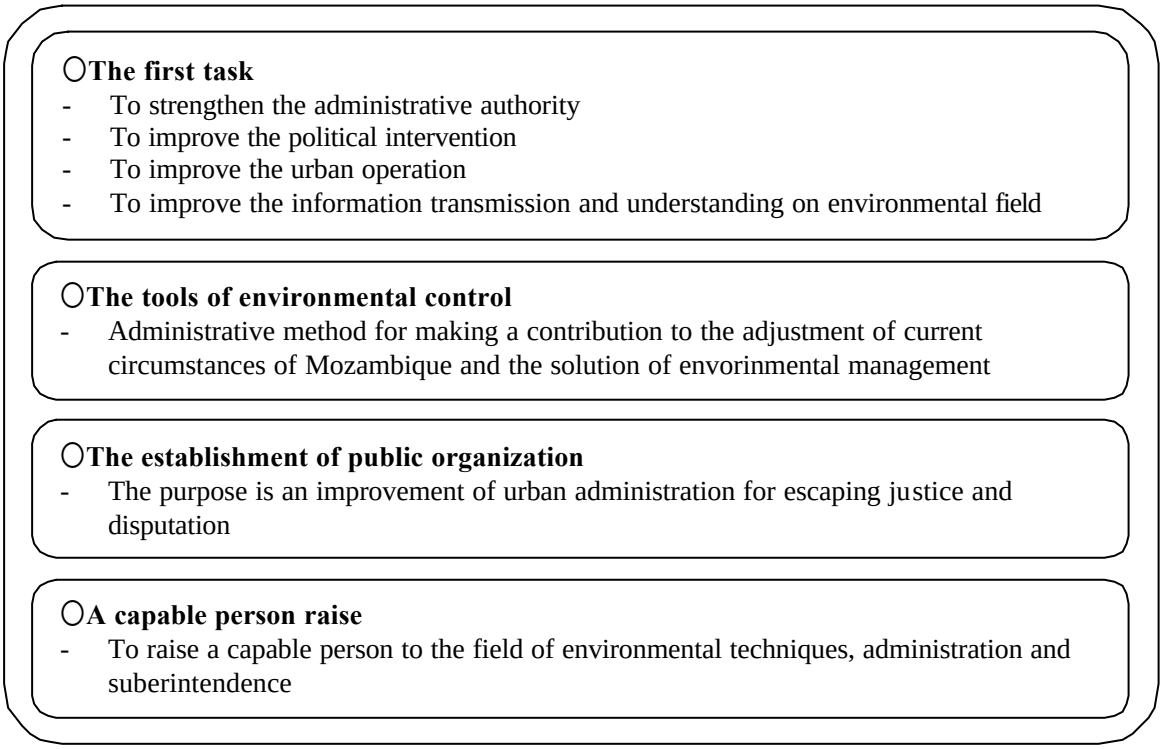


Figure 3.2.2 Environmental strategy in Maputo city

Maputo Municipality Council Environment and Coast Protection Department, which was founded in June of 2000, has seven staffs whereby a member of the city councillor is included. The Environment and Coast Protection Department is in charge of administration that plans and manages all issues related to the environment of Maputo city.

Any sort of environmental ordinance has not been prepared by Maputo city so far, but EIA is expected to be conducted for the approval of the Maputo city, if any project concerning the

environment such as road construction is planned. Basically, such EIA is conducted at expense of the contractor or private company with help of consultants.

The procedure on EIA in Maputo city is that firstly the city inspects the report of EIA submitted by the contractor, and after the approval of the city, the report is presented with the plan of project to MEC. Even though MEC is the final authorizer of the environmental standards, MEC cannot technically intervene the commencement of a project, because the project has normally already been started when an EIA report is submitted to MEC. MEC commands the contractor to make an improvement if it finds the report is not sufficient or any environmental trouble concerns are raised.

3.3 EXAMINATION OF THE ENVIRONMENTAL SITUATION

3.3.1 Social Environment

(1) Demography and Social-Economic Environment

Maputo city is the capital and the center of politics and economy of Mozambique. There is a population of 997,268 (488,352 for male and 508,916 for female) in the city in 1998. With respect to inhabitant density, D.M.(municipal district)№2 is 234 hh./ha., D.M.№3 is 169 hh./ha., D.M.№1 is 113 hh./ha., and D.M.№4, №5 are about 100 hh./ha. It is anticipated that the population will be over one million in the city in 2000.

According to the latest statistical record (1998), Maputo has a workforce population of 300,959 in 1997. Among the workforce population the largest sector is commercial and finance (35.9%), followed by public services (12.9%), manufactual industry (9.8%), agriculture and fishery (9.6%), transport and communication (7.1%), and others (24.7%).

Monthly Income per house hold in Maputo is shown in Figure 3.3.1. The largest sector is monthly 2,000-3,000 thousands Meticas per house hold (13.9%) in urban and 200-400 thousands Meticas (31.7%) in rural.

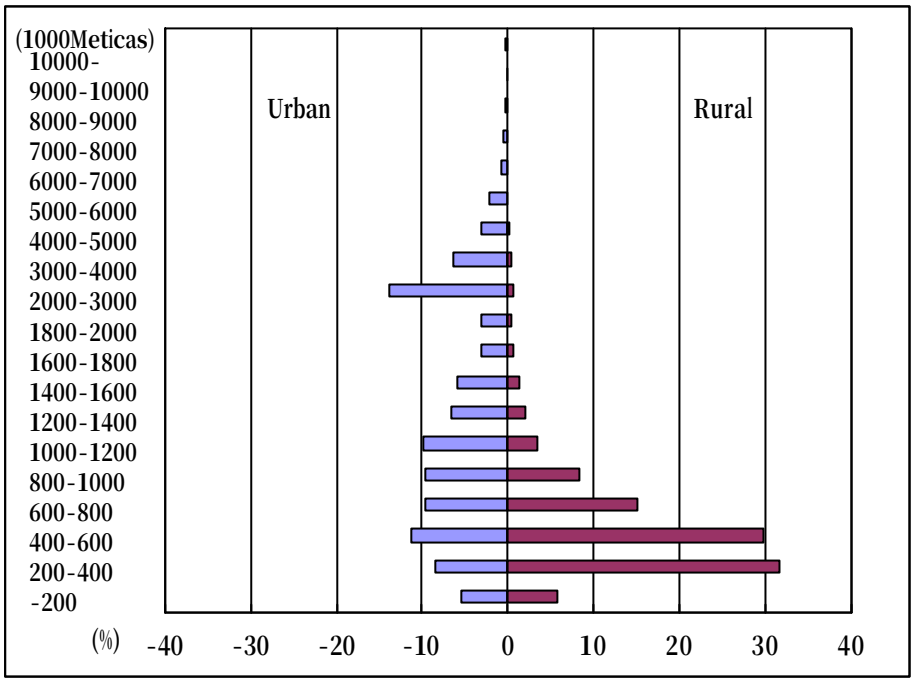


Figure 3.3.1 Monthly income per house hold in Maputo (1998)

(2) Resettlement

It is regulated in "Law on Land Use" that the government of Mozambique owns the whole land and the individual or collective people have the right to use the land given by the government. There is a compensation system for involuntary resettlement in Mozambique. However, there is neither any precise regulation nor law on resettlement. Generally, it is agreed upon in the talks between local people and the Maputo city government to pursue resettlement with help of consultants.

There are a lot of commercial shops, restaurants, residential buildings settled along roads and streets. It is anticipated that a resettlement will be required due to widening of the existing roads. The number of houses to be resettled for the master plan and prioritized projects shall be carefully studied to estimate in order to minimize the affect of construction on habitant's life. The study team is to calculate the compensation values, to carry out the official resettlement program, and to find alternative land for resettlement, if necessary.

(3) Economic Activities

With the urbanization being growing to the suburbs, cultivated area and Maputo's production of agriculture have been decreasing year by year. On the other hand, the production of fishery is increasing with a growth of 36.1%, and others of industry, such as food processing, clothing,

house building, art, chemical industry, mining industry, have a growth of 11.3% from 1997 to 1998. In recent years, with the advancement of South African origin supermarket, the market commercialism has been growing rapidly in Maputo city.

Table 3.3.1 shows structures of economic activities in Maputo city and whole national economy. In Maputo city, the majority of GDP is depending on commerce and other urban-related economic activities such as construction, transport and manufacturing. As against those, agriculture is accounted for only 0.1%.

Table 3.3.1 Economic Activities in Share of GDP in 1998

Sector	Maputo City	National
Agriculture	0.1	22.7
Livestock	0.2	2.3
Forestry	0.5	2.5
Fisheries	0.1	3.3
Mining	0.2	0.3
Manufacturing	13.2	10.0
Electricity and Water	0.7	2.4
Construction	18.2	8.2
Transport (Communication)	14.3	10.1
Commerce	30.7	22.2
Restaurants and Hotels	1.1	1.0
Public Adiministration	4.3	3.1
Finance and Insurance	1.4	1.0
Real Estate and Business	5.1	3.7
Education Service	2.3	1.6
Health Service	0.7	0.5
Other Services	6.9	5.0
TOTAL	100	100

Source: UNDP 2000

(4) Road and Traffic

A two-lane road and a four lane-road that are paved are densely arranging with the east and the west, the south and the north in the center areas of Maputo city. There is no significant congestion of traffic so far, and damage of pavement is not so serious in the city central area. However, in recent years, the pavement of roads located in a lowland area of the city has being damaged by heavy rain and water-pool after the rain, especially in the concentrated rain season. The traveling of vehicles has become difficult day after day in the lowland especially in rain season. On these devastated roads, the vehicle speed is forced to be slow, and such low speed traffic aggravates the air pollution emitted from vehicle exhausts.

In the suburbs, the roads other than main roads are not paved in spite of the condition that the area is highly populated. On these undeveloped roads, the smoky dust rises in a dry season and the surface is very miry in the rainy season, as the ground is composed of fine sands. On these "wild" roads, the traveling condition of a vehicle and the walking condition of a walker are very difficult and it makes people lives very hard.

(5) Public Facilities

The distribution of public facilities, such as commercial facilities (markets), medical facilities, educational facilities, and cultural institutions, are described in previous chapter (Socio-economic characteristics). Generally, they are located in the center areas of Maputo city. These public facilities are taken a special care of consideration in this study.

(6) Split of Community

The administrative boundaries and distribution of areas are shown in Figure3.3.2. The communities have been formed not only by administrative, but also cultural boundaries, such as racial, linguistic, and religious differences. In case of improving the existing roads, these communities should not be affected.

(7) Cultural property

There are 18 items of cultural property (such as buildings, statues, squares and markets) under state protection in Maputo city. Name and location are listed in Table 3.3.2. It is necessary to consider the impact caused by the improvement project.

(8) Solid Waste

Waste amounts are supposed to be 800 tons per day in Maputo city. The amounts that are generated by a person are 0.75 kg per day in the center of city and 0.28 kg per day in the suburbs of Maputo.

Department of Municipal Services and Graveyard (DMSG), which was founded in 2000, is a department that manages solid waste. 200 tons of waste per day are collected and dealt with at one of handling spot of waste, which is managed by DMSG. For small wastes such as litters from home, the local people dispose them by digging them in around home. Locations of waste collection boxes and illegal dumps are shown in Figure3.3.3.

Table 3.3.2 List of historical and cultural items under state protection

No.	Items	Location
1	Casa de ferro(Iron house)	Av.samoral machel e rua antonio manuel de sousa, bairro central, D.U. №1.
2	Mesquita da baixa de maputo (Mosque of maputo low toun)	Rua da mesquita, bairro central, D.U. №1.
3	Casa dos azulejos (Tile house)	Av.martires de inhaminga, bairro central, D.U.№1.
4	Casa amarela (Yellow house)	Praca 25 de junho, bairro central, D.U. №1.
5	Vila joia (Jewel villa)	Av.vladimir lenine, bairro central, D.U. №1.
6	Centro cultural franco-mocambicano (mozambican –French Cultural Certre)	Av.samora machel e rua capitao henrique de sousa, bairro central, D.U. №1.
7	Fortaleza nossa senhora da conceicao (Fortress our lady of conceicao)	Praca 25 de junho, bairro central, D.U. №1.
8	Predio Arpac (Arpac Building)	Rua araujo, bairro central, D.U. №1.
9	Igreja anglicana (Anglican church)	Av.24 de julho, D.U. №1.
10	Arvore " fungosi " ou " sausage tree " ou " kigelia pinnata dc "	Praca 25 de junho, bairro central, D.U. №1.
11	Edificio da estacao C.F.M-sul (Building of C.F.M-south station)	Praca dos trabalhadores, bairro central, D.U. №1.
12	Edificio da estacao central (Building of central station)	Av. 25 de setembro, bairro central, D.U. №1.
13	Edificio dos correios (Post or mail building)	Av. 25 de setembro, bairro central, D.U. №1.
14	Predio pott (Building pott)	Av.samora machel, bairro central, D.U. №1.
15	Edificio da 1a esquadra da prm (Building of PRM 1police station)	Bairro central, D.U. №1.
16	Estatua"samora machel" (Samora machel statue)	Av.samora machel, frente do jardim tunduru, bairro central, D.U. №1.
17	Estatua " eduardo mondlane " (Eduardo mondlane statue)	Av. Eduardo mondlane, bairro do alto-mae.
18	Praca dos herois (Square of herdes)	Av. Acordo de lusaka e Av. Das FPLM.

Source: Ministry of Culture document, 2000

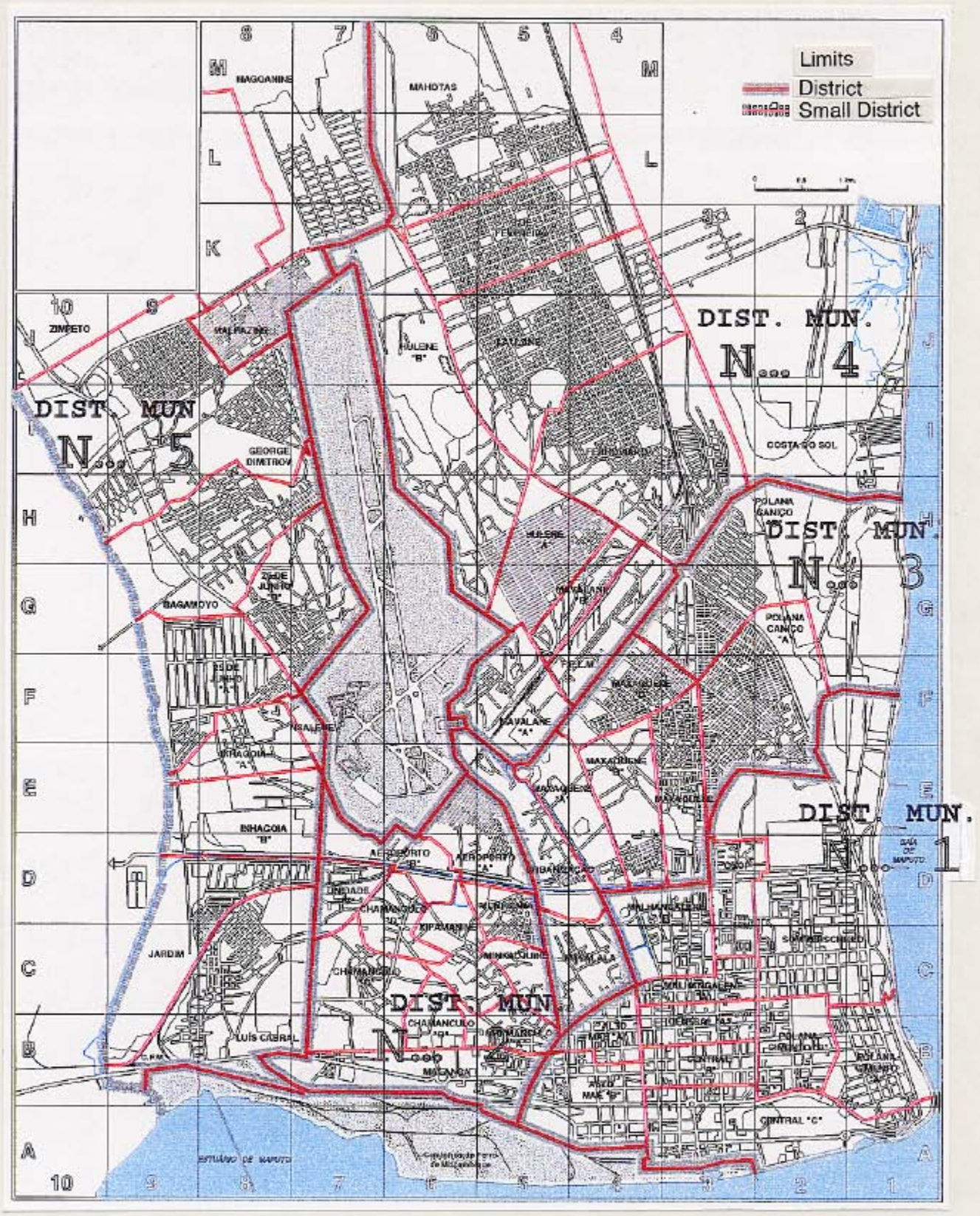


Figure 3.3.2 Administrative Division of Maputo

Daily Waste Amount Produced by One People

Urban Area :	0.750 kg.
Suburban Area :	0.280 kg.
Peri-urban Area :	No Information

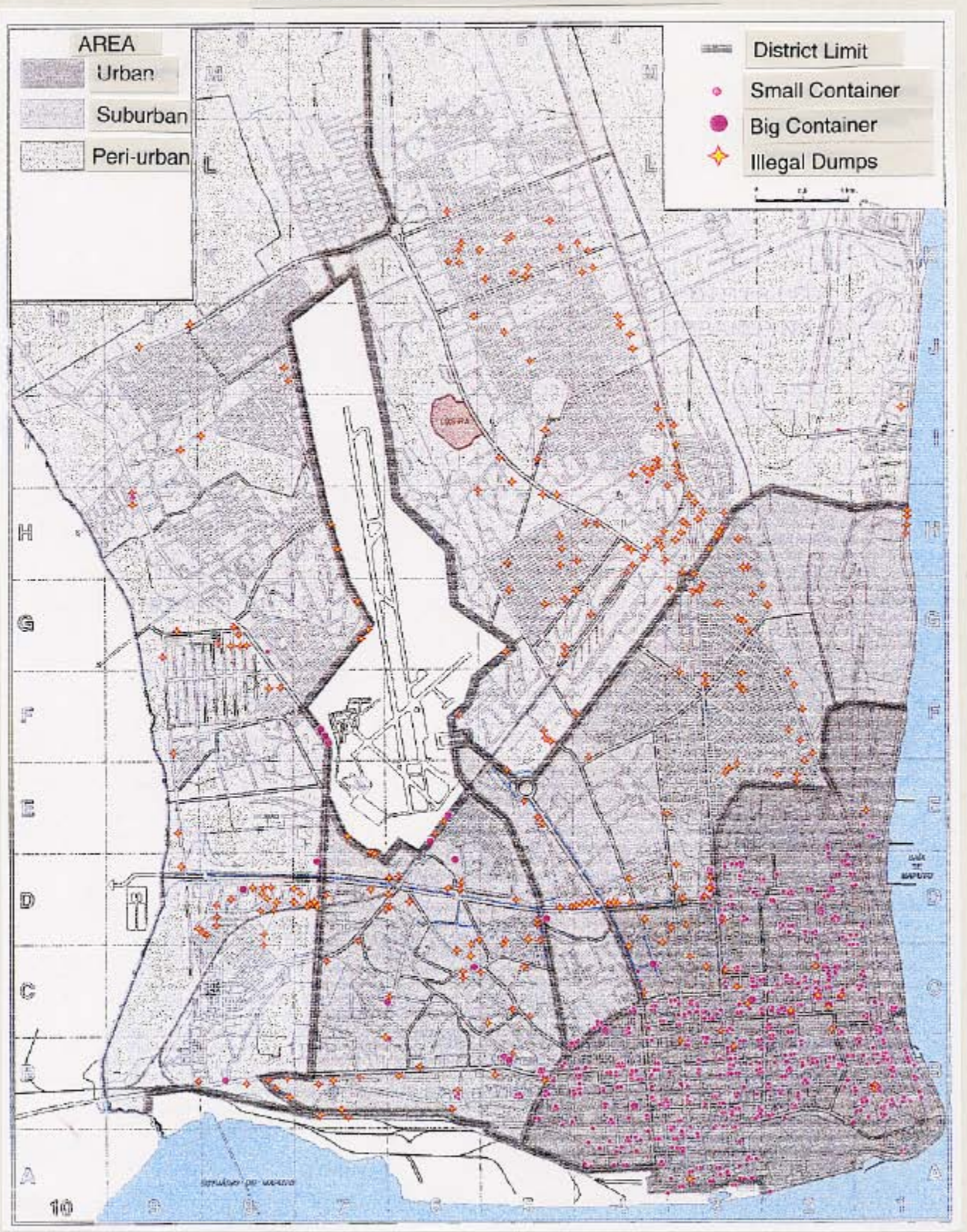


Figure 3.3.3 Distribution of Waste Containers and Illegal Dumps