

5 Urban Environment and Poverty in Indonesia

Sustainable Urban Development in Indonesia

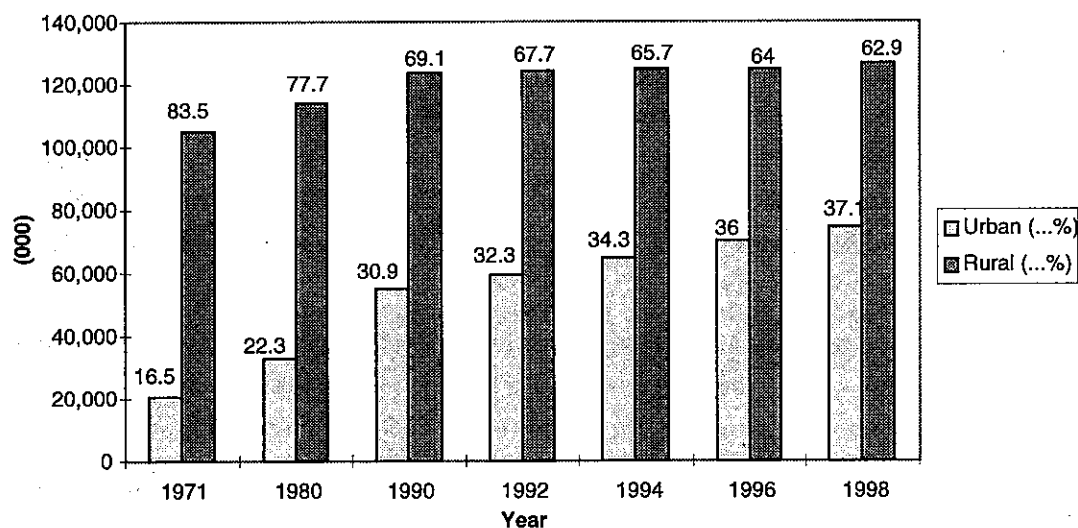
Mohamad Soerjani and Takashi Hayase*

1. Sustainable Urban Development in Indonesia

Indonesia is the largest archipelago in the world, which has a total 17,508 islands. The total land area is 1,937,179 sq. km. The Indonesian exclusive economic zone sea area is approximately four times its land area. The archipelago is located between the Pacific and Indian Oceans, and bridges the mainland Asia and Australia. It has therefore, a unique perspective as part of South East Asia and a specific geography, natural resource and demographic feature.

Total population of Indonesia was 119,268,000 in 1971 and was increasing averagely with 2.5% annually to become 201,537,000 in 1998. The percentage of people living in urban areas was increasing from 16.5% in 1971 to become 37.1% in 1998.

Figure 1 Spatial distribution of the population in Indonesia, 1971 - 1998

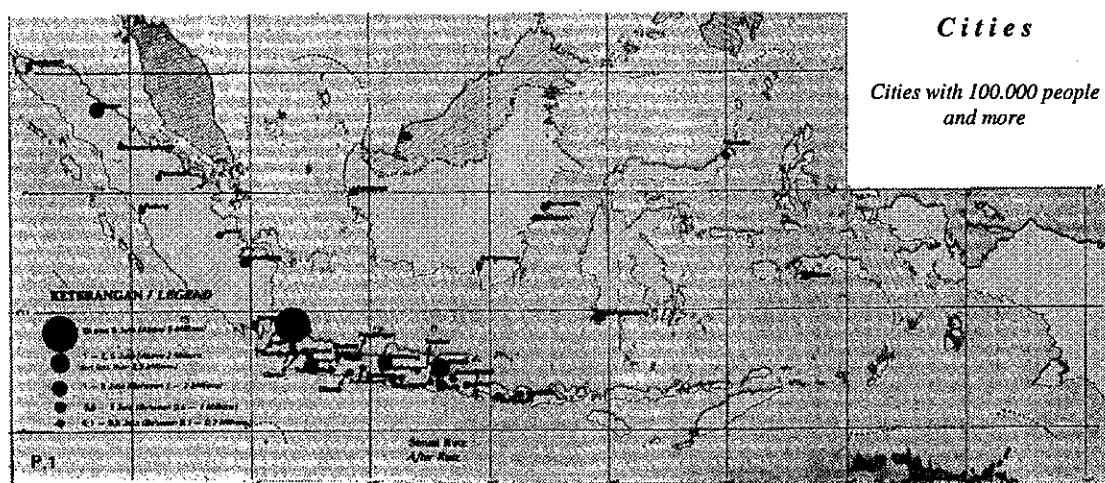


Source: Central Bureau of Statistic (1998)

* This report was prepared by the Team Leader of the Study Team with the Japanese counterpart. The implementation of the study was conducted in Tangerang by: M. Djuhari Wirakartakusumah, Sugeng Rahardjo, Tris Eryando, Jun Yamashita, Siti Rofiah, L.A. Nistyantara, Elvi Adhana & Ratu Fifi Sophia. While the study in Mataram was conducted and supported by: Supardiyono, Siti Rofiah, Verlinda Legiyana, L.A. Sandi, Tuti Lestari, M. Jobeng, A.A. Bhakti, T. Sugiarto, Burhanuddin & Herni Aquarita.

Indonesia's population distribution is uneven. The Java island which has 6.8% of the total land area is inhabited by almost 60% of the total population. The most densely populated province is Jakarta with 12,495 individuals per sq. km in 1990, while the lowest population density is West Papua province with four individuals per sq. km. It is understood, therefore, that cities grow mainly in the densely populated islands (Figure 2).

Figure 2 Distribution of Indonesian cities by city-size



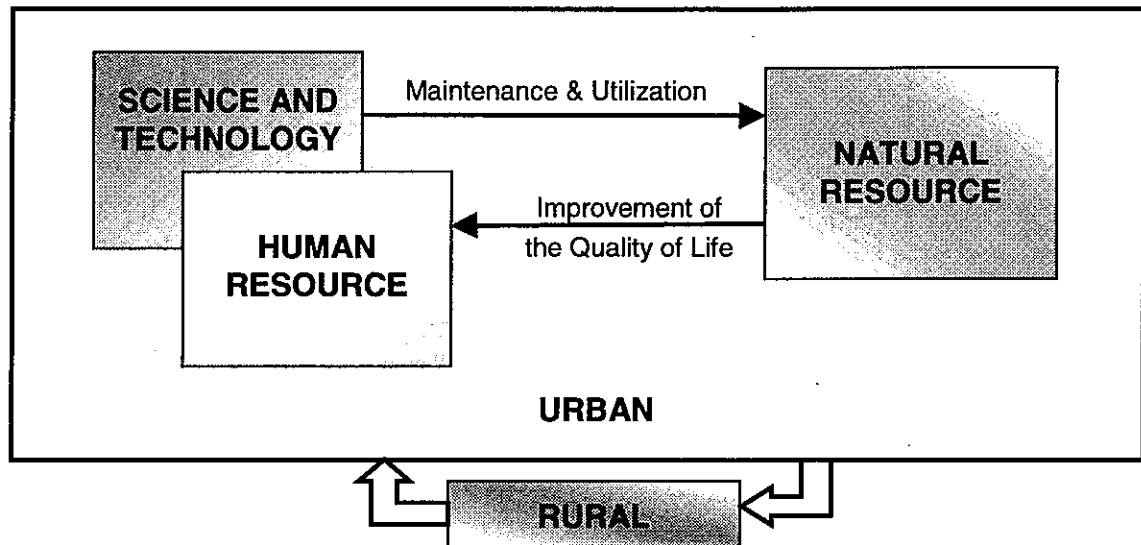
Source: Sandy (1995)

The growth of cities depends on the human activities which can be classified as its driving force, namely as the center of the government at various levels, as industrial growth centers, mining growth centers, agricultural based cities and tourism centers. The study of sustainable urban development in Indonesia will be conducted in two cities: Tangerang as the case of an industrial city and Mataram as a case of a tourist city.

The study is based on the paradigm of sustainable urban development, and this refers to the main components of a system, namely the *human resource*, how people acquire *science* and *technology* to maintain and utilize *natural resources* to improve the *quality of life* as a whole, proportionally.

In general, urban system could not entirely sustainable by itself because of its limitation of foods and other essential needs (see Figure 3). A city in many cases badly needs the rural system to sustain. Therefore, a sustainable development of a city is only feasible if the whole system could maintain the partnership for equal mutual benefits from natural resources and other essential needs with the entire rural system. This concept of sustainability and practicalities will be the main approach for sustainable urban development with two case studies.

Figure 3 Conceptual Framework of urban sustainability and its relations to other factors



Source: Soerjani (1997)

2. Urban Development in Indonesia: The case of Tangerang

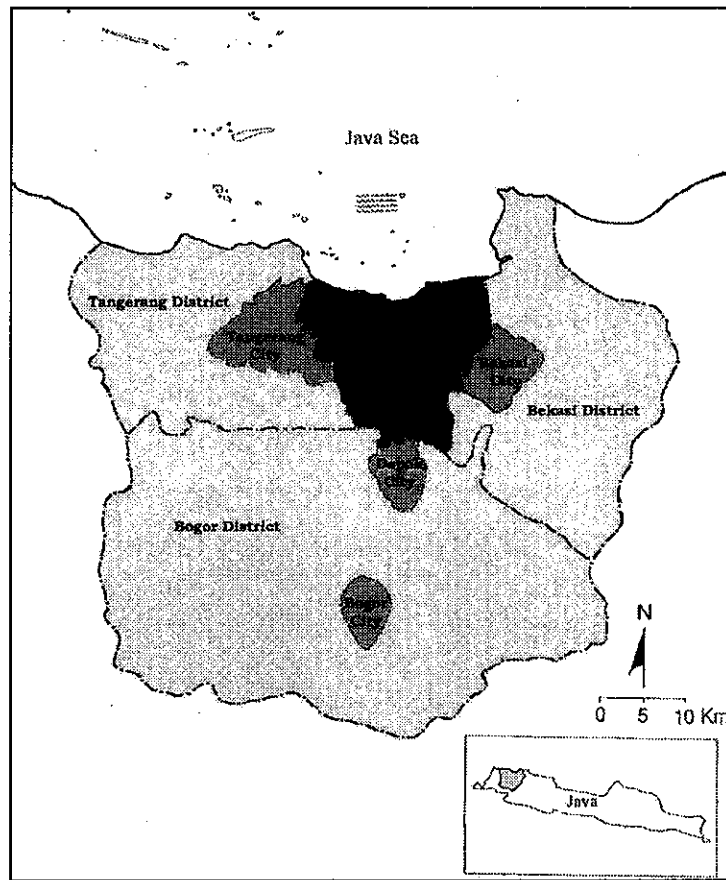
2.1 Tangerang: the Case of an Industrial City

The existence of cities in Indonesia has a very long history, perhaps even as long as the history of human kind in this country. An ancient Kingdom nearby Jakarta is known to exist around the fifth century, although the existence of the city itself was only known when the Portugese migrants came in 1513. On June 22, 1527 the name of the harbour Sunda Kelapa was changed to Jakarta later (Anon 1999).

After the proclamation of the Republic of Indonesia in 1945, Jakarta became the capital city of the country. With the rapid growth of the capital city due to the rapid growth of its population, in 1974 it was decided to broaden the city to include Bogor, Tangerang and Bekasi districts as an integrated development area called *Jabotabek* (Jakarta, Bogor, Tangerang, Bekasi) or Greater Jakarta. This includes expansion of settlements as well as manufacturing industries, trades and other infrastructures.

Tangerang is an area under Banten Kingdom and from 1687 until 1720 it was administered under three Maulanas (Islamic leaders). In 1945 as a subdistrict of Jakarta, it was separated to become a district under West Java administration. As a follow up of the creation of Jabotabek in 1974, Tangerang district and the city of Tangerang has been included as part of Jabotabek development area. Since then the status of Tangerang as a buffer area of Jakarta development is obvious.

Figure 4 Map of Jabotabek area



The administrative city Tangerang was established in 1982, and ten years later in 1992 it was “upgraded” to become an autonomous city. The main function of Tangerang is to accommodate manufacturing industry development, mainly as an expansion of industrial growth of Jakarta. Besides, Tangerang also functions as additional settlement expansions and the related service infrastructures mainly for transportation, trade and economic facilities. The geographic location of Tangerang is shown in Figure 4.

2. 1.1 Population and land use

Tangerang has 17,243 ha of land with a population of 1,431,631 in 1996. This means a density of 8,303 individuals/sq.km (Statistical Office of Tangerang District 1996). The dynamics of the population in Tangerang showed an increase of 6% from 1995-1996 to become 1,431,631. The natural increase due to child birth was 1,56%, and the rest was due to the immigration of 50,156 individuals, and outmigration of 10,362 people, including 557 families with a total population of 1,557 transmigrated to other islands.

Table 1 Land use changes in Tangerang, 1990-1995

Land use (h.a.)	1990	1995	Changes 1990-1995	
			+	-
Forest	-	-	-	-
Plantation	-	-	-	-
Rice fields	7,781.0	3,015.5	-	4,765.5
Dry land	2,899.0	1,831.5	-	1,067.5
Industry	585.0	1,761.5	1,176.5	-
Settlement	4,249.0	7,251.0	3,002.0	-
Fisheries	-	-	-	-
Others	1,729.0	3,383.5	1,654.5	-
Total	17,243.0	17,243.0	5,833.0	5,833.0

Source: Soesanto (1997).

As shown in Table 1, since 1990 there was no forest in Tangerang, while the former rubber plantations were already converted to other man-made land uses. Rice fields are the most vulnerable land area to be converted. A total of 4,765.5 ha were converted in 1995, partly for industries (1,176.5 ha) and settlements (3,002 ha). Partly maybe also for offices, hotels and shops and other uses (roads, hospitals and other infrastructures). Some the rice fields were also converted to become dry lands reserved to be converted for industries or settlements.

The need of lands for industries, settlements and other uses are also extended to the Tangerang districts, such as in Tigaraksa, Ciputat and Serpong sub-districts. The sub-district Benda has to loose rice fields, swamps and mangroves to be converted as the Jakarta Soekarno-Hatta International airport (1,816 ha). These create certain impacts to the nearby landowners, due to noise and other polluted emissions. Meanwhile the airport does not directly profitable to most of the local people, since almost none of them are coopted by this colossal project of the airport.

2. 1.2 Social aspects

The social aspects to be discussed are the workforce and employment, the family income, the basic needs, the human health, education and skills and social security.

Based on the age distribution of the population in Tangerang the *workforce* is 62.3% (891,742 out of 1,431,631 total population), while the dependence ratio is 1.65. This means that every productive person has to sustain approximately two other unproductive persons. There are unemployed groups of people, however, the exact number is unknown. In 1996 it was recorded that there were 12,009 people (50.4% were females) who are seeking for employment. They consisted of graduates from primary, secondary and high schools, while 814 (6.8%) among them graduated from tertiary level education (Statistical Office of Tangerang District 1996). In the meantime there were vacancy of employment for 6,860 workers (for industry 60.5%; trade 22.1%; finance 7.2%; services 5.8% and transportation 4.9%).

Table 2 Food balance in Tangerang, 1996

	Basic needs	Total needs (A)	Total Production (B)	Balance (A - B)
	(kg/cap/year) ¹	(kg/year)		(kg/year)
Carbohydrates	144	206,154,860	14,831,000	191,322,860
Vegetables & fruits	72	103,071,430	3,847,670	99,217,760
Fish & meat	18	25,769,358	2,388,853	29,280,505
Milk	72	103,077,430	-	103,077,430 ²
Drinking water ³	720 (l)	1,030,794,300 (l)	-	-

Source: Statistical Office of Tangerang District (1996).

1. based on the calculation of Sediaoetama 1990

2. provided by Tangerang district: from 2400 milk cows (Statistical Office of Tangerang 1997)

3. mostly from tap water, wells and perhaps also from rivers

The *family income* of people in Tangerang is calculated from the city income in general and the local government tax income that should be used to improve the quality of life of the people. The data available from the *Balance of Regional Environmental Quality 1995* prepared by the Tangerang Government (1995) the average GDP/capita/year was Rp. 4,503,000 (approximately US \$ 750/year or an average of US \$ 62.5/month). The rural people around the city have only Rp. 1,684,000 (approximately US \$ 280/year or US \$ 23/month). To come to the individuals it varies a lot depending on their professions.

The wide gaps due to discrepancies of the family income among the city dwellers and between the urban and rural people may cause different life style. Some of the haves performed "western" life style that strikes contravenes with the local tradition or "eastern" culture. This may create certain social jealousy that can easily trigger social conflicts. The *food balance* for Tangerang's people implicitly demonstrates such a change of life style (see Table 2).

It has to be noted that the other basic needs of human beings are health, shelter, education and peace.

Following WHO indicator, *health condition* of the people in a country or area is based on the percentage of the population that is served with clean water. Indonesia is considered to have only 47% of the people who obtained proper health service based on the fact that only less than half of the people receive clean water service. Having six hospitals means that every hospital will serve 238,605 people and every medical doctor will serve 7,230 people. This indicates that the health service of the Tangerang for the people is considered poor.

Compared to figures of education profile in Jakarta and Indonesia (see Soerjani 1997a: 406) the education of people in Tangerang is lower than the average of Jakarta people, while somewhat better than the whole Indonesia. As an example following the compulsory education regulation (up to

* Times No. 41, 5 Nov. 1990

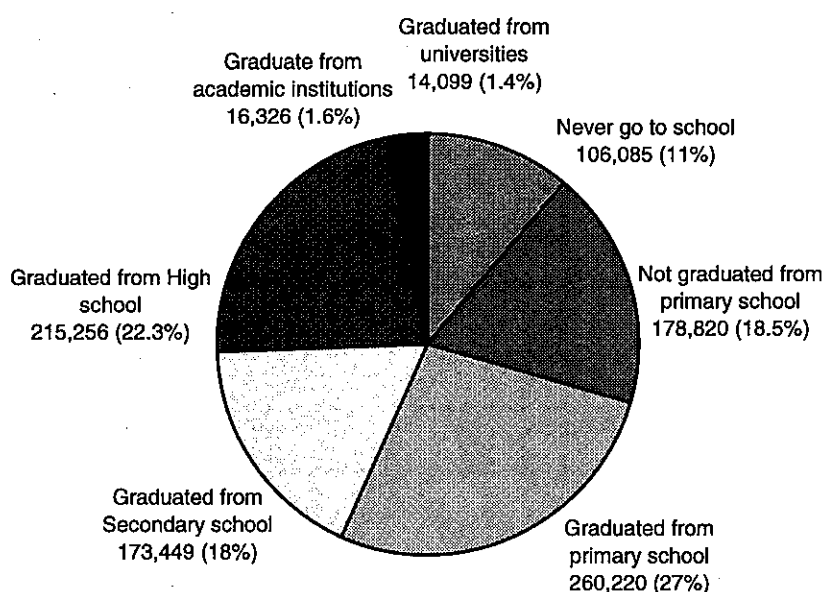
secondary school), Jakarta had 21.7% and Indonesia had 8.0% both in 1988, while in Tangerang in 1996 was 18%.

Table 3 Facilities of health service and their personnel in 1998

Facilities	Number	Personnel
Hospital	6	With: 198 medical doctors
Delivery hospital	17	105 midwives
Clinics	28	87 traditional midwives
Other health service	813	250 nurses

Source: Statistical Office of Tangerang city 1998

Figure 5 Educational background of Tangerang's population, 1996



Source: Statistical Office of Tangerang District (1996)

As a complementary education opportunity the Department of Manpower has a Work Training Center (Balai Latihan Kerja), to improve the skills of manpower, although in reality this has no significant results yet to improve the technical skills of the workers. As a consequence any institution or private sector who are in need of the graduates to be employed, in general special technical skill training has to be conducted for the candidate workers, or some (such as Gajah Tunggal Industry) who have apprentice schools are also offering the opportunity open for candidate workers of other industries.

The most important thing is also to empower the school children and the trainees to acquire entrepreneurship themselves to be able to create jobs and to include others to be employed. The social security in Tangerang is considered vulnerable. This is due to the fact that criminals from Jakarta are mostly hiding in the surrounding cities, mainly to Bekasi (to the east) and Tangerang (to the west). It is to be admitted that after the resign of President Suharto in May 1998, there have been riots in many parts of the country, in East Java (Banyuwangi), Solo, Ambon, Aceh, Medan, Jakarta and surroundings including Karawang (Bekasi district), Ciputat (Tangerang district) and in Tangerang itself. This is due to the serious economic and law crises, that to some extent the security could not, so far, be managed or overcome by the police. Hungry people may do almost everything to survive.

2. 1.3 Economic, industry settlement and infrastructure

The actual facts that Tangerang is developing, is indicated in the economic development, the growth of industry, settlement and infrastructure. This means that Tangerang development as indicated by economic sector is dominated or characterized by manufacturing industry and banking as well as financial services. Agriculture has the least contribution in the economic growth of the city. Almost all agricultural products for food is provided by Tangerang district or other surrounding regions, or even imported from other countries. There was a very small contribution from vegetable and fruit growing activities in the city as well as fisheries from ponds, open water and rivers (Cisadane river and its tributaries). Other agricultural products are coconut, bamboo and cashew nuts from people's home gardens (not from plantations).

Table 4 Growth of Gross Regional Domestic Product in Tangerang City

Type of Business	1993-1994 (%)	1994-1995 (%)
Agriculture	- 21.42	9.63
Mining ¹	-	-
Manufacturing industry (non-oil industry)	32.90	37.62
Electricity and clean water	19.74	19.84
Construction	12.48	18.63
Trade, hotel and restaurant ²	28.79	19.91
Transportation	21.32	15.11
Communication	34.70	43.77
Banking & finance	23.86	29.64
Other services	15.32	21.19
Average	27.30	27.18

Source: Statistical Office of Tangerang District (1996)

1. Mining for queries, etc. is provided by Tangerang districts

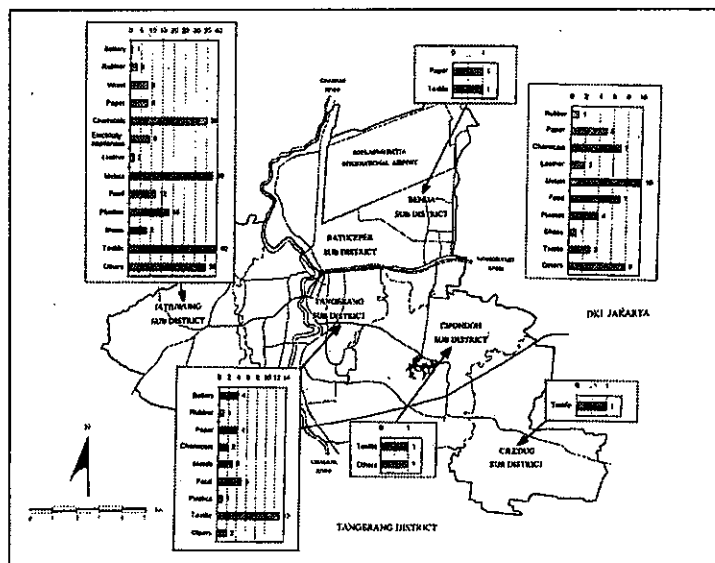
2. Hotel is the most significant contribution under trade category

Table 5 Location of major industries in the sub-districts of Tangerang, 1997

Industries	Benda	Batuceper	Jatiuwung	Tangerang	Cipondoh	Ciledug	Total
Battery	-	-	1	4	-	-	5
Rubber	-	1	3	1	-	-	5
Wood	-	-	8	-	-	-	8
Paper	1	5	8	4	-	-	18
Chemicals	-	7	35	2	-	-	44
Electrical appliances	-	-	9	-	-	-	9
Leather	-	2	2	-	-	-	4
Metals	-	10	38	3	-	-	51
Food	-	7	12	5	-	-	24
Plastics	-	4	18	1	-	-	23
Shoes	-	1	8	-	-	-	9
Textile	1	3	40	13	1	1	59
Others	-	8	35	2	1	-	46
Total	2	48	217	35	2	1	305

Source: Tangerang City Government (1997)

Figure 6 Spatial distribution of Tangerang's industries



Source: Tangerang City Government (1997)

The *manufacturing industry* has grown naturally in Tangerang due to the various facilities provided by the local government. In 1993 there were already 1,053 industries of which 6,8% (72 industries) were based on foreign investments, 15,5% (163 industries) with domestic investment and 77,7% (818 industries) classified as non-facilitated industries.

Since the 1980s water consuming industries in Jakarta, among others *batik* industries had to be relocated to other areas such as to Tangerang, so that there will be less river and open water pollution in Jakarta. The water consuming industries in Tangerang depend on Cisadane river and Mookervaart canal. The various types of industries and their locations in six sub-districts of Tangerang are shown in Table 5 and Table 6. The other small and medium industries are among others batik factories, garment industries, food industries such as *tofu* and *tempe*, beverage factories, etc.

Settlements in Tangerang has been growing along with the increase of its population. The property business is mostly provided by Bumi Serpong Damai, Ltd. (BSD) which also covers housing constructions in Tangerang district. BSD is building mostly luxurious housing units (see Figure 7).

The government itself has the State Housing Company "Perumnas" (National Housing Company) which provides mainly medium, small and very small housing for government officials and low-income families. Some of the housing contractors are facing difficulties in the present economic crises, they are forced to delay new constructions. Therefore, there are rice fields and dry lands that are waiting for the actual construction, and for a while classified as the "sleeping" land. To overcome the need for basic food for the poor, there is recent campaign that the "sleeping" land is to be used to plant food crops such as cassava, corn, vegetables, etc (see Table 8). The infrastructures of Tangerang are being built such as for bus terminal, post office, roads and bridges, shopping centers, etc. Nevertheless with the present crises, some of the roads are lack of proper maintenance.

Figure 7 Bumi Serpong Damai, a property building company in Tangerang

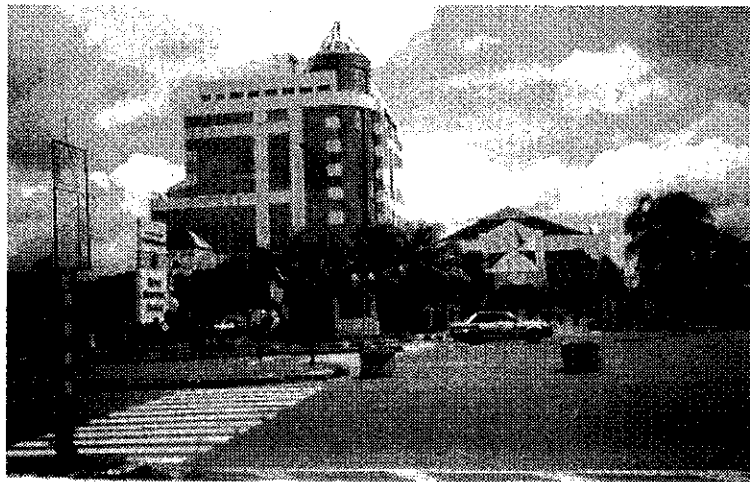


Figure 8 "Sleeping Land" in Tangerang



2. 1.4 Natural resources and energy

The major sources of *water* consumption in Indonesia include primary industry (agriculture), manufacturing industry and domestic uses (offices, service industries and houses). The required amount of water supply is 2.00 m³/capita/day. The domestic use is for drinking water and other personal uses which is 180 l/cap/day, including two liters a day as drinking water (Sediaoetama 1990).

Based on this calculation the services of the Clean Water Installation is not adequate. The need of clean water for domestic purpose (based on its 1996 population of 1,431,651) is 90,192,753,000 l. While the Clean Water Installation can only provide a total supply of 8,192,140,000 l or about less than 10% of the need. Therefore, as shown in Table 6, water for domestic uses are taken not only from tap water, but also from wells and rivers.

Table 6 Water supply for households in Tangerang City, 1996

Source of water	Number of Household	Share (%)
1. Wells with pumps	170,431	68.7
2. Wells without pump	25,136	10.1
3. Tap water	51,117	20.6
4. Rivers and others	1,213	0.5
Total	247,897	100.0

Source: Tangerang City Government (1997)

There is inadequate data related to *energy* needs and supply. The only information is from electricity and is shown in Table 7. To meet the real need for energy, particularly for settlements, the use of kerosene, coal and firewood is also a common feature.

Table 7 Consumption of electricity in Tangerang City, 1996

Purpose	Number of Consumers	Supply (KVA)	Consumed (Kwh)	Price (in million rupiah)
Social	1,543	7,841.50	765,315	115
Houses	169,024	135,096.30	21,404,304	3,280
Business	7,806	138,690.50	11,037,546	2,638
Hotels	6	50,198.10	348,367	84
Industries	1,226	528,020.30	75,346,974	13,202
Offices	147	7,865.25	1,646,078	413
Roads	71	1,882.81	903,547	152
Total	179,823	869,594.76	111,452,131	19,884

Source: Statistical Office of Tangerang City (1997)

2. 1.5 Urban environmental problems

As a city dominated by industrial development, the Environmental Management Center's team has conducted studies to monitor *waste* produced by various activities, from manufacturing industries, domestic and transportation. There are also wastes from rice fields and cattle rangelands. This consists of air pollution, effluents and solid wastes.

The most important air pollutants were CO₂ (996,239 ton/year), CO (58,294 ton/year), NO_x (7,415 ton/year) and dust (7,177 ton/year). Effluents from manufacturing industries were among others total dissolved solid (61,501 ton/year), suspended solid (28,956 ton/year) and COD (48,901 ton/year). The solid wastes source were domestic wastes (379,781 ton/year), while from industries were less (25,213 ton/year) (Statistical Office of Tangerang City 1998).

Figure 9 An industrial plant alongside Cisadane River



* Poor people in our concept are those who can not help themselves to provide with their own basic human needs. They can only survive if properly backed up with subsidy or mercy from others.

Figure 10 · Cisadane river flowing across Tangerang



The quality of Cisadane river was monitored with 23 parameters. Most of these parameters were not exceeding the threshold levels except fluor (F) which is exceeding threshold in the midstream (1.975 mg/l) and oil & grease which were 2.2, 3.1, and 3.7 mg/l in the upstream, midstream and downstream respectively. Chlorine (Cl) was also approaching the threshold level (525 mg/l) in the midstream, while the threshold level is 600 mg/l (see Figure 10).

2. 1.6 Development policy

National development in Indonesia refers to: *“efforts to improve the welfare of the people, through the careful utilization of natural resources as a basis for further development”*. Institutionally development at the national level is guided by the Outline of the Guidance for the State Policy (*Garis-garis Besar Haluan Negara* = GBHN) and explained as the Five Year Development Plan (*Rencana Pembangunan Lima Tahun* = Repelita) and the detailed plan and budget is formulated as Yearly Development Plans. Institutionally national development will have to be implemented by all sectors of development and coordinated by the National Development Agency (*Badan Perencanaan Pembangunan Nasional* = BAPPENAS).

At the national level there are laws, government regulations, and Presidential as well as Ministerial decrees related to environmental management. In 1982 the first environmental act was launched which was then replaced in 1997 with Act No. 23 of 1997 concerning Environmental Management. This was completed with some other Government Regulations such as No. 51 of 1993 concerning the Analysis Upon the Impact on the Environment and Ministerial decree of the Minister of State for Population and Environment as KEP-51/MENKLH/10/1995 concerning the Quality Criteria of Effluent of the Operating Industries (which covers 21 industries).

After the Rio Declaration and the Agenda 21 (1992) was ratified by the Indonesian Government, in 1997 the *Agenda 21 for Indonesia, the national strategy for sustainable development* was officially

launched. Environmental problems are under the responsibility of the Minister of State for Environment, who concurrently also acts as Chairman of the Environmental Impact Control Agency (*Badan Pengendalian Dampak Lingkungan* = BAPEDAL) (Soerjani 1997). The agency is supported by the Environmental Management Center (EMC = *Sarana Pengendalian Dampak Lingkungan* = SARPEDAL) located in Serpong, Tangerang district. This center received support from JICA in terms of facilities, equipments and experts.

The local government of Tangerang is officially under the administration of the West Java Province, although as part of Jabotabek region, the Province of the Special Capital City of Jakarta is also coordinating certain aspects of the city sectoral development. Other Departments (e.g. Industry and Trade, Public Works, Agriculture, Health, etc.) have representatives to assist the West Java Governor and the City Mayor to convey policies of the respective department in each sectoral development. To coordinate various sectors of development, there is a Regional Development Planning Agency (*Badan Perencanaan Pembangunan Daerah* = BAPPEDA).

Environmental matters in the city of Tangerang is under the responsibility of Bureau of the Living Environment (*Biro Lingkungan Hidup* = BLH), which in 1998 was changed to become Regional Environmental Control Impact Agency (*Badan Pengendalian Dampak Lingkungan Daerah* = BAPEDALDA).

2. 1.7 Analysis of the Tangerang development

In the evaluation of *successes of development* of Tangerang, there are some indications of successes:

- ❑ There is an increasing trend of investments in industrial development, from foreign capitals as well as from domestic resources,
- ❑ The number of industries are also increasing,
- ❑ The status of the local city government has been recognized as an autonomous administration, which means that the local people through their representatives are trusted to develop certain local policy and activities,
- ❑ There is an increasing immigration people from elsewhere, which indicates that there are certain successes attracting people to participate and contribute to the city development,
- ❑ After several years of industrial development the main river flowing through Tangerang is considered not yet polluted.

The *shortcomings* that may affect further successes are:

- ❑ Participation of the local people to be coopted by industry are still inadequate; some industries are employing only 10% or less of the workers recruited from local people, the rest were workers coopted from distance areas, mostly from Central Java,

- ❑ There are still a wide gap between the haves and the haves-not due to discrepancies in the family income,
- ❑ There are still lack of skills of most working generations in Tangerang, therefore, most key employment in the government offices as well as private sectors occupied by outsiders as well as foreigners,
- ❑ Education status of the school age children are still beyond the expected level,
- ❑ Social security is not very conducive for further development efforts, there are increasing criminalities, especially during the last two years due to the economic crises.

2. 1.8 Recommendations for Tangerang's future development

The *short-term recommendations* are as follows:

- ❑ The community security due to the political and economic crises should be restored and improved, and this requires solidarity and trust among all concerned,
- ❑ Local people should be coopted in development activities as stakeholders especially by industries, not just in quantity but also in their quality positions,
- ❑ There must be goodwill to overcome gaps in life styles among people to avoid social jealousy that could trigger criminal security.

The *long-term recommendations* are as follows:

- ❑ There should be efforts to provide technical skill trainings for jobless people and drop-outs school children,
- ❑ To establish "distance learning" or open school for the workers, especially the child workers,
- ❑ Any facility owned by industries should provide apprenticeships, learning by doing for local people,
- ❑ To develop cooperative systems among groups of the same profession and activities, mainly for the grass-root people, which is also meant to avoid monopoly,
- ❑ Selected successful workers of industries could be gradually coopted as share-holders of the industry in cooperative systems where they belong to,
- ❑ Gradual improvements of the industrial activities to comply with environmental law and regulations to avoid pollutions that may affect environmental quality degradations as well as health problems and social security.

3. Urban Development in Indonesia: The case of Mataram

3.1 Historical background

Little is known about the prehistory of Lombok island, where the city of Mataram is located. The Sasak language, like most languages spoken in the archipelago, is Austronesian. The Austronesians, originating in mainland Asia began expanding from Taiwan around 5,000 years ago to populate the Philippines, Indonesia and the South Pacific Islands.

After Indonesia's proclamation of independence in 1945, Lombok was made part of the Lesser Sunda province in 1949. In 1951, the province of West Nusa Tenggara was created, with its capital city in Mataram. Today, Lombok splits into three administrative districts, or *kabupaten* - West, Central and East Lombok – with their capitals cities, respectively at Mataram, Praya and Selong.

3.2 Bio-geography

Lombok's area is 4,739 sq. km with 2.3 million people, both are just smaller than Bali. Some 85,000 Balinese live in West Lombok. Mataram is the capital city of West Nusa Tenggara province (see Figure 11). The map of Mataram city is shown in Fig 12. Lombok is dominated by 3,726 m Rinjani mountain, the highest volcano in Indonesia, and the second highest point after Jayawijaya mountain 4,884 m in West Papua. The coastal hills to the south with average elevations around 500 m, do not form a watershed, but drop directly into the sea. These cliffs frame beautiful bays and sandy covers. The strait between Bali and Lombok marks a very important ecological boundary that was discovered by Sir. Alfred Russel Wallace in the 19th Century. He, who spent from 1854-1862 exploring the archipelago, was the first to notice that in crossing from Bali to Lombok, the forms of large, terrestrial natural life change markedly. Beginning with Lombok, observing the *fauna* community, he found no more elephants and rhinos, or tigers — in fact, he found no more carnivorous mammals at all, except for civets, and no more insectivores, with the exception of a small shrew. Starting at Lombok and including in its range the islands to the east, Wallace found mound – building megapodes – whose eggs are laid in piles of sand or vegetation to be hatched by the heat of the sun or decomposition - as well as other Australian species, including ground pigeons and the magnificent sulfur-crested cockatoos. He noticed that, overall, the number of Asian species diminished as he moved east, while the number of Australian species increased.

Figure 11 Location of Lombok island and Mataram

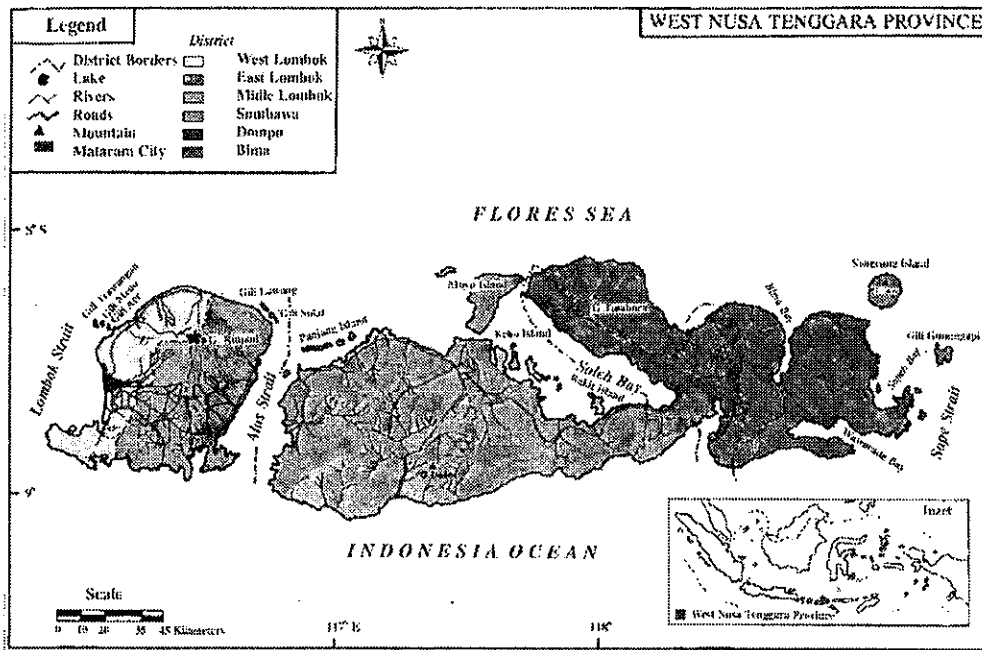
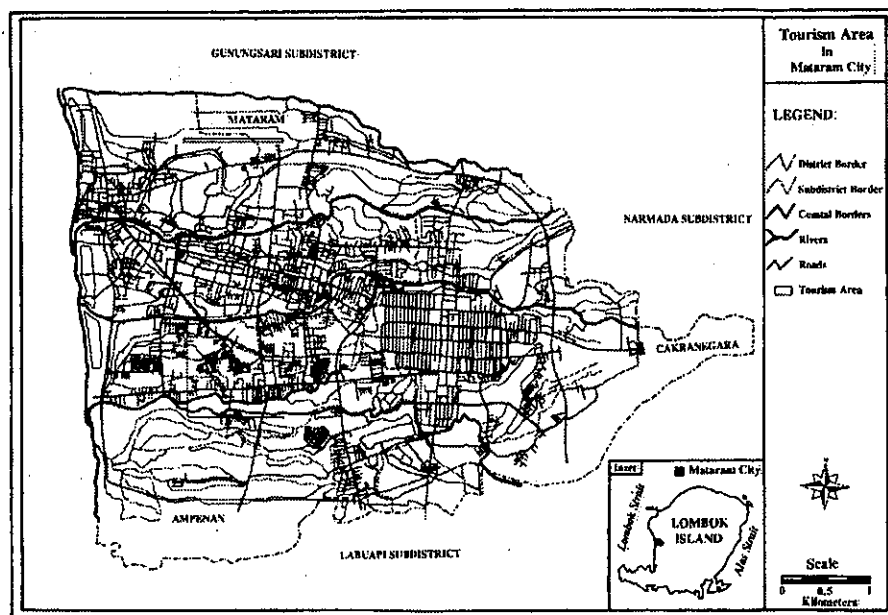
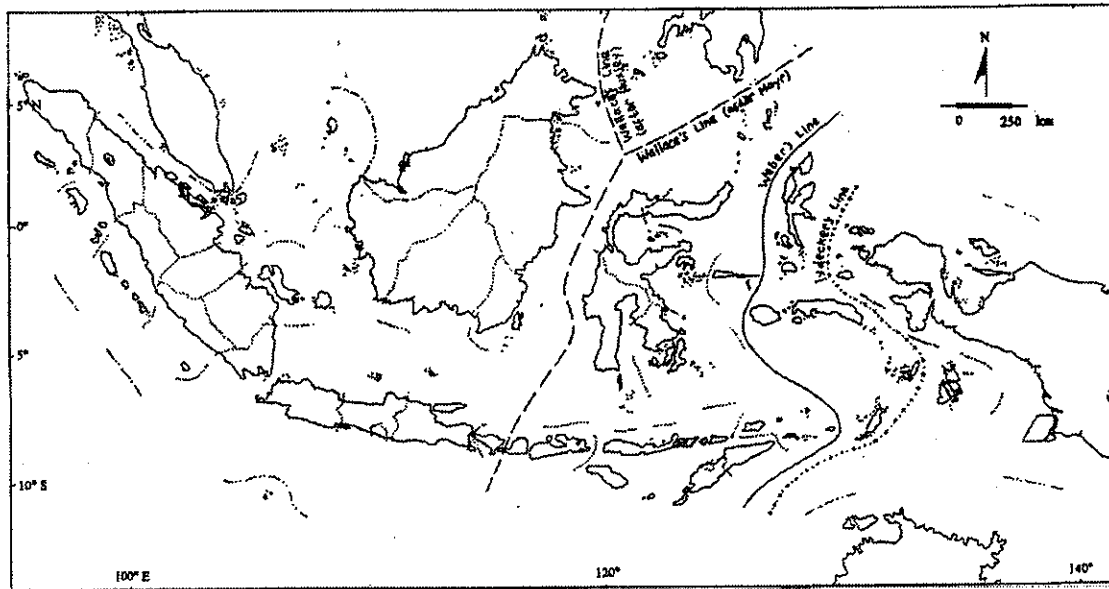


Figure 12 Map of Mataram



Back in London in 1863, Wallace presented a paper to the Royal Geographic Society in which he drew a red line on a map of the Malay Archipelago: it led straight down between Kalimantan and Sulawesi, and Bali and Lombok. This was to become known as the “Wallace line” (Muller 1997: 25). The *Wallacea area* is as shown in Figure 13.

Figure 13 Location of Wallacea area in Indonesia¹



Although Wallace’s theory of impassible straits has more or less been discarded, the region does mark a transition between Asian and Australian animal life. At first, other naturalists drew their own lines, between different islands, but today most simply refer to a zone of transition, rather than a sharp line. In honor of the world’s first biogeographer, this zone has been dubbed Wallacea.

The most dramatic creature found in the islands is the Komodo dragon, the largest lizard extant. Endemic to Komodo and Rinca islands, and nearby eastern Flores, *Varanus komodoensis* is the largest known varanid, or monitor lizard. The monitors are so named because it was thought that they warned of the presence of crocodiles. The name seems somehow inappropriate for the Komodo dragon, however, which itself is as large and voracious as a crocodile. The Komodo dragon – which can reach three meters and 150 kilograms – is a lizard, but has some of the physiology of a snake: a jaw which can be disjointed, allowing it to swallow prey in chunks literally bigger than its mouth, and a flicking, forked tongue that is an organ of both scent and taste (Muller 1997: 24).

¹ This area includes the transitional zone between the Sunda and Sahul shelves. The western border of Wallacea is shown on the map as Wallace’s line. Lydecker’s line indicates the eastern boundary of the occurrence of Oriental fauna, while Weber’s line indicates the balance of 50% Australian and 50% Oriental fauna (Soerjani 1989: 4).

This animal is one of the best adapted predators known, with a powerful tail for bringing down prey, and strong jaws lined with serrated teeth for eviscerating the hapless victim. The saliva and gastric juices of the dragons are extremely powerful, and they are known to digest the horns, bones and hair of their prey (Figure 14).

Figure 14 Komodo (*Varanus komodoensis*), Giant lizard²



Except for a few small regions in the west, the *vegetation* is sparse and made up of dry-adapted species such as various eucalyptus (*Eucalyptus urophylla*, *E. alba*). White sandal-wood (*Santalum alba*), once Timor's major export, is now reduced to a few vestigial stands in remote areas of the island, although the government has recently sponsored efforts to replant the trees.

The fire – and drought – resistant *lontar* palm (*Borassus sundaicus*) is one of the most useful plants in the region, serving as an important source of nutrition (Muller 1997: 25).

3.3 Social and cultural characteristic

The Sasaks never developed the arts to the same degree as their Balinese neighbors. There remains some good traditional craft work – weaving, basket-making and pottery – but nothing that approaches the handicrafts of the Balinese. Nor have recent attempts at the modernization of the crafts industry, to produce items for sale to tourists, produced outstanding pieces.

² This species is widely spread in an isolated island Komodo, east of Sumbawa island of the West Nusa Tenggara. The Komodo island is located in the western part of East Nusa Tenggara.

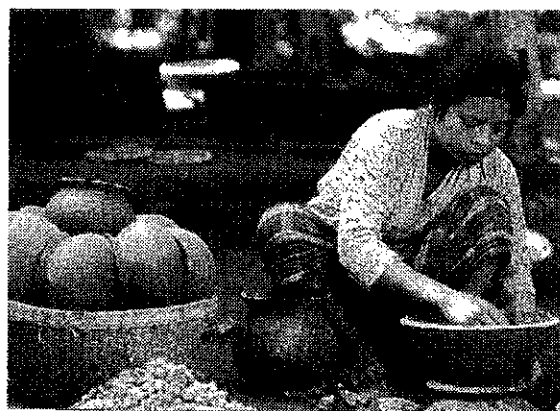
Lombok has been famous for its *ikat* cloth, but since tourists are not willing to pay the cost of a fine piece of cloth, hand-spun thread and natural dyes are being abandoned in favor of cheap, ready-made replacements. The cottage industries that are supporting the tourism development are the weaving industry with specific “tenun ikat” to be used as “sarong”, shirts or any other dress (Figure 15).

A low-tech program to market local pottery - partially funded by the government of New Zealand - has enjoyed a measure of success, putting added cash income into the pockets of the three villages selected for the pilot program. The island’s potters are considered excellent craftsmen (see Figure 16). Also among the best of the local crafts in Lombok are baskets, finely woven from strips of rattan, banana leaves and other vegetal fibers.

Figure 15. “Tenun Ikat”: The weaving industry in Lombok



Figure 16 Earthenware pottery in Lombok



Source: Muller (1997: 65)

Sasak dances and ceremonies also seem somewhat less splendid than the lavish ceremonies of the Hindu Balinese. The main rite of passage for a Sasak boy is his *circumcision*. During this ritual, he is dressed in finery and carried about on a large wooden horse. Muslim weddings, most of which take place after the harvest when funds are plentiful, are also lavish affairs.

The ceremonies are often accompanied by ritual fights, called *peresehan* or *berempuk*. In these, men face off, armed with tough rattan staffs and buffalo skin shields. *Peresehan* fights are also held in conjunction with national or local celebrations and, occasionally, as part of an agricultural ritual asking for rain.

Most of the people of Lombok are Muslims, but one group, traditionalists to the core, have refused to give up their ancient ways. Their religion and culture goes under the name of Islam Wetu Telu, which roughly means "Three Times Islam". There is no agreement as to what the "three" refers to, although many explanations are given. Wetu Telu is not one of Indonesia's "official" religions, so no statistics on the total number of practitioners are available. Many are concentrated in the northern part of the island.

3. 4 Agriculture

The majority of the people in Lombok island are substance *farmers*, perpetually facing land shortages and fearing inadequate water supplies. In spite of the widespread government birth control program, the island's population density remains extremely high.

The heartland of Lombok, an irregularly shaped triangle with its base on the west and its apex around Pringgabaya in the east, has always been the island's rice bowl and regularly produces a large surplus. The area is rich in rice paddies or *sawahs*, and the landscape looks a lot like Bali or Java (Figure 17).

Figure 17 Rice fields in Lombok



Irrigation developments are slowly adding to the hectareage of *sawahs*. New varieties of high-yielding, fast growing rice help boost production, but locals prefer the taste of the old, slow maturing variety. In the markets, the old rice sells for a premium price. With governmental supports, most farmers now practice crop rotation, planting soybeans after one or two crops of rice. In the drier areas, especially to the south of the fertile triangle, many fields are now planted in high grade tobacco, which is dried in local kilns and sold to a large company for export to Java and abroad. *Tobacco* has become Lombok's largest cash crop. The island's farmers also export *areca* nuts, beans, chili peppers, cinnamon, coffee, onions, plants used in herbal medicines – and recently, cloves, pepper and vanilla.

There are several pearl farms in Lombok, which are run as joint ventures with the Japanese, who first discovered years ago how to “seed” pearl oysters then keep them alive. The yearly value of Lombok's pearl production is over \$1 million.

Some of Lombok's farmers have begun to benefit from the jobs and increased craft sales resulting from the recent tourist boom. The *mobility* of Mataram dwellers showed a rapid increase since 1998 when the population in one year period was increasing with approximately 17,000 people, mostly from other districts in West Nusa Tenggara. This is assumed due to the incoming people from other islands due to the significant trend of tourism, overflowing from Bali (Mataram City Government 1998a). Although agricultural and sea products bring cash to Lombok's economy, tourism has given the island its major boost. The cottage industry is booming. Crafts sales-pottery, woven cloth, baskets – both for local sale and for export to the tourist markets in Bali, have also grown.

3.5 Human resource

The *demography* of Mataram city will be analyzed based on the population component, ethnical feature and their mobility.

The *population* of Mataram city is growing much slowly compared to population of West Nusa Tenggara, as well as compared to the Indonesian population in general. The population of Mataram city as compared to the whole West Nusa Tenggara province and Indonesia is shown in Table 8.

Table 8 Population of Mataram, West Nusa Tenggara and Indonesia, 1997

Region	Land area (sq. km)	Population	Population density (per sq. km)	Population growth rate (per year)
Mataram City	61,3	282,574	4,579	0.67
West Nusa Tenggara	20,153.2	3,717,918	184	1.67
Indonesia	1,937,179.0	201,537,000	140	1.80

Source: Statistical Office of Mataram City 1997; Statistical Office of West Nusa Tenggara 1997; Central Bureau of Statistics 1998

It is shown in Table 8 that the population growth of Mataram city dwellers is much slower than the population growth in West Nusa Tenggara and Indonesia. The transmigration program, in which some of Lombok's excess population is shipped to underpopulated islands, has helped reduce population pressures, but there are still too many people for the land to support. Lombok leads the nation in the unenviable categories of infant mortality and illiteracy. In the meantime since 1995 some families in Mataram city were also migrating to other islands, mainly to Sulawesi, Kalimantan and Irian Jaya.

In the human resilience status, *health* is an important component of the human resource quality. This includes the life expectancy and health, basic needs conditions and housing facilities. The government is making commendable progress in some areas. A pilot children's vaccination program against the prevalent hepatitis B shows signs of progress even among conservative rural people. The quality of the drinking water is being improved, in an effort to reduce the number of cases of cholera. While malaria, which has been a wide spread problem, particularly in the north, has begun to receive attention. The number of clinics and trained personnel staffing them are steadily increasing.

Health programs are not immediately visible to casual visitors, but other government programs are: rural electrification, the construction of dams and, especially, the fast improving network of paved road on the island. While some of the new roads aim to provide easy access to tourist areas, many others link out of the way villages to main roads and markets.

The life expectancy and human health is closely related to the birth and death rate, and sickness figures. There is no exact figure of *life expectancy* in Mataram city, informal figure shows that the life expectancy may be slightly lower than the average of the Indonesian people, which is 63 years for males and 65 years for females.

Table 9 Diseases in Mataram, 1996

	Disease	Old Cases	New Cases	Number of hospital visitors
1.	Acute respiratory infections	50,934	8,929	60,575
2.	Skin diseases	14,560	3,415	18,917
3.	Diarrhea	11,964	782	12,808
4.	Allergic skin diseases	11,920	3,114	15,545
5.	Digestive disorders	11,168	3,340	15,294
6.	Dental diseases	6,242	2,525	10,124
7.	Asthma	4,813	4,627	9,773
8.	Conductivity	4,282	599	4,909
9.	Vulva diseases	3,758	3,014	7,766
10.	Other respiratory diseases	2,631	881	3,512
	Total	122,272	31,226	159,223

Source: Statistical Office of Mataram City 1996

The death rate of males are higher than females. In 1990 these are 1.31% for males and 1.30% for females while in 1998 0.95% for males and 0.77% for females. The highest death rate percentage of males was in 70-74, 8.37% in 1990 and in 75 + age, 8.03% in 1998, while females was 13.0% in 1990 and 7.57% in 1998. This also indirectly indicates that females are relatively healthier than males, so is the life expectancy of females are higher than males (Statistical Office of Mataram City 1998). The *health condition* of Mataram people is shown from the figure of diseases (Table 9).

Compared with diseases in West Nusa Tenggara, although generally the diseases are the same, in rural areas in West Nusa Tenggara there are other diseases recorded. These are clinical malaria and anemia. In Mataram itself newly discovered diseases in 1998 are among others tonsillitis, bronchitis, etc.

The *basic needs conditions* for the population in Mataram especially for food is very insufficient to supply the need, although even in the city area itself there are some ricefields left. This is shown in Table 10.

Table 10 Food balance in Mataram City, 1998

	Basic Needs (kg/cap/year) ¹	Total needs (A) (kg/year)	Food production (B) (kg/year) ²	Balance (A - B) (kg/year)
Carbohydrates	144	43,077,312	19,365,000	23,712,312
Vegetable & Fruits	72	21,538,656	3,542,300	17,996,356
Fish & Meat	18	5,384,664	3,797,414	1,587,250
Milk	72	21,538,656	-	21,538,656
Drinking Water ³	720 (l)	215,386,560 (l)	-	-

1. Sediaoetama 1990

2. Statistical Office of Mataram City 1998

3. Obtained from tap water, wells and rivers

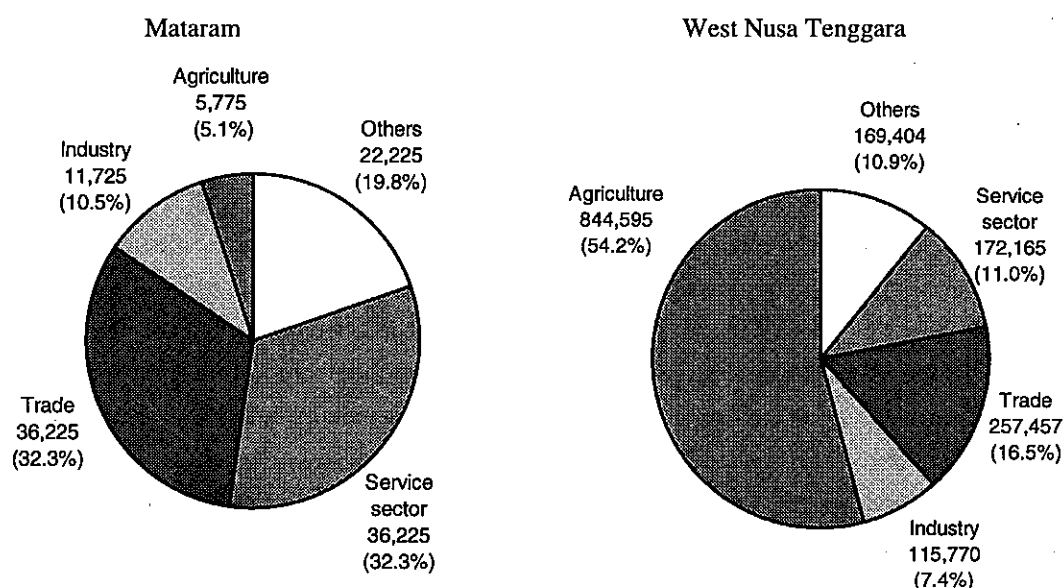
It is shown in Table 15 that basic needs for carbohydrates is -55% for vegetable and fruits is -83.55% while for fish and meat is -24.48%. This means that most staple food has to be obtained from the surrounding rural agricultural areas, or imported from elsewhere.

Education in Mataram is not in a good shape yet, since 42.7% of the education age of the people never went to school. It is assumed that these group of people do not also get adequate training for their skills appropriately. They must acquire a lower quality of work force compared to the other people who went to schools. Many of those who receive some education go to Islamic schools, which are fine for teaching religion, but do little to prepare young men and women for entrepreneurship and opportunities in an expanding economy.

Employment in Mataram only absorb 112,175 (39.7%) out of 282,574 people, while the whole West Nusa Tenggara has 1,559,388 workers (41.1%) out of the 3,795,654 people. This means that more

people in the city are unemployed (officially) compared to the whole people in West Nusa Tenggara. As shown in Figure 18 A and B, most workers in Mataram are employed in trade and other service sectors with a total of 64.6%, while in West Nusa Tenggara most people are engaged in agriculture (54.2%). This figure is slightly higher than the income of the average of whole people in West Nusa Tenggara which was between Rp. 600,000 – 800,000 in 1993-1995. However, it is lower compared to the average income of people in Indonesia, which was Rp. 1,500,000 to 1,900,000 in 1993-1995

Figure 18. The employment in Mataram and West Nusa Tenggara in 1998



Source: West Nusa Tenggara Government 1998).

Table 11 The income per capita in Mataram, 1993 – 1995

Year	Rp.	Growth (%)
1993	921,519	5.4%
1994	980,904	6.4%
1995	1,067,115	8.8%

Source: Mataram City Government (1998).

There are families living below the poverty line in Mataram who received subsidy provided for poor village (Table 12). West Nusa Tenggara people who live under the poverty line in 1997 were 653,026 or 17.6% of the total 3,717,918 population of the whole province.

Table 12 Number of families below poverty line , 1997

Region	No. of Household	Population	Remarks
Cakranegara	1,971	8,338	
Mataram	941	3,764	28,455 people are 10.1% of the total population in Mataram
Ampenan	4,460	16,353	
Total	7,372	28,455	282,574

Source: Mataram City Government (1998)

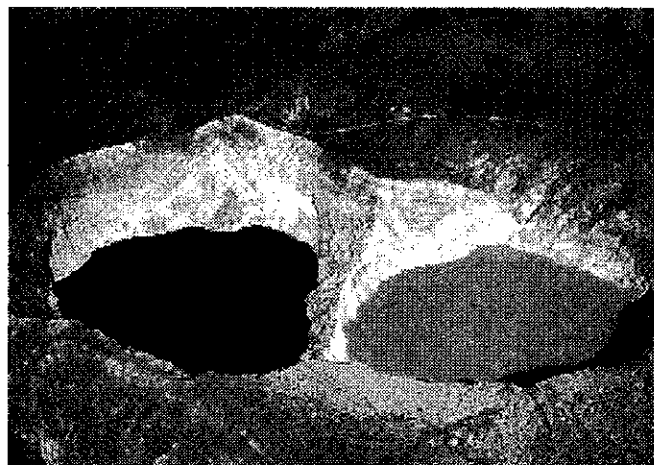
3.6 Institutional system

The institutional system in Mataram consists of the government, the business and private sector, the NGO or self reliance organization, and rules and regulations. The *government* in Mataram city as a city with autonomy consisting of the ordinary autonomous district. It has a mayor and autonomous offices and Regional People's Representatives, which now have new members after the June 1999 general election. The *business* and *private sectors* are dominated by trade and public service due to the development of tourism in the whole West and East Nusa Tenggara. It has to be noted that tourism business in the whole Nusa Tenggara has developed due to the saturation of tourism in Bali. The *self reliance organization* or the *non-government organization* found Mataram as a conducive atmosphere for the community actively involved in self reliance activities in various fields, e.g. in tourism, community development, cooperatives, industry, agriculture, science and technology, religion, advocacy, law, health, environmental protection, children welfare, and education.

3.7 Natural resource

Apart from the natural beauty of the *land area* in Lombok, there are also unique panoramic scenery of the beaches, volcanoes (see the exotic lake Kelimutu Figure 19) the exotic species of rare animals, e.g. the comodo (*Varanus komodoensis*) (Figure 14) and the Timor deer (*Cervus timorensis*).

Figure 19. The Volcanic lakes of Kelimutu, in south-central Flores



Land area of Mataram City is 61.3 sq. km or 6,130 ha consisting of agriculture (rice fields), bare lands, industrial area, offices, business areas, settlement and infrastructures.

Table 13 Change of land use in Mataram

Land use	1996 (ha)	1997 (ha)	Changes	
			+	-
Agriculture	3,114.1	3,044.9	-	69.2
Reserve area	137.8	132.1	-	5.7
Bare land	32.8	32.8	-	-
Industry	45.2	45.2	-	-
Business	176.9	182.3	5.4	-
Offices	236.6	239.3	2.7	-
Settlement	2,332.9	2,399.6	66.7	-
Others	53.8	53.8	-	-
Total	6,130.1	6,130.1	74.8	74.8

Source: Mataram City Government (1998a)

Water has a multipurpose use, namely for domestic purposes, for agriculture, irrigation of rice fields, fisheries, animal husbandry and industry. The various uses of water may create certain conflict in their uses and therefore produce also waste water that degrade the quality of water for other uses. Sources of water pollution due to some water consuming activities are shown in Table 14.

Table 14 Sources of water pollution for industrial use in Mataram, 1998

Industry and processes	Waste water (m ³ /day)	BOD (kg/day)	Suspended solid (kg/day)
Agroindustry			
- Beef & buffalo	253.3	2,911.8	20.0
- Pig	23.10	408.5	2.6
- Goat	13.1	265.8	1.5
- Chicken	19.1	669.4	6.9
- Duck	0.9	30.8	0.3
Agromanufacture			
- Slaughtery	65.7	79.3	64.4
- Ketchup	-	1.4	-
- Soybean cake	-	11.2	-
Leather industry	3.5	5.9	-

Source: Mataram City Government (1998a)

Air in Mataram city is polluted mainly by dust, SO₂, NO_x, CH₄, CO₂ and CO from domestic energy sources using fuel, woods, kerosene, and liquid natural gas, and from solid waste dumping sites. Other sources of air pollution are from small food industry: *tahu* (soybean cake) and *tempe*, and from transportation.

Mineral is not available significantly in Mataram. In Sumbawa island, however, there are tin, manganese and limestone minerals. These non-oil product are exported approximately 15-38,000 tons between 1993-1998 valued at approximately USD 10 millions annually.

Purnice, a porous stony substance from volcanoes used for stone-washed jeans, and used to polish marble, wood and ivory was exported (mainly to Hongkong). The boom started in 1985 and it reached USD 1.4 million in six months in 1990.

Energy produced in West Nusa Tenggara, which some are exported from Mataram are crude oil, coal and liquid natural gas.

Forest is not any longer exists in Mataram city, since most of forest areas in the past have been converted to become settlements, buildings for offices and business centers, rice fields and other infrastructure development.

Biodiversity is a unique biotic resource in Nusa Tenggara archipelago, since Lombok area and the whole Nusa Tenggara are located in the Wallacea zone.

3.8 Science and Technology

Science and technology development is analyzed through the following components: research, education and training, industrial development and development system.

Research system, namely, research institutions and information systems are components that sustain research results to support development. In Mataram *research system* is still in its early stage, there is lack of adequate local experts at present to formulate and solve local problems properly, while research policy from the central government is also unable to cover the local aspiration and needs. University research staff is expected to pioneer research based on local conditions and needs. However, in most cases, provinces and regions far away from the central government are facing a lot of problems, lack of funds, lack of appropriate opportunity, since they are overburdened with non-research activities, such as meetings, ceremonies, teaching, etc. It is the intention of the policy of the Minister of State for Research and Technology and the National Research Council (NRC) to develop the Provincial or Regional Research Council (RRC) with the intention to gradually empower the local experts from the government, universities, private sectors as well as the community to decide local research priority while still open-mindedly develop a mutual cooperation with other provinces and with the central community in overcoming local problems to be solved strategically.

This hopefully will strengthen the *research institutions* at the provincial level and that education institutions will also play a significant role to educate their students to be critical and creative, with full confidence to be able to solve local problems innovatively.

The *information system* to support research activities is not ideally developed yet. The complete data should actually be obtained from the Central Bureau of Statistic, from the Coordinating Agency for National Survey and Mapping (Bakosurtanal), from the National Institute for Outerspace and Aerial Photography (Lapan) and the Indonesian Institute for Sciences (LIPI). However, so far, coordination of the information network at the local and national level is still inadequate to really support innovative research and development programs.

The *education system* is not fully implemented by disciplines and sectors in an ideal integrated system. Education is rather focused on knowledge development and not fully empower the students to acquire creative and innovative developmental skills to fully support the real objective of development in a sustainable way.

There is yet no ideal linkages between the vertical *education institutions* from primary schools up to the university level. The horizontal education system is also not in support of the various sectoral system: social culture, social economics, law, health, basic science, and technology in an integrated way. There is lack of practical objectives of the common goal of education institutions what to achieve. This is probably due to lack of the principles and practicalities of education for sustainable development (see Soerjani 1997).

Training is another component as a continuation of formal education at various levels, since education alone is considered as providing inadequate opportunity for the students to be practical in solving development problems. This is indicated in the fact that a lot of opportunity to innovate certain appropriate technology is lacking and if certain technology has been developed or improved, then we still have to get it from elsewhere rather than to create and develop it by ourselves. This is a general situation not just in Mataram, probably it is a general situation elsewhere in this country.

3.9 Industrial development

The *primary industry* is conducting activities obtaining products from nature, namely in agriculture and forestry, animal husbandry, fisheries, (also mining) secondary or manufacturing industry, and the tertiary industry consisting of services, such as trade, transportation, tourism and other public service.

Agricultural activities in Mataram city are producing annual as well as perennial or plantation crops. The staple foods produced in Mataram are rice, corn, cassava and sweet potato. The product in 1998 are shown in Table 15.

Table 15 Staple food and vegetable production, 1998

Product	Harvest	
	Size (ha.)	Amount (ton)
Rice	3,960	19,291
Corn	19	33
Sweet potato	4	41
Soybean	1,287	1,413
Cabbage	25	1,614
Chili	122	1,140
Long bean	22	696
Cucumber	11	80
Spinach	13	941
Ipomoea	246	12,625

Source: Statistical Office of Mataram City (1998).

Table 16 Fruits production in Mataram, 1998

Fruits	Product (quintal)
Avocado	2
Mango	5,653
Hairy fruit (Rambutan)	1,732
Lancium (Duku)	23
Citrus	213
Durian	42
Guava	2,165
Eugenia (Jambu air)	100
Zapota (Sawo)	468
Papaw	2,702
Banana	3,958
Pineapple	1
Jackfruit	1,116
Sour sop	154

Source: Statistical Office of Mataram City (1998)

Plantation crops are also productive in certain parts of Mataram city. The production is shown in Table 17.

Table 17 The production of plantation crops in 1997-1998

Crops	Production (ton)	
	1997	1998
Coconut	209.39	213.37
Coffee	2.03	2.06
Cloves	0.07	0.03
Kapok	8.94	9.22
Areca-nuts	48.25	48.73
Tamarind	20.00	28.43
Tobacco	51.69	50.06

Source: Statistical Office of Mataram City (1998)

There is no forest produced in Mataram city. The need for wood is provided from Banjarmasin, Palangkaraya, Pontianak, Samarinda, Jakarta and East Java (for teak). While some are also transported from other districts in West Nusa Tenggara, especially for firewood and also non-timber products, such as honey, rattan, nuts, bamboo, cinnamon, charcoal, etc.

Animal husbandry in Mataram are still productive, although most of the animal feed is transported from surrounding rural areas. The number of livestock slaughtered in Mataram is oversteering the number of its own production, for which quite a number of these livestock is imported from other districts.

Table 18 Production of livestock in Mataram, 1994-1997

	1994 ¹	1996 ²	1997 ³
Cow	1,626	1,828	1,777
Buffalo	448	505	272
Horse	1,852	1,860	2,218
Goat	2,343	2,614	2,424
Pig	4,016	5,178	3,792
Chicken	115,406	125,073	77,887
Duck	5,511	7,922	3,890
Total	131,202	192,029	92,260

Source: 1. Mataram City Government (1998)

2. 3. Statistical Office of Mataram City (1998)

Marine resource in Mataram as well as in the island Lombok is not well managed at present. There are hundred of small boats owned by poor fishermen. The marine biotic products are consumed locally and the highest price of shrimps (exported to Japan and Singapore), milk fish (*Chanos-chanos*) and sea cucumber (*tripang*) were exported to Singapore. Other marine resource potentially exploited are seaweeds (*Euchema* spp) that can be consumed as creaminess to foods or cosmetics, mostly exported to Hongkong (see Figure 20).

Figure 20 Women tying springs of seaweed



Fisheries in Mataram is considered marginal. Exploitation of fish from marine resources is more than from fresh water (Table 19).

Table 19 Fish production from marine and fresh water, 1993 - 1998

	Product (ton)	
	Marine fish	Fresh water fish
1993	2,771.0	255.9
1994	3,120.2	263.6
1995	3,365.6	222.0
1996	9,538.4	940.9
1997	2,016.5	16.1
1998	2,144.9	21.2

Source: Statistical Office of Mataram City (1996; 1997; 1998).

The marine fish includes red snappers, barramundi, yellow tail, barracudes, herrings, sardinella, mackarel, skipjack tuna, eastern tuna, squids, shrimps, etc. Most of these high price fishes are expoted, mainly to Japan, Singapore and Hongkong. The inland fisheries production are common carp, tilapia, puntius, nila, gouramy, etc. These are mostly consumed locally. In addition, agricultural industry in Mataram includes also the food beverage, and candy industries. In particular the wellknown candy is the jackfruit candy (*dodol nangka*). *Manufacturing industries* in Mataram as compared to agricultural products are shown in Table 20.

Table 20 Industrial production in Mataram, 1994-1998

	Agricultural products	Miscellaneous industries	Chemical, metal, machinery & electronics	Total
1994				
No.	165	112	438	715
Value	5,157	1154	11664	17975
1995				
No.	639	716	1074	2429
Value	12,093	7625	25521	45239
1996				
No.	667	788	1084	2544
Value	18755	19286	18954	56995
1997				
No.	1071	334	1053	2458
Value	40058	6319	17872	64249
1998				
No.	1269	343	1008	2620
Value	43285	6656	13061	63002

Source: Statistical Office of Mataram City (1994; 1995; 1996; 1997; 1998).

Note: value: in million Ruphah

Transportation consisting of figure of the number of vehicles, road infrastructure (in km) and the air traffic in Selaparang airport. The number of vehicles in 1998 are: 9,197 private cars, 7,875 trucks, 1,380 buses, 64,649 motorcycles. Besides horse cart (*cidomo*) is also popular, especially among tourists, the number is 418. The airport Selaparang is connected with Jakarta, Denpasar, Makassar, Sumbawa Besar, Bima, Kupang, Surabaya and Singapore.

2.10 Tourism

Tourism is the most important component of Mataram development. The tourist attraction is among others the ecotourism and cultural tourism. Besides, when tourist are in Mataram, there are additional tourist facilities and other tourist attractions, namely the ritual ceremony, music and dance performances. The number of tourist in 1995 and 1996 is shown in Table 21. So far only the Senggigi beach area that has sprouted with full-scaled resort hotels.

Table 21 Number of foreign and domestic tourist staying in hotels

	Tourist		Total
	Foreign	Domestic	
1995	7,531	49,818	57,349
1996	6,408	46,407	52,815

Source: Mataram City Government (1998)

Table 22 Foreign guests in Holiday Inn Resort in Lombok, 1997 - 1998*

Country of origin	1997		1998		Change in number	
	Number	%	Number	%	+	-
Europe	16,587	46.33	9,585	32.92	-	7,002
Asia	10,443	29.17	5,971	20.51	-	4,472
Australia & New Zealand	5,523	15.43	6,406	22	883	-
USA	2,081	5.81	6,451	22.16	4,370	-
Japan	990	2.76	598	2.05	-	392
Middle East	109	0.30	25	0.09	-	84
Central & South Asia	39	0.11	31	0.11	-	8
Africa	33	0.09	50	0.17	17	-
	35,805	100.00	29,117	100.00	5,270	11,958

* Holiday Inn Resort Lombok 1999

Several spots along the south coast of Lombok, now still hard to reach, offer beautiful scenery and white sand beaches, and the a number of investors from Jakarta have already bought up all of these paradises, on which they plan to build deluxe accommodations - or just to speculate on the price of the land. No one buys just a few hectares - it's all sold in 100 hectares chunks. In order to fill all the expected hotel rooms, the government is planning a huge international airport, probably to be located southeast of Praya. Construction is started to begin in the mid to late 1990s.

The decrease of number of tourist in 1996 compared the number in 1995 is due to the indication of monetary crises in Indonesia which culminated in 1998. The origin of foreign tourist is shown in Table 22. The *other public service* is directly or in directly related with the tourism, such as telecommunication service, postal, health service, immigration and quarantine facilities.

2.11 New paradigm for tourism development

As a new center of tourism, Mataram has to observe the new paradigm of tourism development. Tourism is a complexity of a system that covers various socio-economic, cultural and technological aspects. These aspects are accumulated as a complex and yet unique feature of a city. This is why it is very appropriate to consider these aspects in the study of Mataram city, which functions as one of the growth centers of the tourist resorts in the eastern part of Indonesia.

The recent global and national dynamic drives the restructurization of the institutional and organization system of tourism in Indonesia, which requires the redefinition of the policy in tourism development as a component of the objective of sustainable development. The restructurization of tourism system is to comply with the dynamics of the global tourism development.

There is an external factor, which influences the Indonesian tourism development concept, and this is due to the recent trends of international tourism. This is not just based on the consumer characters, producers and the management of international tourism industry, however, it is also due to the rapid changes in the supporting information system. According to an observer, Indonesia will have to face the mature characters of individual, not as mass tourists, and that they are looking for the enrichment of spiritual life, not just for fun or for material and physical pleasures.

These trends will have a significant impact on the creation of tourism products that attract the consumer perspectives. In the managerial aspects it will have to promote changes from the orientation to *sell what is produced*, toward selling products to meet the market demand, from mass marketing, to individual consumer marketing, from the use of *mass branding* to the *diversified branding*, from price competition, to quality competition.

In the information site, there will be a challenge toward our integrated information system, with a more friendly atmosphere, a fast technological diffusion, systematic, and more toward a global networking. The democratic and decentralization change in Indonesia has shifted the growth paradigm

toward the people's economic growth paradigm. This will be a very decisive factor in the tourism development. Other factors such as demographic changes, trade (global) liberation, the advancement of information technology, transportation, the establishment of regional blocks, and the Pacific region as the World's tourism target, should be included in this new paradigm orientation.

In the new Act No. 22 of 1999 concerning the regional autonomy and Act No. 25 of 1999 concerning the financial balance between the central or national and regional interest, tourism development should be developed considering the regional approaches, based on the spatial planning of each province, district and autonomous city, so that the tourism assets could be optimized for the benefit of the local community.

Another important factor is the Human Right establishment effort as well as the protection and restoration of environmental quality. These are two important factors that may affect tourism promotions. This means that enforcement or involuntary resettlement for tourism resorts, or deforestation for the same purpose may not be very popular these days to promote tourism. International tourist will be very critical toward any dehumiliation of the human right, destruction of natural resources and also other security matter, regardless if the tourist resort area is full with attractions.

There are two future trends that will sweep and drive the world tourism namely the *community and ecologically based tourism*. The first trend is that the global process is moving toward the potential and local community aspirations and roles. This will have to be a realistic trend, when the relationship between human beings and the entire life on Earth follows relativism process. The knowledge and truth related to human as part of the entire life and nature is relative and dependent upon time, place and individual experience.

Tourism development should be integrated into the global relationship networks of various communities, when units of the community is driven to become unified and interdependent. As a follow-up consequence the diversity of local culture and social life will be somewhat eroded.

It has to be admitted that for a couple of decades the development of tourism neglected the role and participation of local people. Most tourism development, such as in Denpasar and Bali island as well as in Mataram and Lombok island as a whole has been monopolized by a small group of private economic sectors, and not providing any significant benefit for the local people. The local people instead are exploited, their land has been encroached by "modern" tourism facilities, hotels, restaurants and the like without appropriate compensation nor coopting these people, while the environmental quality has been degraded or destroyed, the local culture has been exploited for commercial purposes, the tradition has been neglected or destroyed, etc. etc.

This situation can not be further tolerated. There must be *alternative tourism development*:

- In order to empower the local people to be *made directly involved* in tourism development; they must become the shareholder of any tourism development considering their land or any other

property considered as the people's share; and gradually their shares must be increased through education and training as well as empower their cooperative and managerial capacity and so on;

- In order to protect the natural amenity and beauty as it was originally protected or traditionally owned by local people through *ecotourism*, in which local people with their traditional knowledge, such as the fate of Kelimutu lake and the Komodo giant lizard* that can be included in this ecotourism programs.

There are a lot of examples in which local community could be made involved in local cultural as well as ecotourism. Attractions such as pony riding for young ex-patriate tourists in Sumba or Sumbawa will be an exciting opportunity. Experience by tourist how to prepare local cuisine (local style of cooking), such as preparing jackfruit candy or cake, the "*taliwang*" Lombok hot-chili cuisine, etc.

Development of these alternative tourists involving local people are not without weaknesses nor with certain risks and impacts. These are among others lack of *tourism vision* among the local people, lack of *professionalism* to manage modern tourism business, lack of socio-cultural background (related to the background of the tourists), which is essentially required since tourism may also create individual relationships between the local people and the incoming tourists, especially those coming from abroad. The most important last factor but not least one is lack of investment capital by the local people. This can be a crucial factor that in reality local people will be rather exploited or cheated instead of being partners of the haves who are interested to invest their money and capabilities for their own benefit.

In the development of ecotourism the knowledge of local people on various aspects of nature and its biodiversity are mostly very limited, so that they can also be manipulated or cheated by tourists who are natural and biological experts. These shortcoming may need sometime to overcome through education and training, empowering and facilitating these people to allow narrower gaps between them and the visitors.

Considering these factors, the development or changes that happened in the past and options for future mutual benefit by the local people in Mataram has to be properly analyzed and better future tourism program has to be developed. In the improvement of the local people share and their obtaining an increasing benefit, it does mean that there will be still an open room for those with significant contributions in terms of their major investments, financially, technically as well as managerially.

4. Conclusions and Recommendations

The most important factor to promote Mataram city development is the natural beauty, the historical and socio-cultural background.

* Ecotourism to Komodo island should entirely change the non-ethical attraction in the way the Komodo dragon is consuming the living (goat) prey, since this is *not* environmentally ethical. There must be another way to attract tourists with other human right characters.

The *conclusion* is based on the following facts. The positive aspects to be further promoted are:

- ❑ The demography of the city community is conducive with its ethnical background, as well as its historical and socio-cultural origin.
- ❑ The human resilience which include health, basic needs and housing facilities is considered important, but at present is in its static condition, due to the health status and the housing or settlement condition of those living below the poverty line.
- ❑ The biotic value of the city is good, since the biodiversity of the whole area is very appropriate to promote ecotourism, and this is not only considering the terrestrial biota, but also the biodiversity of the marine biota, its fish species of high values, as well as the seaweed potential that with the regional autonomy will have to be managed by the local community.
- ❑ The education and training component in science and technology could potentially be developed with the support of Mataram University as an educational institute and its staff to be entrusted by the government, the business and private sectors and the community at large. The university should be in the spearhead of research and development of the local community with its supporting resource to promote sustainable development, with new vision of education toward empowering the graduates with innovative spirit, commitment and capability. This hopefully will fulfill the objective of the autonomy of the region in future development fundamentally, based on its own resources.

The negative aspects to be improved or corrected are:

- ❑ The human capability which is at present considered as contra productive because of the uncertain socio-economic condition of the region as affected by the total economic and political crises at present. This should be overcome by the opportunity of the autonomy status of the province as well as the district and the city. With the spirit of the unity of the archipelago it is expected that the autonomy will be fulfilled in cooperation with other regions, provinces or districts in sharing similar problems to be overcome in mutual coordinative spirit.
- ❑ The institutional system has to be drastically reformed with the spirit of the new environmental law (Act No. 23 of 1997) concerning the environmental management with Act No. 22 and 25 of 1999 concerning the regional autonomy should have a more flexibility in considering the local aspiration and need to develop successfully and to improve the participation of the entire stakeholders so that development will be mutually beneficial for all, particularly to alleviate the quality of life of those who live below the poverty line. It is to be noted that the percentage of people living below the poverty line in Mataram is significant (over 10%) of the total population of Mataram city. All stakeholders have also to be reminded that unemployment percentage of people in Mataram city is high. The new vision in the promotion of productivity should be emphasized on efforts that everyone must primarily create oneself own job, furthermore to create innovative jobs not just for oneself, but as many working opportunities for others.

- ❑ The physical natural resource is degraded due to unplanned spatial encroachment of economic projects regardless its impact to degrade the environmental quality, such as impairing soil erosion, lost of biodiversity in national parks and other protected and protection forests.
- ❑ Research based on local problems, needs and capability must be promoted. This is in line with the democratic and autonomy spirit of the region to be pioneered by local support, and the idea to create the Provincial or Regional Research Council (*Dewan Riset Nasional*) should be realized.
- ❑ Agroindustry has never been promoted to improve the technical skill of the poor farmers so that they should not only benefit from the in-farm products, but also to be involved in off-farm activities to be able to technically promote the agricultural products with added values to be properly protected and to compete properly with imported agricultural products from other regions in Indonesia and from abroad.
- ❑ The transfer of technology should be selected based on the national, provincial and local aspirations and needs also by considering traditional technology, so that the transferred exogenous technology should only be adopted to become compatible with the traditional technology. The local experts must also innovate advanced technology with its own creativity.

It is recommended that Mataram city development could be improved based on the followings.

First, environmental management is not a target of human life, but it is urgently needed as the most important component to obtain the result of sustainable development. Therefore, there is a need to establish a new paradigm of sustainable development with environmental outlook.

In a broader scope to cover activities of private and business sectors, *sustainable development means conducting business in a way which meets the needs of the enterprise and its stakeholders today, while protecting, sustaining and enhancing the human and natural resources needed tomorrow* (Anon 1992).

The three main factors to be improved with added values continuously are the *human resource*, the *natural resource* and the *application of appropriate technology* to obtain the essential needs from the natural resources with proportional consumption of goods and services for the improvement of the quality of life.

It is recommended that the development process that create changes of the above three main factors is observed, monitored and analyzed to guarantee that development programs have been implemented in a sustainable way. These require the commitment and active roles of all stakeholders, the government, the private and business sectors, the banking sectors, the self reliance organizations, the community leaders, mass media, the educational system, the educators, the trainers and the entire community at large.

In a pluralistic community such as in Indonesia, different opinions should be managed with precautionary principles preventively before any conflict is seriously increasing needing to be resolved. Mutual interactions between an urban and rural ecosystem and their communities are

producing a lot of intangible benefits, e.g. partnerships, check and balance, social security and others. More specifically, the following points should be recommended:

- ❑ Local residents must be empowered through a variety of education and training. Such an empowerment results in the improvement of people's productivity and innovative skills in both quantitative and qualitative terms. The dependence of the urban community in their basic needs for food, especially for fruits and vegetables from rural areas should be overcome apart from partnerships with the rural farmers, also by the urban community, greening, gardening, etc. The human institution must be improved with the socialization of the concept and practicalities of development in a sustainable way, addressed to all stakeholders. This is particularly important to reach the policy makers, the community leaders, the private and business sectors and the community at large, particularly those who are potentially susceptible to be affected by the impact of the proposed development project.
- ❑ The physical natural resources must be properly maintain and protected, especially there should be proper land use planning considering the impact of development project on the interface of conflicting land use for different purposes. The land acquisition stimulated by rapid tourism development should be properly accompanied by feasibility studies, particularly should consider the social and cultural impacts to the poor village community who owned the land traditionally. Besides, water and air quality should be intensively monitored, followed by measures to overcome the present water and air pollution.
- ❑ Research system should be based on local aspirations and needs of the ecosystem and the local community. The establishment of local institutions such as the Regional Research Council (RRC) and the Regional Agency for Environmental Impact Control (Bapedalda) should be speeded up with qualified personnels: eventually coming from other places with certain terms of contract, with incentives, before younger local generations could take over the job.
- ❑ Industrial development in Mataram is dominantly driven by tourism. This should be properly supported by long term planning not only follows the success of tourism in Bali, since the condition and potential of Mataram and the whole Lombok island is different with that of Bali. Instead, mistakes as part of the history of tourism in Bali should be analyzed, so that these shortcomings are not repeated in Mataram nor in Lombok. It is widely known that the original traditional spirit of Balinese culture is gradually spoiled by the rapid tourism development in Bali. In short the traditional, social and cultural spirit of Mataram, Lombok and the whole Nusa Tenggara should not be overdriven and spoiled by the demand of tourism, in particular due to the overflowed tourist pressures from Bali. The new paradigm of tourism as mentioned under 5.2.11 should be properly observed, and the need of future tourists in looking for the enrichment of spiritual life and environmental ethics could be properly fulfilled.
- ❑ In line with the atmosphere of the open market in the ASEAN countries as well as in the whole world, local people should be aware of the need to transfer technology properly, considering the condition of the local habitat, and the aspirations as well as culture of the local community. A

combination of traditional technology and the transferred of appropriate exogenous technology is very important if Mataram and the whole Nusa Tenggara are to survive in the open market regionally, particularly in the ASEAN countries and globally.

Further follow up studies in other rapidly growing cities are recommended, in line with the fact that Indonesia is implementing its autonomy policy based on Act No. 22 of 1999 and Act No. 25 of 1999 concerning the financial balance between the central and the local government. These cities will have to acquire in their autonomy the following potentials:

- ❑ To develop democracy;
- ❑ To promote local activities and projects so far considered as the authority of the central government, e.g. in education, health, trade, environmental management, agriculture, fisheries and other provincial development;
- ❑ To negotiate with foreign capital investors with the consent of the central government to invest development projects, mainly in tourism industry and its infrastructure, based on equal share with the investors.

ACKNOWLEDGMENT

The study team members expressed their heartfull thanks to Prof. Morishima, Director of IGES for his support in conducting the study of the Tangerang and Mataram cities. To Prof. Hidefumi Imura for his guidance and leadership and to his staff in particular to Dr. Xuemei Bai, Ms. Rie Sugiyama and Ms. Tomoe Karasawa for their kind support. To all concerned in Jakarta, Tangerang and Mataram for their enthusiasm and assistance, so that the study team was able to finalize the report.

References

- Anon 1992. *Business Strategy for Sustainable Development; Leadership and Accountability for the 90s*. International Institute for Sustainable Development, Manitoba, Canada.
- Anon 1999. *Indonesia 1999 an Official Handbook*. Department of Information Republic of Indonesia, Jakarta.
- Central Bureau of Statistics 1998. *Statistics of Indonesia* (in Indonesian).
- Mataram City Government 1998. *Mataram City Profile 1998* (in Indonesian).
- Mataram City Government 1998a. *Balance of Regional Environmental Quality 1998* (in Indonesian).
- Muller, K. 1997. *East of Bali from Lombok to Timor*. Periplus Adventure Guides. Periplus (Singapore) Pte. Ltd, Singapore: 332 pp.
- Sandy, I. M. 1995. *Map of the Republic of Indonesia* (in Indonesian).
- Sediaoetama, A.D. 1990. *Nutrition Science* (2nd volume) (in Indonesian). Dian Rakyat Publ., Jakarta: 261 pp.
- Soerjani, M. 1989. *Promoting Environmental Study Centres in Indonesia, in Support of Sustainable Development*. UNDP/World Bank/GOI: INS/82/009: 63 pp.
- Soerjani, M. 1997. *Development and Environment; Reviewing the idea and implementation of sustainable development* (in Indonesian). Institute for Environmental Education and development, Jakarta: 122 pp.
- Soerjani, M. 1997a. Environmental education in bridging gaps between urban and rural development, in *Environmental Education for Biodiversity and Sustainable Development* (Eds. M. Soerjani & Monica Hale), University of Indonesia in cooperation with London Guildhall University: 401-415.
- Soesanto, L.J.A. 1997. *Changes of land use in Tangerang* (in Indonesian). Research report. Dept. of Geography, University of Indonesia.
- Statistical Office of Mataram City 1994. *Mataram in Figures 1994* (in Indonesian).
- Statistical Office of Mataram City 1995. *Mataram in Figures 1995* (in Indonesian).
- Statistical Office of Mataram City 1996. *Mataram in Figures 1996* (in Indonesian).
- Statistical Office of Mataram City 1997. *Mataram in Figures 1997* (in Indonesian).
- Statistical Office of Mataram City 1998. *Mataram in Figures 1998* (in Indonesian).
- Statistical Office of Tangerang District 1996. *Tangerang in Figures 1996* (in Indonesian).
- Statistical Office of Tangerang City 1997. *Tangerang in Figures 1997* (in Indonesian).
- Statistical Office of Tangerang City 1998. *Tangerang in Figures 1998* (in Indonesian).
- Statistical Office of West Nusa Tenggara 1997. *West Nusa Tenggara in Figures 1997* (in Indonesian).
- Tangerang City Government 1995. *Balance of Regional Environmental Quality 1995* (in Indonesian).
- Tangerang City Government 1997. *Balance of Regional Environmental Quality 1997* (in Indonesian).
- West Nusa Tenggara Government 1998. *Balance of Regional Environmental Quality 1998 of West Nusa Tenggara* (in Indonesian).

Institute for Global Environmental Strategies

1560-39 Kamiyamaguchi, Hayama, Kanagawa
Prefecture 240-0198 Japan

Phone: 81-468-55-3700

Fax:: 81-468-55-3709

E-mail: iges@iges.or.jp

URL: <http://www.iges.or.jp>

The most intense interactions between humans and their environment take place in urban areas. Changing the patterns of human activity in these areas could significantly influence, not only local environmental problems, but also global ones such as climate change.

Asian cities in particular, while enjoying the fruits of industrial growth, lack adequate resources and the effective city management needed to cope with the environmental problems that are in turn caused by rapid urbanization and industrialization. That is why improving urban environmental management policy is at the top of the agenda for municipalities throughout the region. Nowadays, cities in the Asian region are facing both great opportunities and challenges. How to deal with this situation is of critical importance to the sustainable development of cities, regions, and the world.

Recognizing the importance and significance of these problems, the IGES Urban Environmental Management (IGES-UE) Project aims to present innovative ideas and models that will guide urban environmental management policies into the 21st century in the face of economic development in Asia.

Institute for Global Environmental Strategies (IGES)

1560-39 Kamiyamaguchi, Hayama
Kanagawa Prefecture 240-0198 Japan
Phone: 81-468-55-3700
Fax:: 81-468-55-3709
E-mail: iges@iges.or.jp
URL: <http://www.iges.or.jp>