

社会開発調査部報告書

MASTER PLAN STUDY

ON

**VISAYAS AND MINDANAO ISLANDS STRATEGIC ROAD
NETWORK DEVELOPMENT PROJECT**

FINAL REPORT

EXECUTIVE SUMMARY

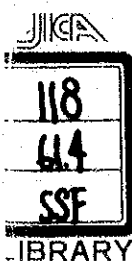
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MARCH 1999

**KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.**



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EXCHANGE RATE

October 30, 1998

1 US \$ = P40.831

1 US\$ = Yen 116.90

1 P = Yen 2.863

Source : Central Bank of the Philippines

PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct the Master Plan Study on Visayas and Mindanao Islands Strategic Road Network Development Project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Kunihiro Sawano of Katahira & Engineers International, and consisting of Katahira & Engineers International and Yachiyo Engineering Co., Ltd. to the Philippines, three times between February 1997 and February 1999.

The team held discussions with the officials concerned of the Government of the Philippines and conducted field surveys in the study area. Upon returning to Japan, the team conducted further studies and prepared the present report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Philippines for their close cooperation extended to the study team.

March 1999

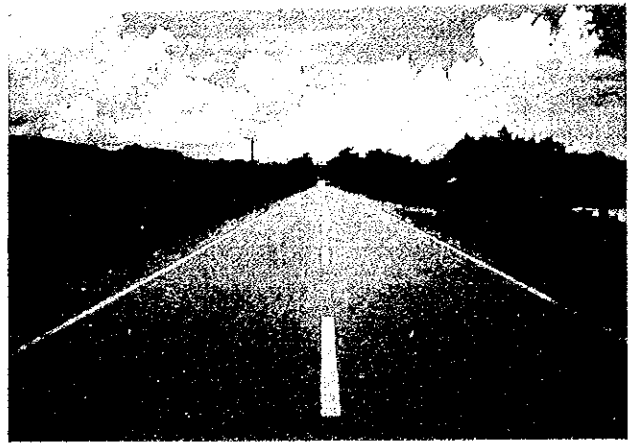
A handwritten signature in black ink, reading "Kimio Fujita". The signature is fluid and cursive, with the first name "Kimio" and last name "Fujita" clearly distinguishable.

Kimio Fujita
President

Japan International Cooperation Agency



PCC Pavement in good condition
Bontoc - Sogod Road, Southern Leyte



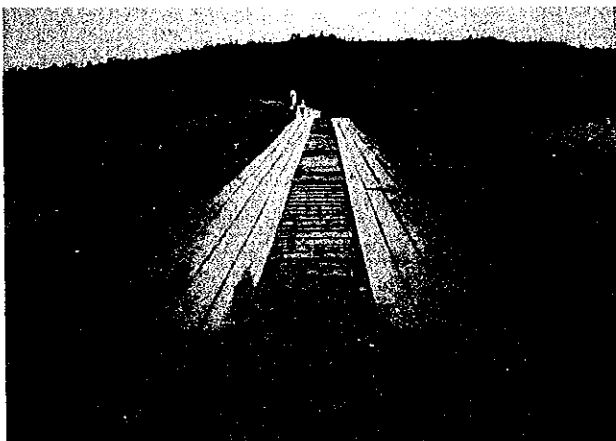
AC Pavement in good condition
Sindagan - Leon Postigo(Bacungan) Road, Zamboanga del Sur



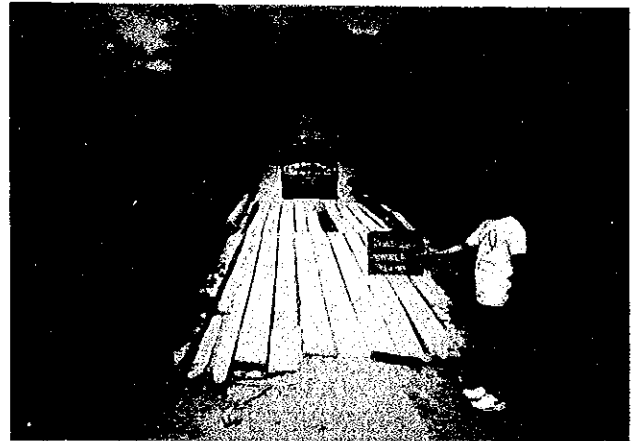
Gravel road in fair condition
Surallah - Lake Sebu - Maitum Road, South Cotabato



Earth road in bad condition
Leon - Bucari Road, Iloilo



Bailey Bridge
Surigao - Davao Coastal Road, Surigao del Sur



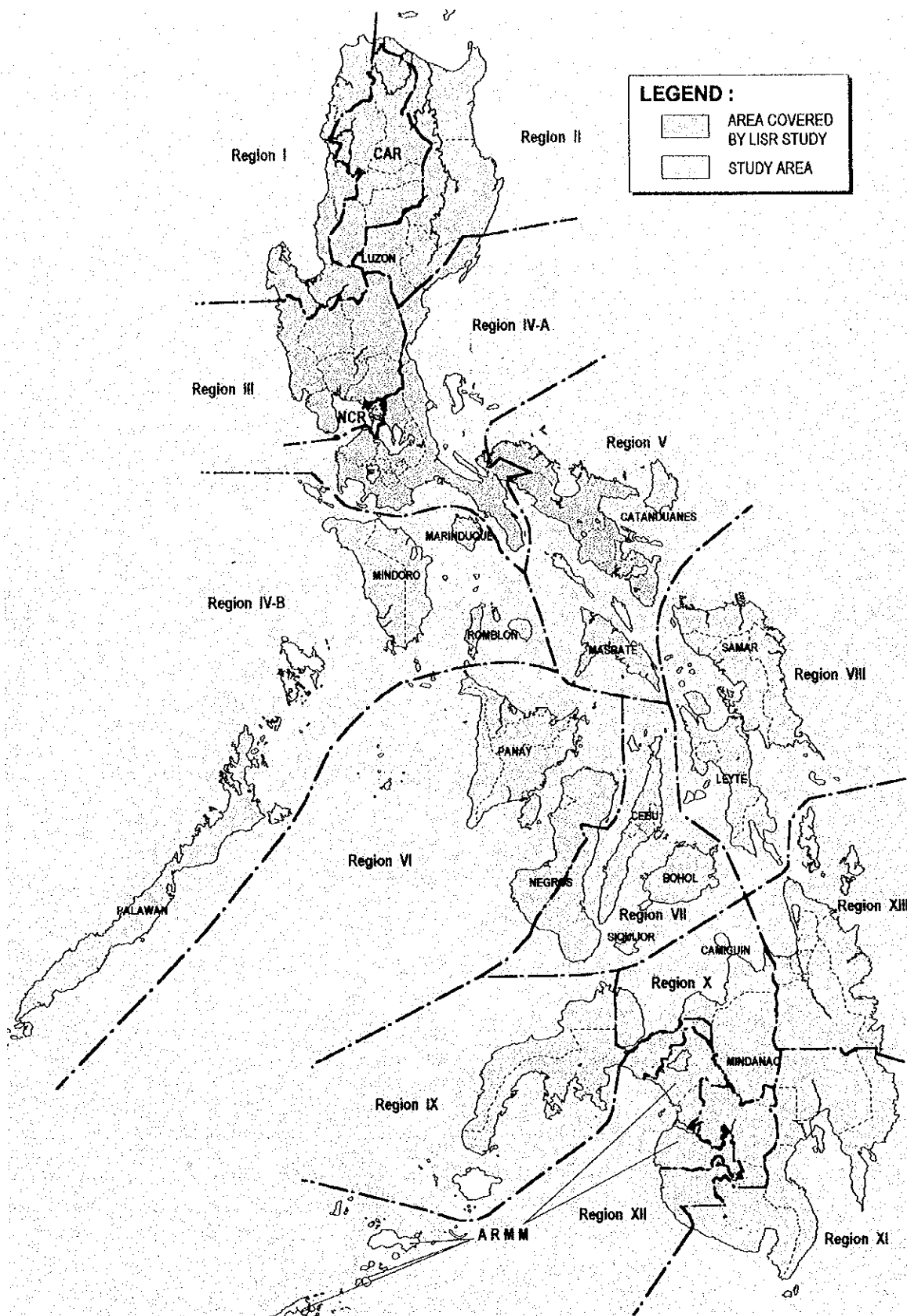
Timber Bridge
Quezon - J.P. Rizal Road, Palawan



RC Bridge
Midsayap - Dulawan - Tacurong Road, Maguindanao



Spillway
Sagay - Balea Road, Negros Occidental



LOCATION MAP OF STUDY AREA

SUMMARY

BACKGROUND

The Medium Term Development Plan (1993 ~1998) of GOP set the target level of the upgrading of national roads, however, the road development level in the Study Area is still substandard and a lot of improvements need to be done, as follows:

- 6,637 km of national roads are still unpaved and 2,994 km are 1-lane roads.
- Existence of wide areas still remaining inaccessible, particularly in Mindanao, Mindoro, Palawan and Samar Islands.
- Insufficient development of east-west lateral links.
- Insufficient transport linkage between and among major regional activity centers.
- Insufficient inter-modal linkage.
- Traffic interruptions due to damages by natural calamities.
- Increasing road sections with traffic capacity problems.

OBJECTIVES OF THE MASTER PLAN

From 1995 to 2016, population and GRDP of the Study Area are expected to grow by 1.5 and 2.7 times, respectively. Passenger trips (1997 to 2016) were estimated to increase by 2.5 times and commodity movement by 3.0 times. To cope with the above situation, the goals of the Master Plan were established as follows:

- To enlarge and reinforce the physical foundation of the regional economy.
- To promote effective land use and contribute to unity of nation and preservation of peace.

The objectives of the Master Plan were established as follows:

- To complete a major road network which connects major urban centers.
- To cover whole island by a major road network to eliminate inaccessible areas.
- To achieve effective multi-modal transport linkages.

- To take proper preventive measures against road closures due to natural calamities.
- To maintain all component roads in acceptable service level.

MASTER PLAN ROAD NETWORK

The following backbone transport axes are planned to be formed:

- Eastern Transport Axis
- Western Transport Axis
- Central Transport Axis
- Growth Corridor Transport Axes

The Master Plan Road Network comprises the following:

	(km)		
	Existing Road	New Road	Total
2-Lane Road	15,152	1,747	16,899
- N-S Backbone	4,061	10	4,071
- E-W Lateral	2,030	364	2,394
- Strategic Road	9,061	1,373	10,434
4-Lane Roads (widening of above)	-	-	1,769
7 Bypasses	-	215	215
2 Expressways	-	149	149
5 Inter-Island Links	-	91	91

Identified and programmed projects in the Plan are as follows:

	(km)	
	Identified	Programmed
2-Lane Road Projects	16,899	12,010
- Rehabilitation	3,569	3,935
- Improvement	6,135	6,586
- New / Impassable	2,197	1,489
- On-going / Committed	1,696	(*)
- No work	3,302	-
Widening to a 4-Lane Road	1,769	1,769
Bypasses	215	215
Expressways	149	149
Inter-Island Link	91	3
Total	15,821	14,146

(*) Distributed to Rehabilitation and Improvement.

Master Plan Development By 6-Year Period

Period	Physical Target (Km.)	Project Cost (Billion Pesos at 1998 prices)	Possible Investment Amount (Billion Pesos at 1998 prices)	Cumulative Completion Rate of Master Plan Network (% of Physical Length)
First 6-Year Program (1999-2004)	4,394	58.0 (57.7)	53 ~ 67	27.8
Second 6-Year Program (2005-2010)	4,269	107.2 (94.4)	89 ~ 104	54.8
Third 6-Year Program (2011-2016)	5,483	148.2 (139.4)	127 ~ 146	89.4
Total	14,146	313.4 (291.4)	269 ~ 317	89.4

Note: Project Cost in () excludes expressways.

IMPLEMENTATION SCHEDULE

The identified projects were prioritized by the criteria based on the road class, the degree of inconvenience, economic return, contribution to regional development, etc. The implementation schedule for each project was determined by its priority, regional balance of investment, engineering judgment, etc. Three programs for the first, second and third 6-Year periods were prepared.

EVALUATION OF MASTER PLAN

The Master Plan as well as each program was evaluated and found to be highly economically feasible.

	EIRR (%)	B/C	NPV (Billion Pesos)
Master Plan	41.3	2.92	150.1
Program I	44.2	3.66	99.1
Program II	31.1	2.49	91.0
Program III	24.2	1.79	62.4

Investment requirement excluding expressways for the 1st and 2nd 6-year period is within the possible investment amount under the medium assumption, and the 3rd 6-year period within the high assumption. In order to realize the expressway projects, fund sources such as co-finance with private sector investment are required.

Major improvements will be made for the reduction of vehicle-hours, and vehicle operating costs. The former is estimated to be reduced by 44%, and the latter by 30% (or 47.9 Billion Pesos) in year 2016.

Currently inaccessible vast areas will be provided with a road network, particularly in Mindanao. However, the topographically constrained areas such as the mountainous areas of Mindoro, Palawan, Panay and Samar will remain inaccessible.

Transport cost reduction, travel time reduction and improved accessibility will greatly contribute to activating economic activities, upgrading living standards of people, inter-reliance among major urban centers, the sustainable growth of regional economy will be achieved. Each island will be more closely united and integrated and the development efforts will be more efficient and effective.

RECOMMENDATIONS

- To systematically and successfully implement the Master Plan projects, DPWH should restructure the Planning Service by establishing two Divisions; namely the Arterial Roads Division and the Minor Roads Division. The former will plan and program this Master Plan and the Luzon Master Plan (LISR) from the viewpoint of national level transport efficiency. The latter will plan and program the minor roads projects accommodating local demands.
- Road funds should be steadily increased by the following:
 - Higher share of the road transport sector tax revenue from present 38% to 47% in the 3rd 6-year period be exclusively allocated to the national road capital investment.
 - Additional taxation on fuels and vehicle registration fee, for national road maintenance.
- Road maintenance should be improved and more cost-effective maintenance be implemented.
- Stronger roads against natural calamity should be built.
- Road ROW acquisition plan and resettlement plan of project-affected people should be prepared as early as possible, with due consideration of mitigating adverse social impacts.
- Review and updating of this Master Plan should be made periodically (at least every 6 years) by reflecting progress of the proposed projects, prevailing economic conditions and focuses of Government's policies.
- Early execution of feasibility studies for the following roads:
 - Mindanao East-West Lateral Road
 - Palawan North Road
 - Surigao - Davao Coastal Road
 - Liloy - Siocon - Zamboanga Road
 - Kalamansig - Isulan - Matalam Road
 - Capacity Expansion Projects
 - Iloilo - Roxas Road
 - Bacolod - San Carlos Coastal Road
 - Butuan - Cagayan de Oro - Iligan - Tubod Road
 - Sayre Highway
 - Cebu City Expressway
 - Iloilo - Guimaras Link (Guimaras Bridge)

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1. INTRODUCTION

BACKGROUND

Transport system of the Philippines relies highly on road transport which handles 89% of the country's passenger movement and 53% of freight movement. In recognition of its importance, transport sector investment of the Government of the Republic of the Philippines (GOP) has been focused on the road network development.

The Medium Term Development Plan (1993 ~ 1998) of GOP set the target level of the upgrading of national roads, however, development level of major road network in the country is still far behind targeted level, suffering frequent road closures brought about by natural calamities and ensuing loss of economic opportunities. Development level in terms of road density and paved road ratio of major road network in Visayas and Mindanao, furthermore, lags behind the road network in Luzon Island.

The long term systematic road development plan has been studied only in the late 1960s under the Philippine Transport Survey (PTS). No other studies have been carried out since then except the Master Plan Study on Luzon Island Strategic Road Network Development Project in 1993 by JICA. It is now time to re-evaluate the present major road network and to formulate a master plan for the forthcoming decades aiming at the development of more flexible, reliable and efficient road network in order to soundly support national development objectives and goals.

With this view, GOP through the Department of Public Works and Highways (DPWH) sought a technical assistance from the Government of Japan (GOJ) for the conduct of the Master Plan Study on Visayas and Mindanao Islands Strategic Road Network Development Project (the Study).

In response to the request of GOP, GOJ decided to conduct the Study. The Japan International Cooperation Agency (JICA), which is the official agency responsible for the implementation of GOJ technical cooperation

programs, organized a study team to undertake the Study.

With completion of the Study, the strategic road network development plan covering the entire Philippine archipelago will be all set for implementation to achieve regional economic development and industrialization of the country.

The JICA Study Team, in close collaboration with the DPWH counterpart team, commenced its work in January 1997 and completed the Study in March 1999.

OBJECTIVES OF THE STUDY

- 1) To formulate a Master Plan for Visayas and Mindanao Islands Strategic Road Network Development.
- 2) To prepare short, medium and long term implementation programs in the form of three 6-year programs covering 1999 - 2004, 2005 - 2010, and 2011 - 2016.

STUDY AREA

- Regions IV-B and V : Mindoro, Palawan, Romblon, Marinduque, Catanduanes and Masbate Islands .
- Visayas : Panay, Guimaras, Negros, Cebu, Bohol, Siquijor, Samar, Leyte and Biliran Islands.
- Mindanao : Mindanao and Camiguin Islands.

REPORTS

The final report consists of the following:

- Executive Summary
- Main Text
- Appendix
- Database Manual
- Project Profile
- Maps

2. PHYSICAL PROFILE

The Philippines is an archipelago of 7,100 islands with a total land area of 300,000 km². The archipelago is divided into three (3) major island groups, i.e. Luzon, Visayas and Mindanao. The Study Area covers Visayas and Mindanao including island provinces of Luzon consisting of 19 islands and 43 provinces with a total land area of 183,852 km². The smallest island in the Study Area is Romblon Island with a land area of 172 km² and the biggest is Mindanao Island with 94,031 km².

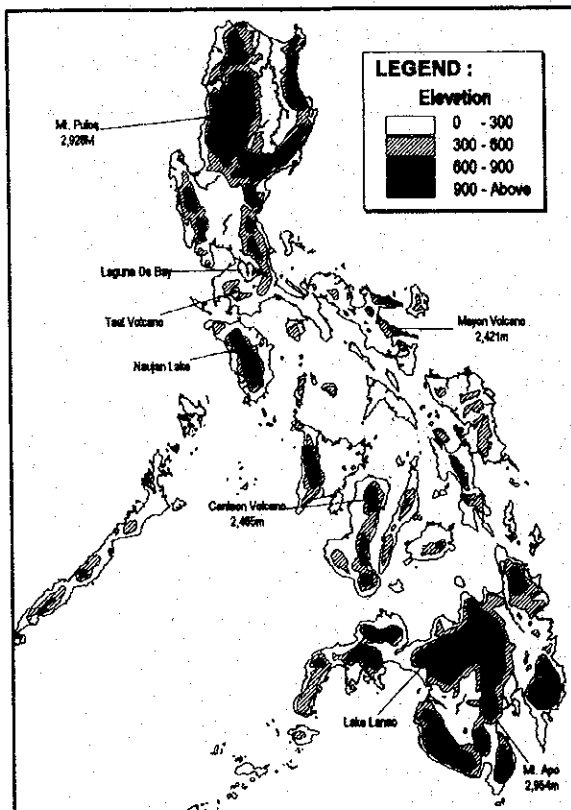
Topography of the islands in the Study Area is generally mountainous in the middle part of the island, except Masbate, with strips of flat land along coastal areas or major rivers. This topographical restriction hampers development of cross-island roads in most islands.

In general, the climate of the Philippine is controlled by two (2) types of air stream, southwest monsoon and northeast monsoon.

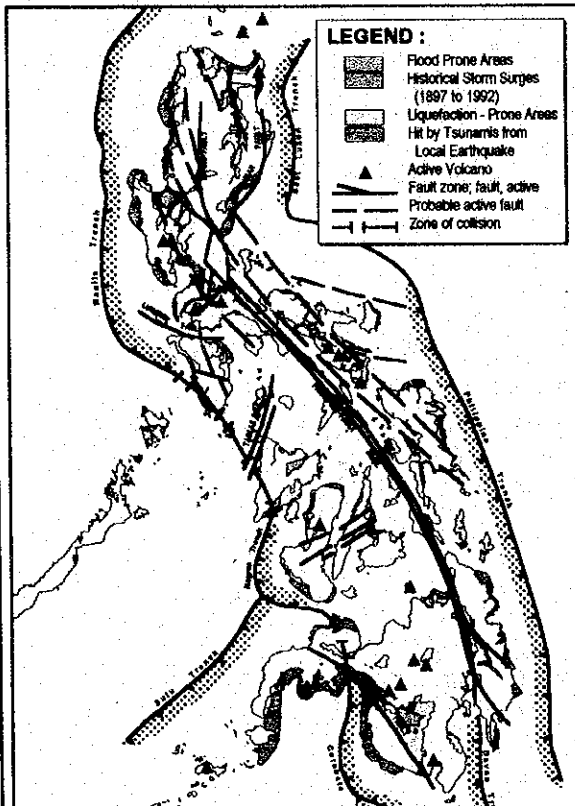
The southwest monsoon occurs from May to October and brings heavy rainfall in the western part of the archipelago while northeast monsoon brings heavy rainfall in the eastern part of the archipelago from November to February.

The Philippine archipelago is situated on the area with active diastrophism where the Pacific plate and the Eurasian plate collide with each other and forms deep trenches and numerous number of faults which generate earthquakes. Philippine Fault, the biggest fault in the country, traverses the archipelago north to south. The archipelago is also bounded by the Philippine Trench in the east and the Manila-Negros-Cotabato Trench in the west.

With its geographical and geological formation and meteorological features, roads in the Philippines are perennially exposed to natural calamities such as landslides, flooding, earthquakes and volcano eruptions.



TOPOGRAPHY

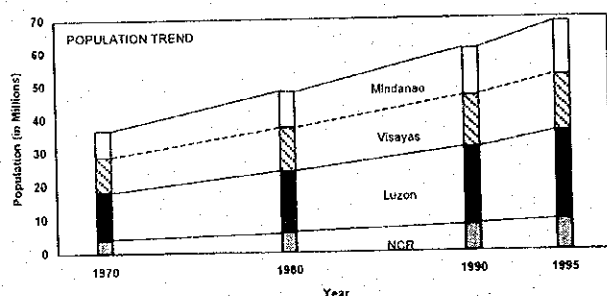


DISASTER POTENTIAL AREAS

3. SOCIO - ECONOMIC PROFILE

POPULATION

Population of the Philippines in 1995 was 68.61 million which increased from 48.10 million in 1980 and 60.70 million in 1990. The average annual population growth rate in the period of 1990 - 1995 is 2.48%. Population of the Study Area is 32.17 million that shares 46.9% of national total while land area shares 61.3%, resulting in lower population density than the national average.



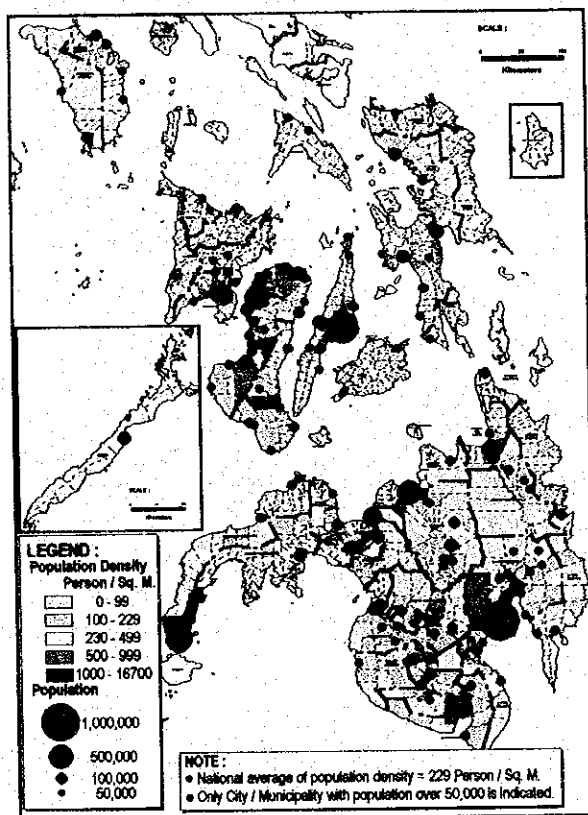
Approximately 36.9% of the people in the Study Area reside in the urban areas.

ECONOMY

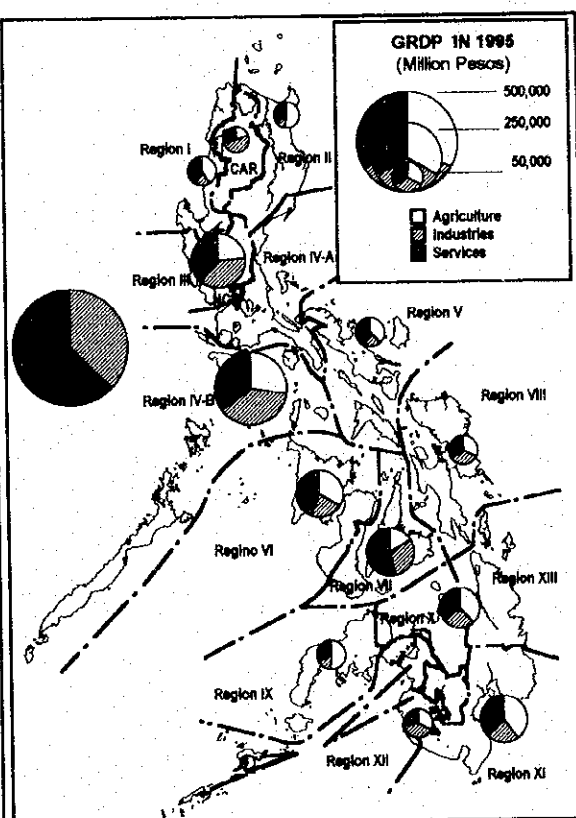
Economic growth of the country has repeated a cycle of short-term growth and long-term stagnancy. GDP per capita in real terms remains almost constant since 1980 with an average amount of 11,400 pesos at 1985 prices. About 20% of Philippine population is concentrated in the National Capital Region (NCR) which produces 33% of GDP, as compared to the Study Area which shares 38% of GDP corresponding to an amount of 725.7 billion pesos at 1995 prices.

Composition of primary, secondary and tertiary sector varies widely among regions. Region VII has the lowest share of primary sector with 16.3%, while Autonomous Region for Muslim Mindanao has the highest share with 56.4%.

Average household income in the Study Area was estimated at 57,754 pesos in 1994, which is below the NCR's average of 173,599 pesos, and the national average of 83,161 pesos.



POPULATION DENSITY AND
POPULATION BY CITY / MUNICIPALITY



REGIONAL ECONOMY

4. EXISTING ROAD NETWORK

NATIONAL ROAD DEVELOPMENT LEVEL

The national road development level in 1995 is as shown below. Regions IV-B and V and Mindanao in the Study Area show much lower development level than the national average. Visayas, on the other hand, has a level slightly higher than the national average.

National Road Development Level (1995)			
	Length (km)	Pavement Ratio (%)	Paved Road Density
Philippines	27,112	56	0.11
Study Area	15,246	51	0.11
- Regs. IV-B,V	2,282	32	0.09
- Visayas	6,465	62	0.15
- Mindanao	6,499	46	0.08

Road Density = L/\sqrt{PA} , where L = Road Length (km)
P = Population (1,000 person)
A = Land Area (km²)

PRESENT ROAD NETWORK BY ISLAND

Marinduque, Romblon, Tablas, Sibuyan

- Road network is appropriate.
- Existing roads are mostly unpaved and suffer damages by natural calamities.

Mindoro, Palawan

- Road network is not yet developed. Wide areas remain inaccessible.
- Existing roads are substandard with low pavement ratio and are frequently damaged by natural calamities.
- The severe topographic conditions hamper road network development.

Catanduanes, Masbate

- Basic road network is more or less formed, but their conditions are very sub-standard.
- Improvement of existing roads and strengthening them against natural calamities are needed.
- The southern coastal area of Masbate is currently isolated.

Panay

- Basic road network is formed. The western mountainous areas are presently isolated due to the stern topographic conditions.
- Both national road density and paved national road density are higher than the national average.
- Capacity expansion of roads in and around Iloilo City is needed.
- The road connecting with the proposed new Iloilo Airport needs to be upgraded.

Guimaras

- Basic road network is formed but existing roads are in substandard conditions.
- The proposed Iloilo-Guimaras link (Guimaras Bridge) will greatly contribute to the development of the island.

Negros

- Basic road network is formed, though the road network in the southern half area of the island needs to be strengthened.
- Cross island roads are still in poor conditions.
- Capacity expansion in and around Bacolod City is needed.
- The road linking with the proposed new Bacolod Airport needs to be upgraded.

Cebu

- Basic road network is formed.
- The western coastal road and cross island roads are still substandards.
- Capacity expansion of roads in and around Cebu City is needed.

Bohol

- Road network is well formed.
- Most existing roads are unpaved roads.

Siquijor

- Road network is well formed.
- The Circumferential Roads is in good/fair condition but cross island roads are substandard.

Samar

- Road network is still very scarce. Construction of additional roads is difficult due to mountainous terrain.
- Needed is to improve pavement condition of existing roads.
- The northern section of Pacific Coastal Road is still missing.

Leyte

- Generally, good road network is formed.
- The Mahaplag-Sogod Section of the Pan-Philippine Highway suffers frequent damages due to natural calamity.
- A short section along the Pacific Coast in the southern portion of the Island is not completed yet.

Biliran

- Road network is formed, but most sections are still gravel surfaces and improvement is needed.

Camiguin

- Road network is formed. Needed is to improve unpaved roads.

Mindanao

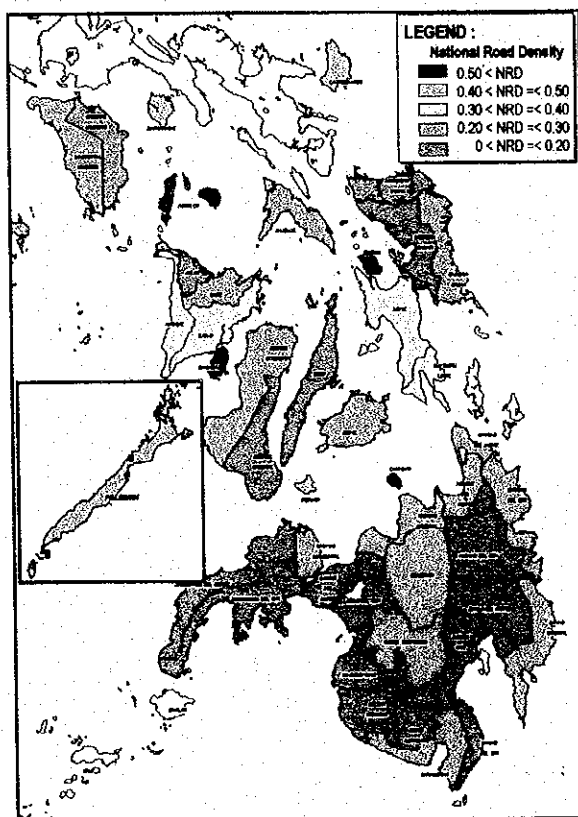
- Road network is still scarce.
- The vast area bounded by Agusan del Sur, Davao del Norte and Bukidnon is isolated, where agro-forestry industrial potential is high, thus road network development in the area is highly needed.

- Other areas where road network development is needed are:

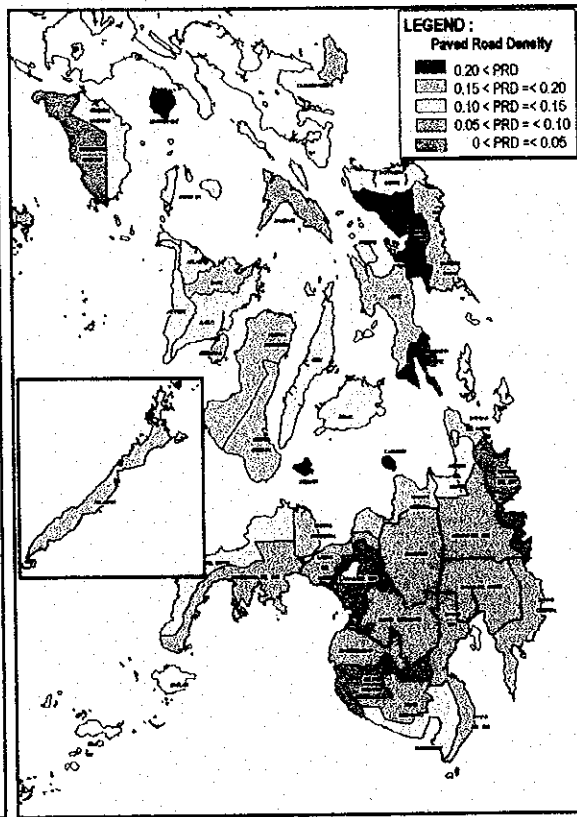
- Zamboanga Peninsula
- Sultan Kudarat
- South Cotabato
- Davao del Sur
- Davao Oriental

Mountainous terrain is a serious constraint for road development in these areas.

- Both national road density and pavement ratio are lower than the national average.
- Capacity expansion of roads in and around Davao City, Cagayan de Oro City, Gen. Santos City and Butuan City is needed.



NATIONAL ROAD DENSITY



PAVED NATIONAL ROAD DENSITY

ROAD CONDITION OF SURVEYED ROADS

A total of 21,260 km. of roads, comprising of 15,340 km of national roads and 5,920 km of selected provincial roads, were surveyed under the Study.

Surveyed Road Length (1997 & 1998)			
	National Road (km)	Prov'l Road (km)	Total (km)
Study Area	15,340	5,920	21,260
- Regs .IV-B, V	2,282	678	2,960
- Visayas	6,434	1,634	8,068
- Mindanao	6,624	3,608	10,232

* Longer than 1995 length due to new national roads

PAVEMENT TYPE OF NATIONAL ROADS

Of the total 15,340 km of national roads in the Study Area, 7,969 km. (52%) are paved, 6,637 km. are unpaved, and 382 km. are impassable.

	Paved	Un-paved	Impas sable	Under Const	Total
Study Area	7,969	6,637	382	352	15,340
- Reg. IV-B,V	727	1,479	60	16	2,280
- Visayas	4,031	2,216	48	139	6,434
- Mindanao	3,211	2,942	274	197	6,624

PAVEMENT CONDITION OF NATIONAL ROADS

Among paved roads, 84% are in good / fair condition and 16% are in bad / very bad condition.

	Paved Roads			Unpaved Roads		
	Good/ Fair	Bad/ V.Bad	Total	Good/ Fair	Bad/ V.Bad	Total
Study Area	6,702 (84%)	1,267 (16%)	7,969 (100%)	2,737 (41%)	3,900 (59%)	6,637 (100%)
- Reg. IV-B,V	482 (66%)	245 (34%)	727 (100%)	701 (47%)	778 (53%)	1,479 (100%)
- Visayas	3,412 (85%)	619 (15%)	4,031 (100%)	865 (39%)	1,351 (61%)	2,216 (100%)
- Mindanao	2,808 (87%)	403 (13%)	3,211 (100%)	1,171 (40%)	1,771 (60%)	2,942 (100%)

NUMBER OF LANES

There are still 2,994 km of 1-lane roads in the Study Area.

	4-lane or more	2-lane	1-lane
Study Area	234	11,378	2,994
- Regs .IV-B, V	2	1,183	1,021
- Visayas	108	5,033	1,106
- Mindanao	124	5,162	867

BRIDGE TYPE

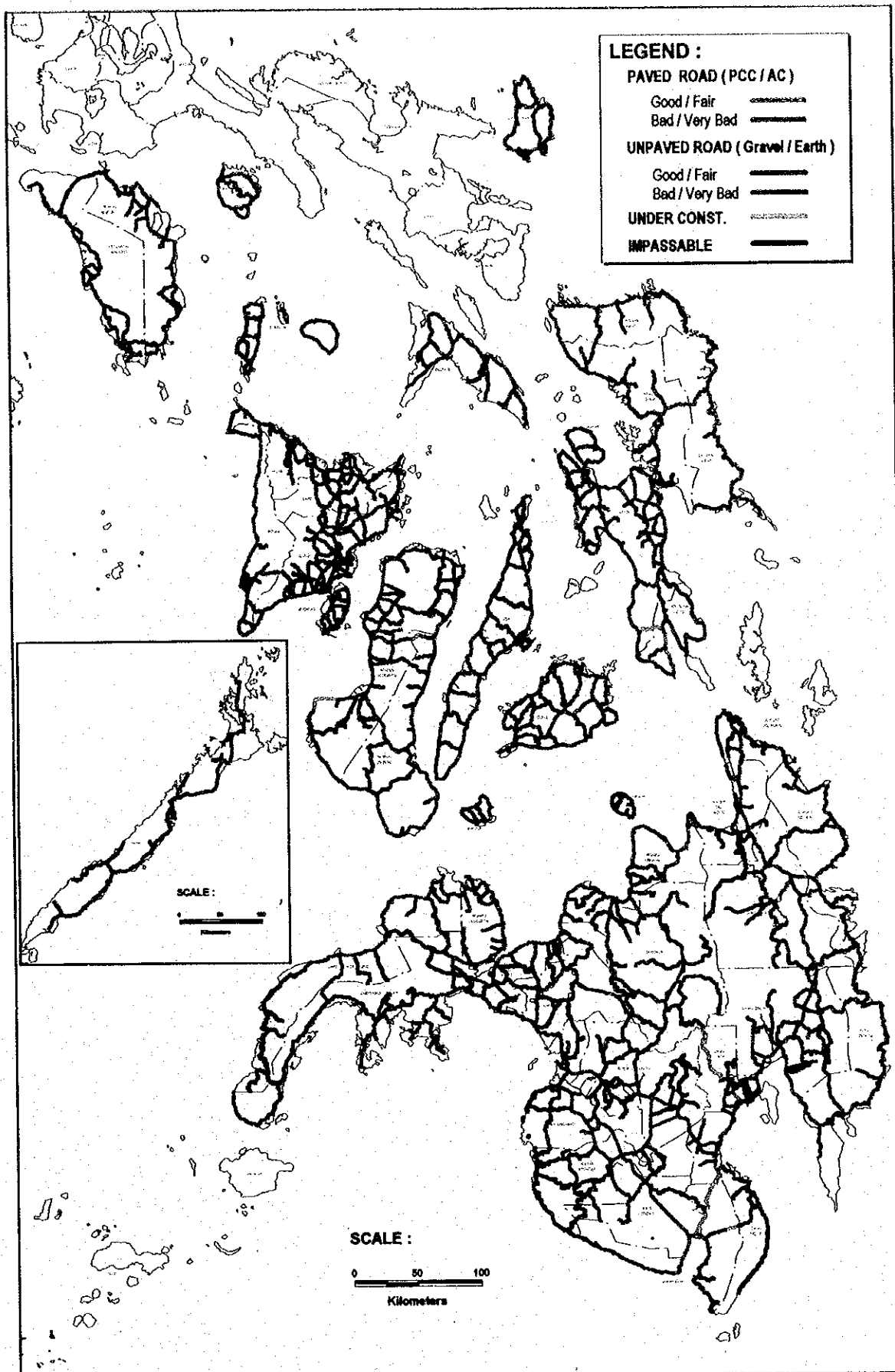
A total of 1,174 bridges (31,843 meters) are still temporary bridges.

	Permanent Br.		Temporary Br.		Total	
	No.	Length (m)	No.	Length (m)	No.	Length (m)
Study Area	3,104	120,813	1,174	31,843	4,278	152,656
- Reg. IV-B,V	433	16,600	294	9,365	727	25,965
- Visayas	1,514	55,290	453	11,235	1,967	66,525
- Mindanao	1,157	49,023	427	11,243	1,584	60,266

SUMMARY OF EXISTING PROBLEMS

Road network development level in the Study Area is still substandard. Even existing roads need a lot of improvements. The existing problems are summarized as follows:

- 1) Insufficient and substandard condition of existing roads
 - 6,637 km (43%) of national roads are still unpaved.
 - 1,267 km (16%) of paved national roads are in bad / v. bad condition.
 - 2,994 km (20%) are still 1-lane road and 382 km (2%) are impassable.
 - 1,174 bridges (31,843 meters) are still temporary bridges.
 - There are many disaster-prone sections.
- 2) Existence of wide areas still remaining inaccessible, particularly in Mindanao, Mindoro, Palawan and Samar Islands.
- 3) Insufficient development of east-west lateral links (mainly cross-island roads).
- 4) Inefficient transport linkage between and among major activity centers.
- 5) Insufficient inter-modal linkage.
- 6) Traffic interruptions due to road damages caused by natural calamities.
- 7) Increasing road sections with traffic capacity problems.



PAVEMENT CONDITION OF SURVEYED ROADS

5. EXISTING TRANSPORT FACILITIES

SEA TRANSPORT

The Philippines by virtue of its geographical nature, depends largely on sea transport as one of the main transport systems.

The sea transport shares 47% of total cargo movement next to the road transport.

There are about 1,250 ports in the country. Classification and number of ports are as follows:

Ports under PPA	123
Ports under CPA	7
Fishing ports under PFDA	180
Municipal ports	720
Private ports	220
Total	1,250

PPA : Philippine Port Authority

CPA : Cebu Port Authority

PFDA : Philippine Fisheries Development Authority

Domestic sea passenger movement recorded 41.9 million in 1995. Passenger movement between Region VII and X marked the highest with 2.06 million followed by NCR – Region X

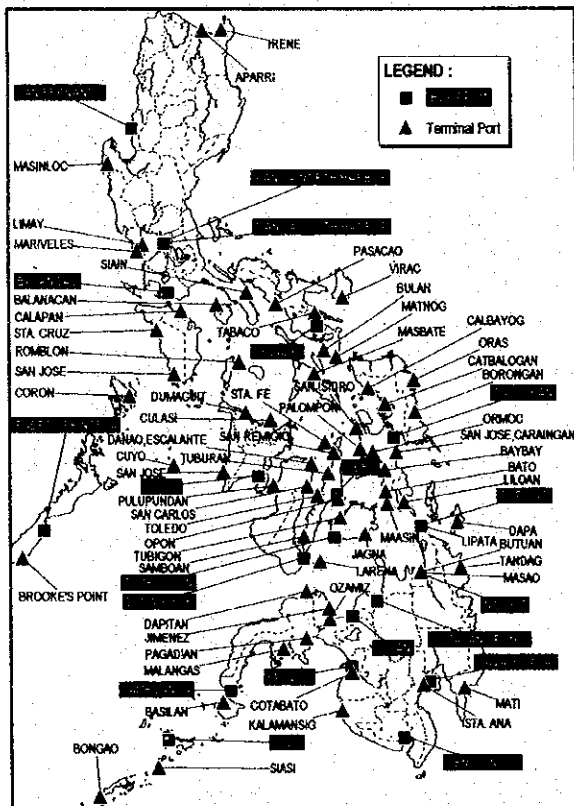
with 1.16 million. Passenger movement between other regions is more or less evenly distributed nationwide.

Among the major ports in the country, Cebu handles the highest number of passengers with 6.21 million followed by Iloilo with 4.72 million.

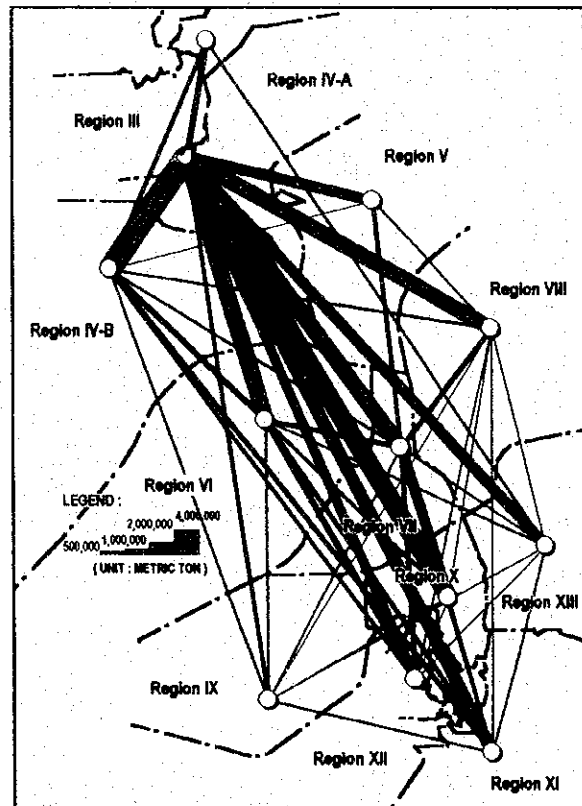
Domestic commodity movement was accounted at 72.4 million tons in 1995. Foreign cargo amounted to about 58.6 million tons of which 71% (or 41.8 million tons) was imported cargo.

In contrast to passenger movement, domestic commodity movement is largely concentrated in NCR, with more than 34% (or 24.7 million tons) of cargo originating from or destined to NCR.

Among inter-regional commodity movement, movement between NCR and Region IV is the highest with 3.61 million tons followed by 2.43 million tons between NCR and Region VII.



BASE AND TERMINAL PORT IN THE PHILIPPINES



INTER - REGIONAL COMMODITY MOVEMENT

AIR TRANSPORT

Airports in the Philippines are classified into five (5) categories with the number of airports for each category given as follows:

Regular International Airport	4
Alternate International Airport	4
Trunk Line Airport	12
Secondary Airport	37
Feeder Airport	34
Total	91

Total number of domestic air passengers was recorded at 10.2 million in 1996 of which about 42% (or 4.3 million) were boarded/landed at Manila airport followed by 20% (or 2.0 million) at Cebu and 8% (or 0.8 million) at Davao airport. Passenger movement between Manila and Cebu is the largest with 1.32 million followed by 0.38 million between Manila and Davao. Manila and Cebu airports function as hub airports in the country.

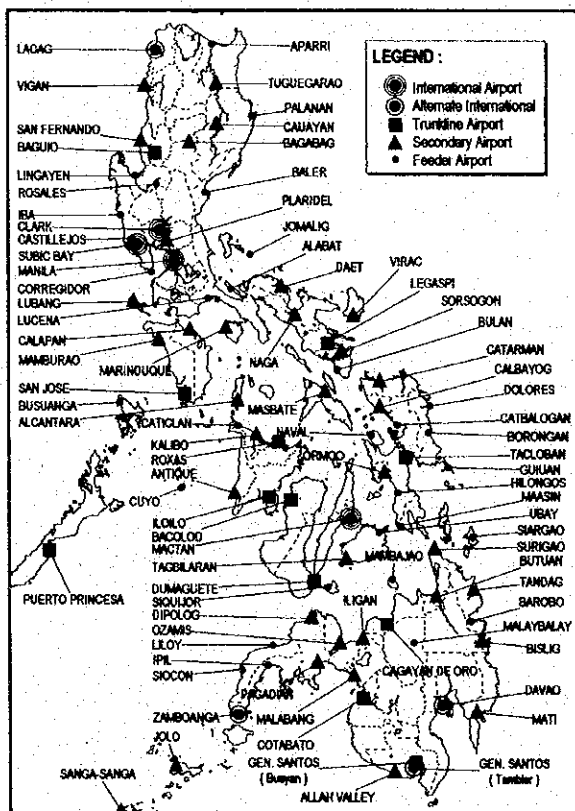
Cargo transported by air amounted to only 55,000 tons in 1994 that is small in magnitude and considered negligible in this Study.

Three new airports are proposed to be built in the Study Area as follows:

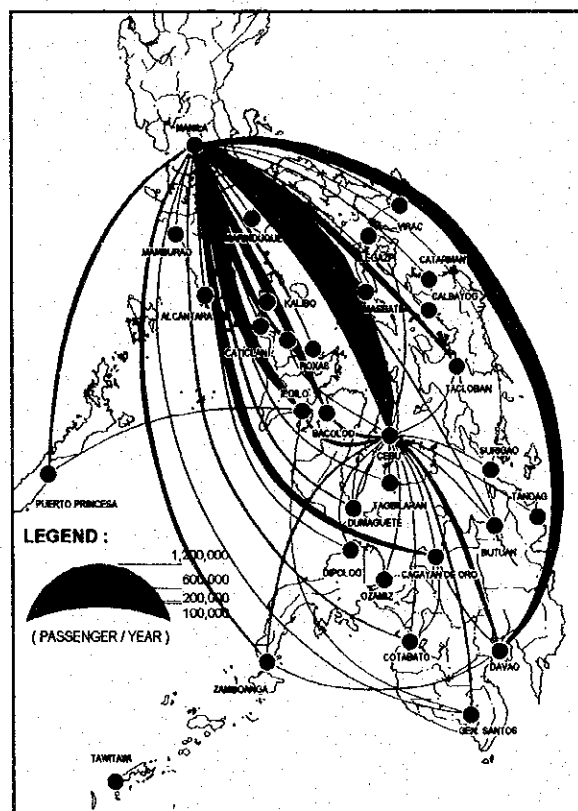
- New Iloilo Airport
- New Bacolod Airport
- New Laguindingan Airport to replace the Cagayan de Oro Airport

RAIL TRANSPORT

There is no railway operating in the Study Area. There is a proposal to develop a Mindanao Railway System but is still in the planning stage. Funding sources for the proposed project, implementation schedule, etc. are still unknown at this stage.



AIRPORTS IN THE PHILIPPINES



AIR PASSENGER MOVEMENT

6. PRESENT ROAD PLANNING AND MAINTENANCE SYSTEM

ROAD PLANNING SYSTEM

The Planning Service of the DPWH Central Office is the body to select, schedule and program all projects of DPWH in close coordination with NEDA, DPWH Regional Offices, Regional Development Councils and Local Government Units. The Planning Service has the following four Divisions:

- Development Planning Division
- Project Evaluation Division
- Programming Division
- Infrastructure Planning Research and Statistics Division

The "Bottom Up" planning procedure is being adopted in preparing the Annual Infrastructure Program, wherein the project lists and proposals are submitted from LGUs level to Regional level, then finally to the Central Office. Regional fund allocation is determined by the formula developed by DPWH which considers factors of equal share per province, population and scarcity of infrastructure.

In the project preparation stage, the Project Management Office – Feasibility Studies (PMO – F/S) takes an important role to determine viability of projects, based on which decision on implementation is made.

The projects to be implemented under the private sector financing are managed by the Project Management Office – Build – Operate – Transfer (PMO – BOT).

ROAD MAINTENANCE SYSTEM

DPWH is responsible for the maintenance of all national roads. The Bureau of Maintenance (BOM) and the Bureau of Equipment (BOE) of the DPWH Central Office provides maintenance policies, directions, technical assistance and guidance to the field offices, i.e. Regional Offices and District/City Engineering Offices which are the implementing bodies of maintenance works.

Under the current maintenance system of DPWH, maintenance works are divided into Maintenance Work by Administration (MBA) under the Philippine Highway Maintenance Management System (PHMMS) and Maintenance Work by Contract (MBC).

Maintenance Budget

Maintenance budget and its allocation to Regional / District / City Offices is determined by the Equivalent Maintenance Kilometer (EMK) system.

$$\text{Maintenance Budget} = \text{Basic Cost} \times \text{EMK}$$

Year	Basic Cost (P / EMK)	(At Current Price)
		Total Budget (Billion Pesos)
1994	33,500	1.787
1995	62,463	3.237
1996	63,351	3.399
1997	66,835	3.586
1998	70,511	3.696

Present maintenance budget is not sufficient to repair all existing pavement distresses and other maintenance needs.

Present Maintenance Level

Under the present maintenance level which is greatly dependent on maintenance budget, only 34~40% of PCC pavement distresses and 78~88% of AC pavement distresses are estimated to be repaired. Pavement conditions will be aggravated year by year, if the present maintenance level is not upgraded.

Privatization of Work Activities

Three priority categories are established by BOM and each maintenance activity is specified with its priority. However, present prioritization criteria do not consider such factors as a road class and traffic volume. Maintenance works of paved roads and unpaved roads are evenly prioritized.

Maintenance by Administration

Work productivity is becoming low due to poor condition of equipment and older staff. The existing equipment has been operated for 19 years on the average, which exceeds the economic operational life of 10~12 years. Only 40~50% of equipment are utilized and others are under repair or unserviceable. One third of staff are over 51 years old and they are adversely influencing younger generation in discipline.

Maintenance by Contract

Maintenance oriented contractors are few. Many contractors do not consider MBC as their main line of business. Present contract size (average is 2.3 million pesos and the maximum is 4.5 million pesos) is too small to attract good contractors. Organizations of District Offices still remain that of MBA, and supervisory staff for MBC are not sufficient.

Share of MBA and MBC

Budgetary share of MBC is currently 50%. DPWH plans to increase MBC share up to 70%.

7. FUTURE SOCIO – ECONOMIC FRAMEWORK

FUTURE POPULATION

"1995-based National and Regional Population Projection" prepared by the Technical Advisory Group and the National Statistics Office which is the GOP's official projection was adopted for the Study.

Population of the Philippines is projected to increase from 68.6 million in 1995 to 100.3 million (or 1.46 times) in 2016. Population of the Study Area will increase from 31.1 million in 1995 to 46.0 million (or 1.48 times) in 2016. Population share of the Study Area to the Philippines is expected to slightly increase from current 45% to 46% in 2016.

Higher population increase than national average is expected in Regions IV-B / V and Mindanao Island of the Study Area.

	(Million)				
	1995	2004	2010	2016	2016/ 1995
Philippines	68.6	82.6	91.9	100.3	1.46
Study Area	31.1	37.7	42.1	46.0	1.48
- Region IV-B, V	2.5	3.1	3.5	3.9	1.56
- Visayas	13.8	16.4	18.0	19.5	1.41
- Mindanao	14.8	18.2	20.5	22.6	1.53

Urban population in the Study Area is estimated to be doubled from 1995 to 2016, showing much higher increase than the national average. About 47% of the Study Area population will reside in the urban areas.

	(Million)				
	1995	2004	2010	2016	2016/ 1995
Philippines	32.4	42.8	50.5	58.0	1.79
Study Area	10.6	14.9	18.2	21.6	2.04
- Region IV-B, V	0.5	0.7	0.9	1.1	2.20
- Visayas	4.9	6.7	8.0	9.3	1.90
- Mindanao	5.2	7.5	9.3	11.2	2.15

FUTURE LAND USE

Among land uses, the agricultural land is planned by the "Crop Development and Soil

Conservation Framework" to be expanded by 1.37 times from 65,100 to 89,150 sq. km. in the Study Area in future.

	(1,000 sq.km)				
	Present Agricultural Land (A)	Agri. Land	Expansion Zone	Total (B)	B / A
Study Area	65.10	64.80	24.35	89.15	1.37
- Region IV-B, V	7.87	7.39	3.38	10.77	1.37
- Visayas	25.82	25.06	5.28	30.34	1.18
- Mindanao	31.41	32.35	15.69	48.04	1.53

ECONOMIC FRAMEWORK

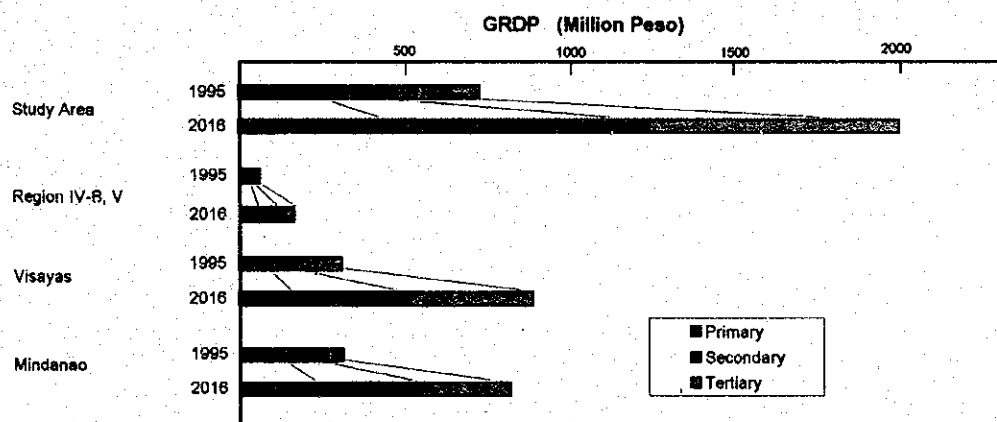
The agricultural sector GDP was estimated in consideration of future agricultural land use and the target yield by crop. The industry and service sector GDP was estimated by the Klein-Kosobud Model.

GDP is targeted to grow at an average rate of 5.06% per annum from 1995 to 2016. A slightly lower growth rate is targeted for the Study Area.

	GDP/GRDP (Billion Pesos)		Growth Rate	
	1995	2016	Per Annum 1995-2016	2016/ 1995
Philippines	1,906 (100%)	5,374 (100%)	5.06%	2.82
Study Area	726 (38%)	1,970 (37%)	4.87%	2.71
- Reg. IV-B, V	65 (3%)	168 (3%)	4.60%	2.58
- Visayas	309 (16%)	881 (16%)	5.11%	2.85
- Mindanao	351 (18%)	921 (17%)	4.70%	2.62

The agricultural sector is expected to grow at a rate of 2.6-3.0%, the industrial sector at 6.5 to 7.0% and the service sector at 4.6-4.8% per annum.

	Growth Rate Per Annum		
	Primary	Secondary	Tertiary
Philippines	2.7	6.5	4.8
Study Area	2.8	6.9	4.8
- Region IV-B, V	3.0	6.4	4.6
- Visayas	3.0	7.0	4.8
- Mindanao	2.6	6.8	4.8



8. PRESENT TRAFFIC

Present OD matrices were prepared based on a roadside OD survey at 40 stations and supplemental traffic counts at 37 stations. The present OD traffic was assigned on the existing road network to estimate traffic volume on all component links.

TRAFFIC VOLUME

Heavy traffic sections with more than 5,000 vehicles per day are found in and around the big cities of Iloilo, Bacolod, Cebu, Tacloban, Cagayan de Oro, Davao, General Santos and Butuan.

VEHICLE TRIP

Vehicle composition and average trip length in the whole Study Area are as follows:

	Car	Jeepney	Bus	Truck
Vehicle Composition (%)	44.5	29.9	5.5	20.1
Average Trip Length (km)	35.7	30.6	71.5	42.5

Average trip length of jeepney is the shortest and that of bus is the longest, which is about 2.3 times as much as the former. Car share in Cebu is the highest accounting for 58.8%, while car share in Marinduque, Romblon, Panay and Camiguin Islands is less than 30%.

PASSENGER TRIP

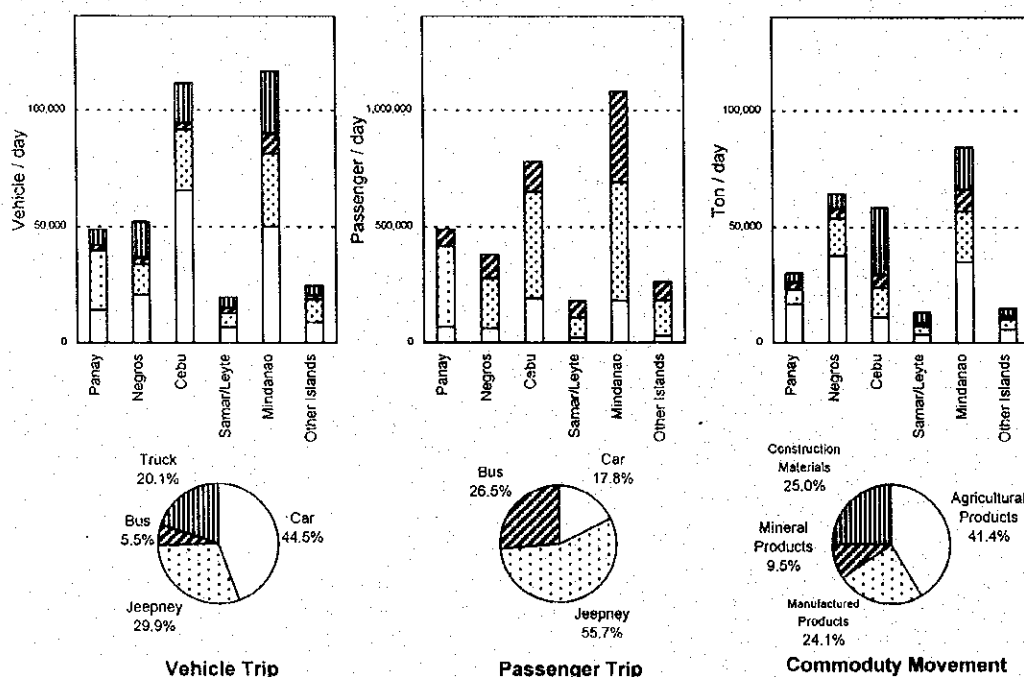
Passenger trip characteristics are as follows:

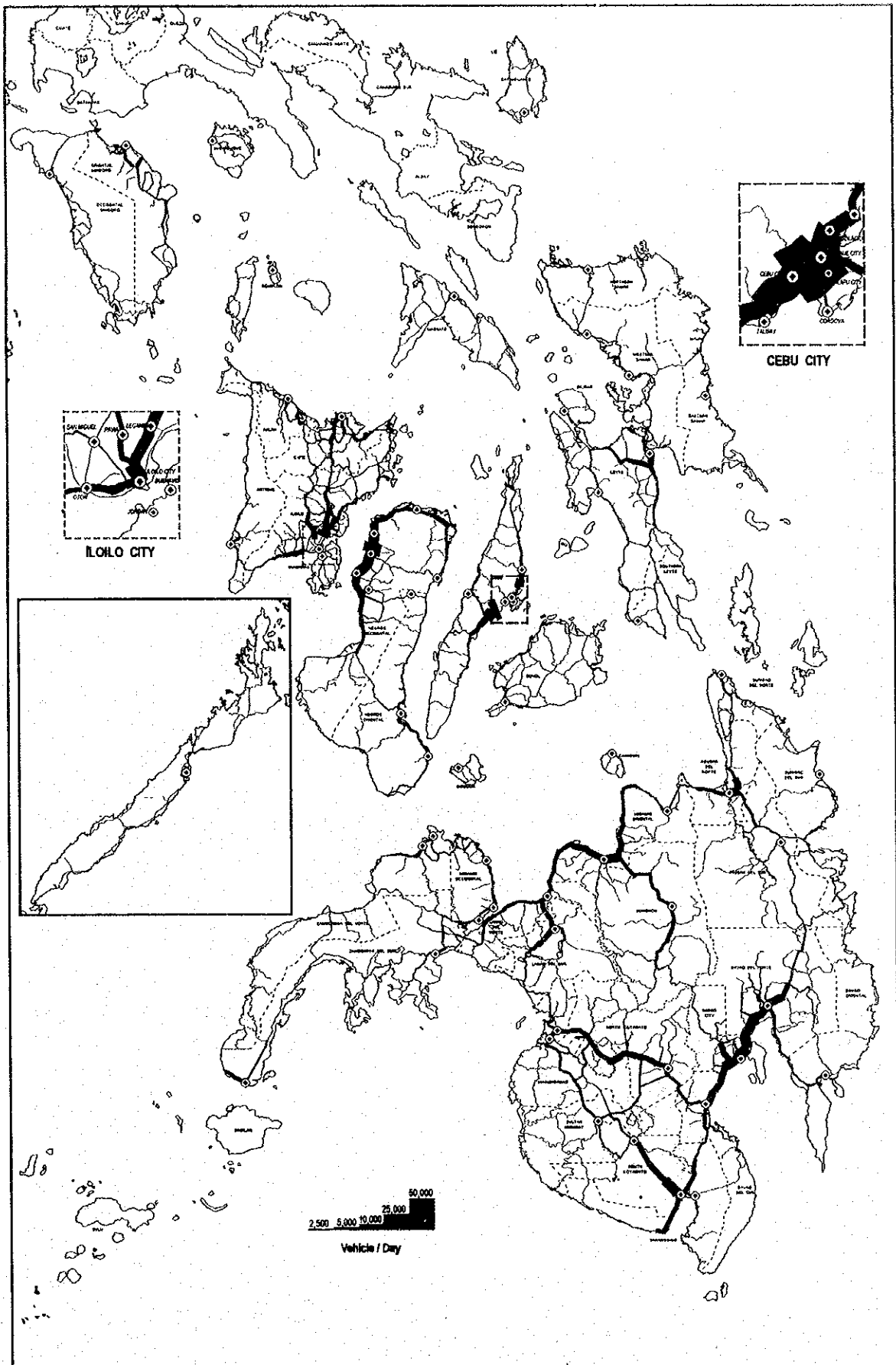
	Car	Jeepney	Bus
Vehicle Composition (%)	17.8	55.7	26.5
Average Trip Length (km)	38.7	27.0	57.5
Average Occupancy (person/veh)	3.3	15.9	41.2

Inter-municipal trip rate (average number of trips per person per day) varies from 0.05 in Samar / Leyte to 0.27 in Cebu. Car share has a clear tendency to increase as the average income increases and the road condition becomes better.

COMMODITY MOVEMENT

In the whole Study Area, agricultural products account for 41.4%, construction materials 25.0%, manufactured products 24.1% and mineral products 9.5%. Share of agricultural products is relatively high in Negros and Panay being 58.3% and 55.6% respectively, while construction materials' share is significantly high in Cebu accounting for 49.9%. About 95% of commodity is carried by trucks with an average load of 3.36 ton/truck including empty trucks.





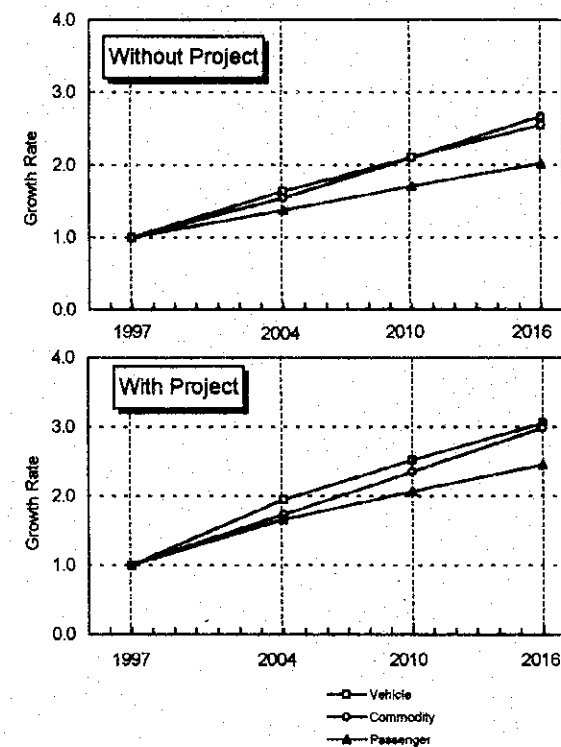
PRESENT TRAFFIC VOLUME

9. FUTURE TRAFFIC DEMAND

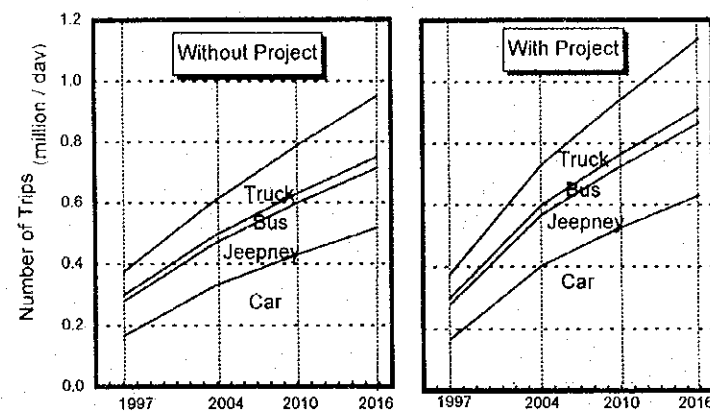
Future OD matrices are prepared based on the present traffic pattern and future socio-economic framework, for the two cases of "without project" and "with project". The first case assumes that the present road condition will not change in the future, while the second case considers the improvements in the arterial road network and evaluation on induced and development traffic volume.

TRAFFIC GROWTH

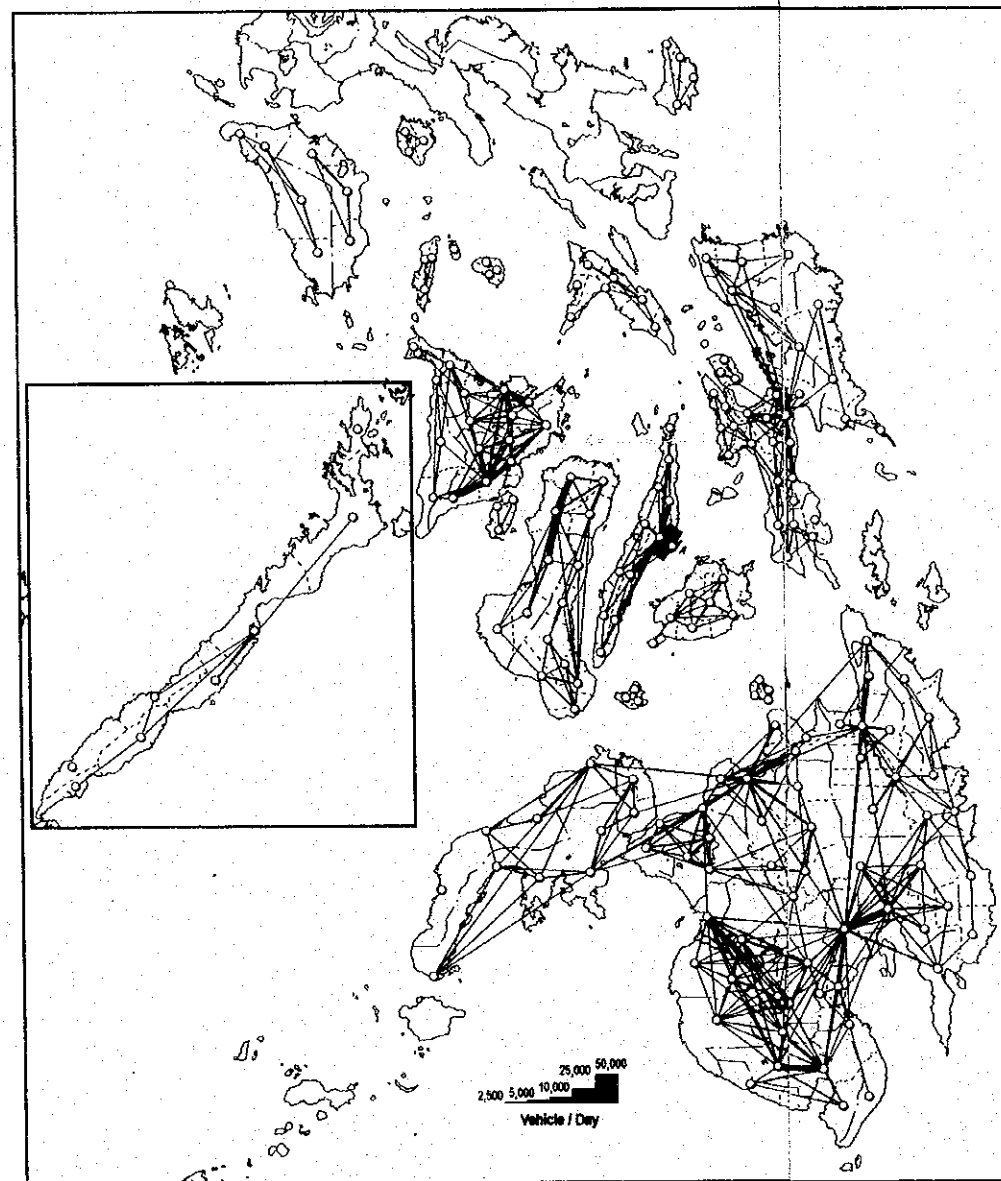
Passenger trips and commodity movement are expected to increase about 2.5 times and 3.0 times in 2016, respectively. Vehicle trips are estimated to increase about 3.1 times in which car trips have the highest growth rate of 3.8 followed by truck (3.0), bus (2.3) and jeepney (2.1). This difference is mainly due to increase of car share in passenger trips resulting from the increase in per-capita income. As a result, vehicle composition is estimated to change from car 44.5%, jeepney 29.9%, bus 5.5% and truck 20.1% in 1997 to car 55.3%, jeepney 20.7%, bus 4.1% and truck 19.9% in 2016.



GROWTH RATE OF TRIP GENERATION



NUMBERS OF TRIPS BY VEHICLE TYPE



DESIRE LINE IN 1997

TRAFFIC GENERATION SOURCE

The highest trip generation source is Cebu City followed by Mandaue City and Lapu-lapu City. All cities are located in Cebu Province and forming a metropolitan area. Vehicle trips generated in the three cities accounted for 19.2% of the total trips in the Study Area in 1997. The share is estimated to slightly decrease to 15.2% in 2016. From the viewpoint of provincial share, Cebu Province is predominant with 29.9% in 1997 and 26.2% in 2016, while share of the land area is only 2.8% and population is 8.7% in 1997 and 8.5% in 2016.

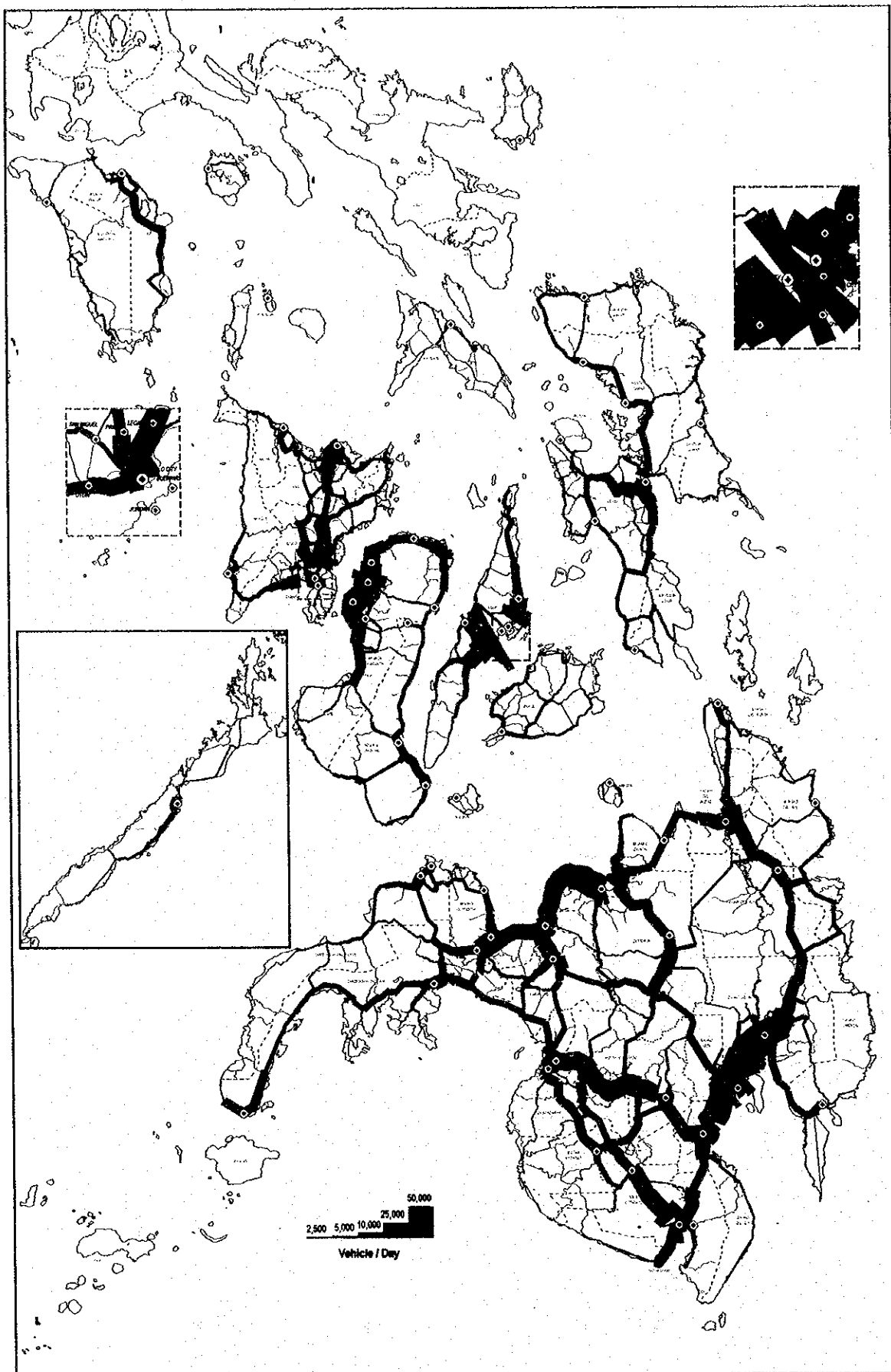
Other high trip generation sources are Davao City, Bacolod City, Iloilo City, General Santos City and Cagayan de Oro City.

Highest 10 Traffic Generation Sources

	(1,000 vehicle trip/day)	
	1997	2016 With Case
Cebu City	32.72	78.93
Mandaue City	22.46	60.10
Lapu-lapu City	16.55	33.78
Davao City	9.86	36.50
Bacolod City	9.75	20.68
Talisay	8.05	28.44
Iloilo City	7.69	17.15
Consolacion	6.91	18.03
Gen. Santos City	5.39	17.35
Cag. de Oro City	4.97	18.17
Study Area Total	373.25	1,139.88



DESIRE LINE (WITH PROJECT) IN 2016

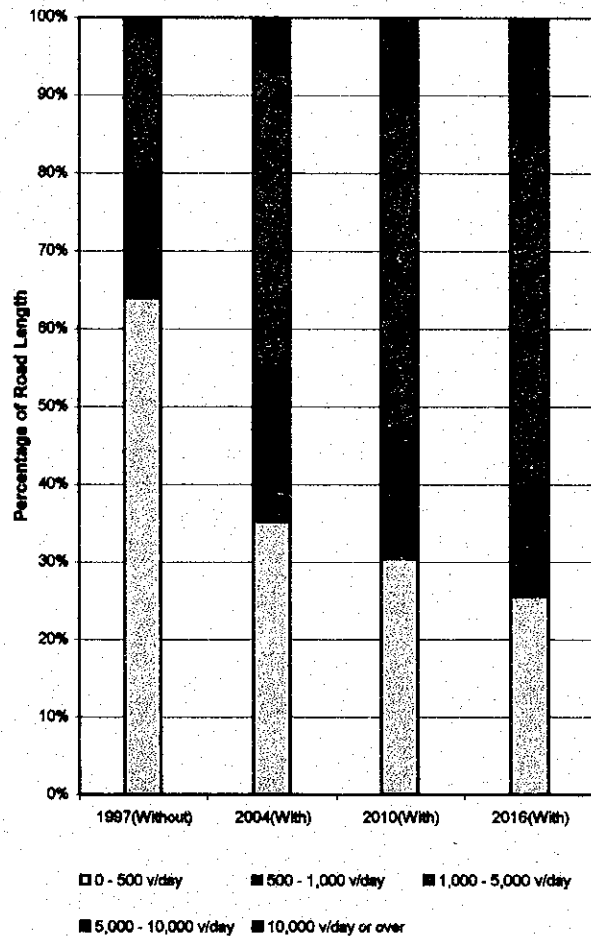


FUTURE TRAFFIC VOLUME (WITH PROJECT) IN 2016

TRAFFIC VOLUME DISTRIBUTION

Out of 16,899 km of arterial roads in the Study Area, 64% has a low traffic volume of less than 500 vehicles per day, while only 1.7% has a heavy traffic volume of more than 5,000 vehicles per day in 1997. The percentages of the low and heavy traffic volume sections are forecasted to change to 25.5% and 15.3%, respectively in 2016. Average traffic volumes are estimated to increase as follows:

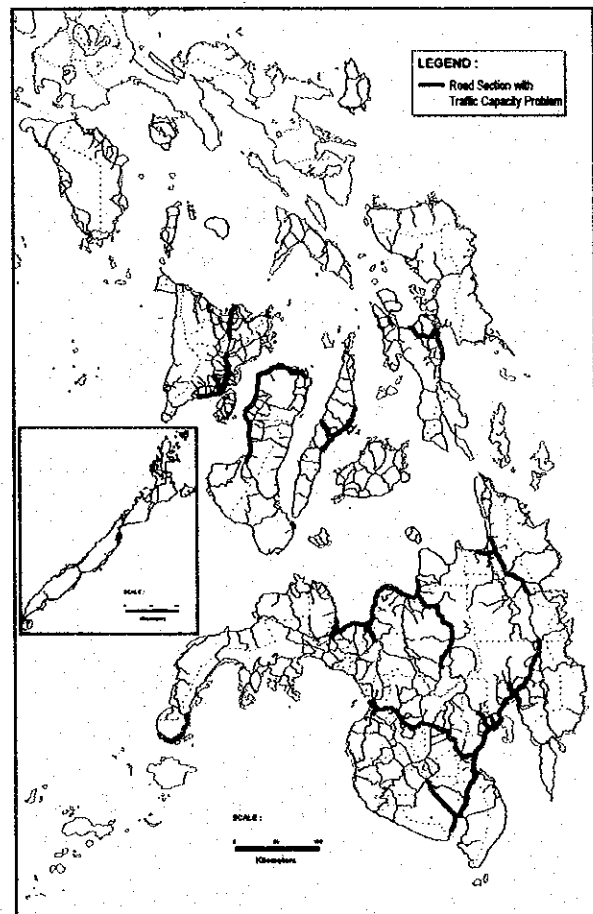
1997	754 veh/day
2004	1,658 veh/day
2010	2,189 veh/day
2016	2,691 veh/day



Traffic Volume Distribution

TRAFFIC CAPACITY PROBLEM SECTIONS

The significant increase of traffic volume in the future will result in traffic congestion problem on many sections, which will need to be strengthened by means of widening existing roads and/or constructing expressway/bypass.



ROAD SECTIONS WITH TRAFFIC CAPACITY PROBLEM (2016)

10. PROPOSED MASTER PLAN NETWORK

Basic Network was initially formulated as a skeleton network connecting important activity centers. Basic Network was further strengthened from the viewpoint of transport efficiency to formulate the Master Plan Network.

GOALS AND OBJECTIVES OF THE MASTER PLAN NETWORK

The goals of the Master Plan were established as follows:

- To enlarge and reinforce the physical foundation of the regional economy.
- To promote effective land use and contribute to unity of nation and preservation of peace.

The objectives of the Master Plan were established as follows:

- To complete a major road network which connects major urban centers.
- To cover whole island by a major road network to eliminate inaccessible areas.
- To achieve effective multi-modal transport linkages.
- To take proper preventive measures against road closures due to natural calamities.
- To maintain all component roads in acceptable service level.

BACKBONE TRANSPORT AXES

The following backbone transport axes were planned to be formed:

- Eastern Transport Axis
- Western Transport Axis
- Central Transport Axis
- Growth Corridor Transport Axis

BASIC NETWORK

Basic network is composed of the following four categories of roads:

- North-South Backbone which forms the backbone transport axes and interconnects most primary activity centers.
- East-West Lateral which forms to east-west (or lateral) link at an interval of 50-100 kilometers.
- Strategic Road (A) which interconnects all of secondary and tertiary activity centers and serves as an alternative route of higher class of roads in case of a road closure.

- Strategic Road (B) which penetrates agricultural lands and other areas currently with no access and contributes to effective use of lands and integration of the country.

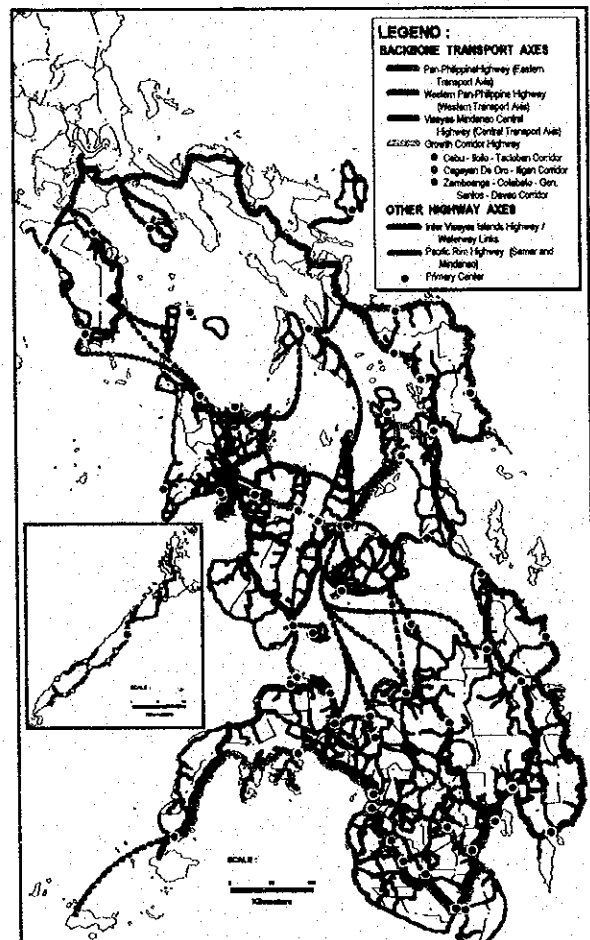
Basic network consists of the following roads:
(km)

	Existing Road	New Road	Total
N-S Backbone	4,061	10	4,071
E-W Lateral	2,030	364	2,394
Strategic Road (A)	6,906	118	7,024
Strategic Road (B)	2,155	1,255	3,410
Total	15,152	1,747	16,899

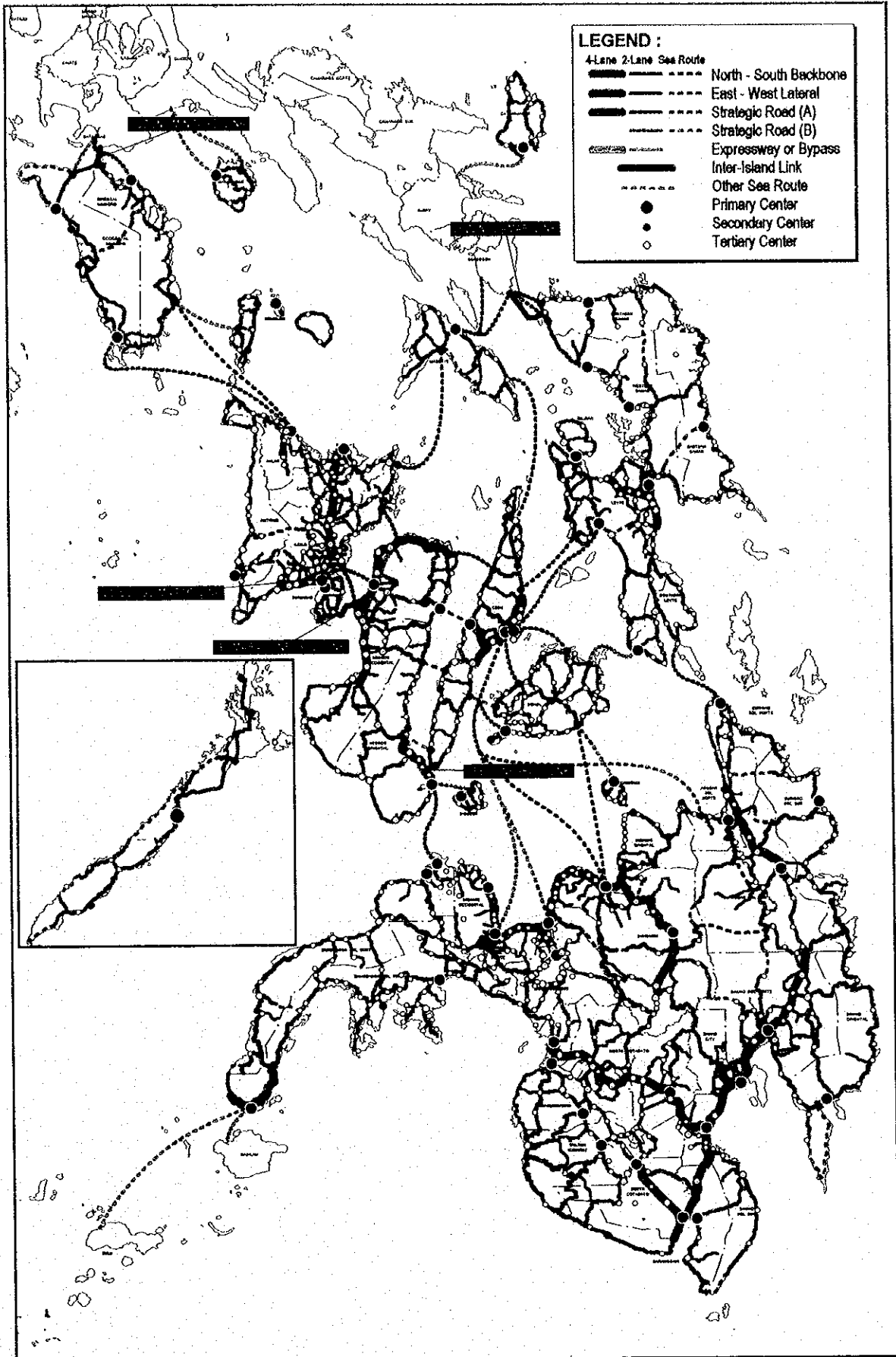
MASTER PLAN NETWORK

The Master Plan Network was established by reinforcing the basic network from the viewpoints of transport efficiencies. Following are added:

- Capacity expansion L = 1,769 km
- 7 Bypasses L = 215 km
- 2 Expressways L = 149 km
- 5 Inter-Island Links L = 91 km



BACKBONE TRANSPORT AXES



MASTER PLAN ROAD NETWORK

11. ROAD PROJECTS AND ESTIMATED PROJECT COST

PROJECT IDENTIFICATION CRITERIA

Projects are classified into 3 groups and project identification criteria for each group are established as follows:

Group 1 : 2-lane Road Projects

Existing Condition	Type of Work	Code
Paved roads in Bad / V.Bad Condition	Rehabilitation	Reh. A
Paved roads in fair condition	Rehabilitation	Reh. B
Gravel / Earth Road	Improvement to paved road	Imp.
Impassable / Missing Link / New Link	Construction of Paved road	New

Group 2 : Traffic Capacity Expansion Projects

Traffic volume exceeds capacity	W - 4
---------------------------------	-------

Group 3 : Special Projects

Bypass	: Widening difficult, or even widened, traffic congestion expected	BY
Expressway	: Strategic measures required to drastically improve transport efficiency.	EXP.
Inter-Island Link	: Strategically link two island to contribute island development and strengthen inter-island linkage.	IL.

IDENTIFIED ROAD PROJECTS

Basic network consists of 169 roads which are further subdivided into 633 segments. Identified road projects are as follows:

Group	Type of Work	No. of Segment	Length (km)
Group 1	Reh. A	61	1,291
	Reh. B	122	2,278
	Imp.	231	6,135
	New/Impassable	63	2,197
	On-going/committed	76	1,696
	No work (do nothing)	80	3,302
Group 2	W-4 (26 roads)	100	1,769
Group 3	BY (7 Bypasses)	10	215
	EXP (2 Expressways)	6	149
	IL (5 Links)	5	91

ESTIMATED PROJECT COST

The project cost for identified projects was estimated at October 1998 prices. Total project cost was estimated at 750.6 billion pesos, comprising of 258.3 billion pesos for Group 1, 40.1 billion pesos for Group 2, 33.4 billion pesos for expressways and bypasses and 418.8 billion pesos for inter-island link projects.

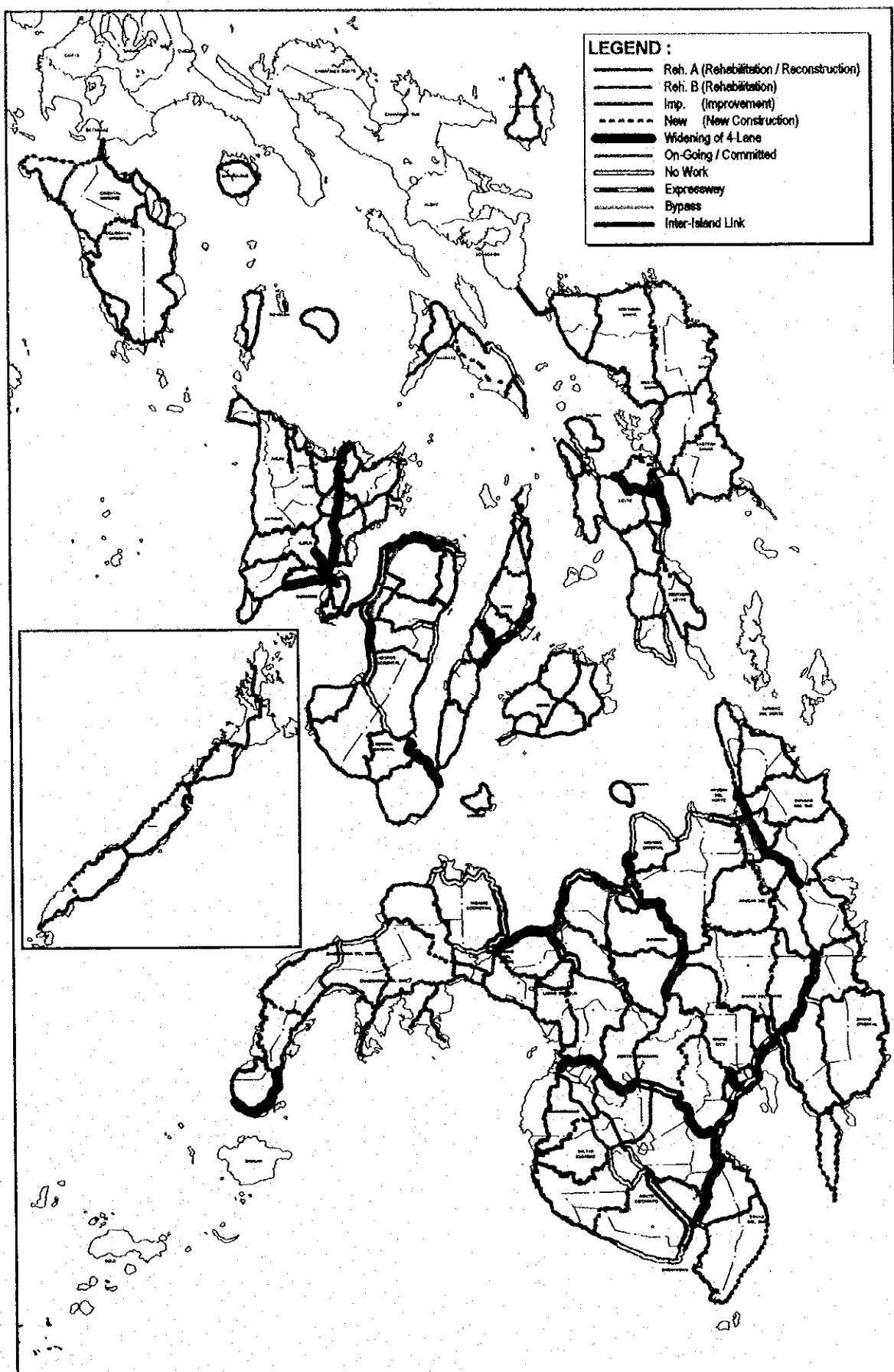
ESTIMATED PROJECT COSTS BY ISLAND

Island	Group 1	Group 2	(Million Pesos)	
			Group 3 Excluding IL	Total
Marinduque	1,167.1	-	-	1,167.1
Mindoro	17,394.2	-	-	17,394.2
Palawan	20,833.6	-	-	20,833.6
Romblon	4,907.2	-	-	4,907.2
Catanduanes	3,887.9	-	-	3,887.9
Masbate	5,818.6	-	-	5,818.6
Panay	20,707.9	3,734.4	1,043.6	25,485.9
Guimaras	1,913.4	-	-	1,913.4
Negros	10,022.5	5,204.0	2,923.6	18,150.1
Bohol	4,284.1	-	-	4,284.1
Cebu	6,969.2	1,644.3	12,393.3	21,006.8
Siquijor	372.1	-	-	372.1
Leyte	15,058.7	2,326.3	-	17,385.0
Samar	19,396.9	-	-	19,396.9
Camiguin	540.6	-	-	540.6
Mindanao	125,015.8	27,240.1	17,041.3	169,297.2
Sub-Total	258,287.8	40,149.1	33,401.8	331,838.7
Inter-Island				418,752.0
Grand-Total				750,590.7

The Project cost by area is shown below:

ESTIMATED PROJECT COSTS BY AREA

Area	(Million Pesos)	
	Total Project Cost	(%)
Region IV-B/V	54,008.6	(16.3%)
Visayas	107,992.3	(32.5%)
Mindanao	169,837.8	(51.2%)
Sub-Total	331,838.7	(100%)
Inter-Island	418,752.0	
Grand Total	750,590.7	



PROJECT LOCATION MAP

12. IMPLEMENTATION PRIORITY AND PROGRAMS

PROCEDURE FOR IMPLEMENTATION SCHEDULING

Project priority and implementation timing were evaluated for each group of projects. Group 1 consists of different types of projects and prioritization was required under the established criteria. Group 2 is a traffic capacity expansion project and is to be implemented prior to the occurrence of severe traffic congestion. Group 3 is a large scale project and implementing timing is governed by the economic viability.

For Group 1, the prioritization criteria was established. Based on the criteria, four implementation scenarios were prepared and evaluated, then the balance of regional investment and the engineering judgment were taken into account to develop the implementation schedule for Group 1.

Four Group 2, implementation timing was assessed in consideration of future traffic demand and set before traffic volume-to-capacity ratio becomes 1.25.

For Group 3, implementation timing was determined by the economic evaluation result.

PROJECT PRIORITIZATION OF GROUP 1

Evaluation Items

Project priority was evaluated from the following items:

- I. Road Class
- II. Degree of Inconvenience
- III. Economic Return
- IV. Contribution to Regional Development
- V. Type of Work
- VI. Environmental Consideration
- VII. Inter-modal Linkage
- VIII. Continuity of On-going / Committed Project

The degree of inconvenience (DI) was evaluated based on the following formula:

$$DI = \text{Road Condition} \times DI \text{ Factor} \times AADT$$

Development Scenario

Project priority largely depends on weight given to each evaluation item. Four development scenarios were prepared for giving high weight on the focused item as follows:

- Scenario 1 : Economic Return Oriented
- Scenario 2 : Regional Development Oriented
- Scenario 3 : Highway Hierarchy and Past Investment Protection Oriented
- Scenario 4 : Development Scenario Based on Opinions of Concerned Agencies

Priority of Group 1 Projects

Priorities of Group 1 projects were determined mainly on Scenario 4 and additional factors as follows:

- Regional balance of investment
- Engineering judgment, particularly construction sequence

OVERALL IMPLEMENTATION PRIORITY

Implementation priorities of projects of three Groups were integrated and the overall implementation priorities of projects were prepared. Minor adjustments were made to comply with the budgetary framework of each 6-year period.

PROGRAMS

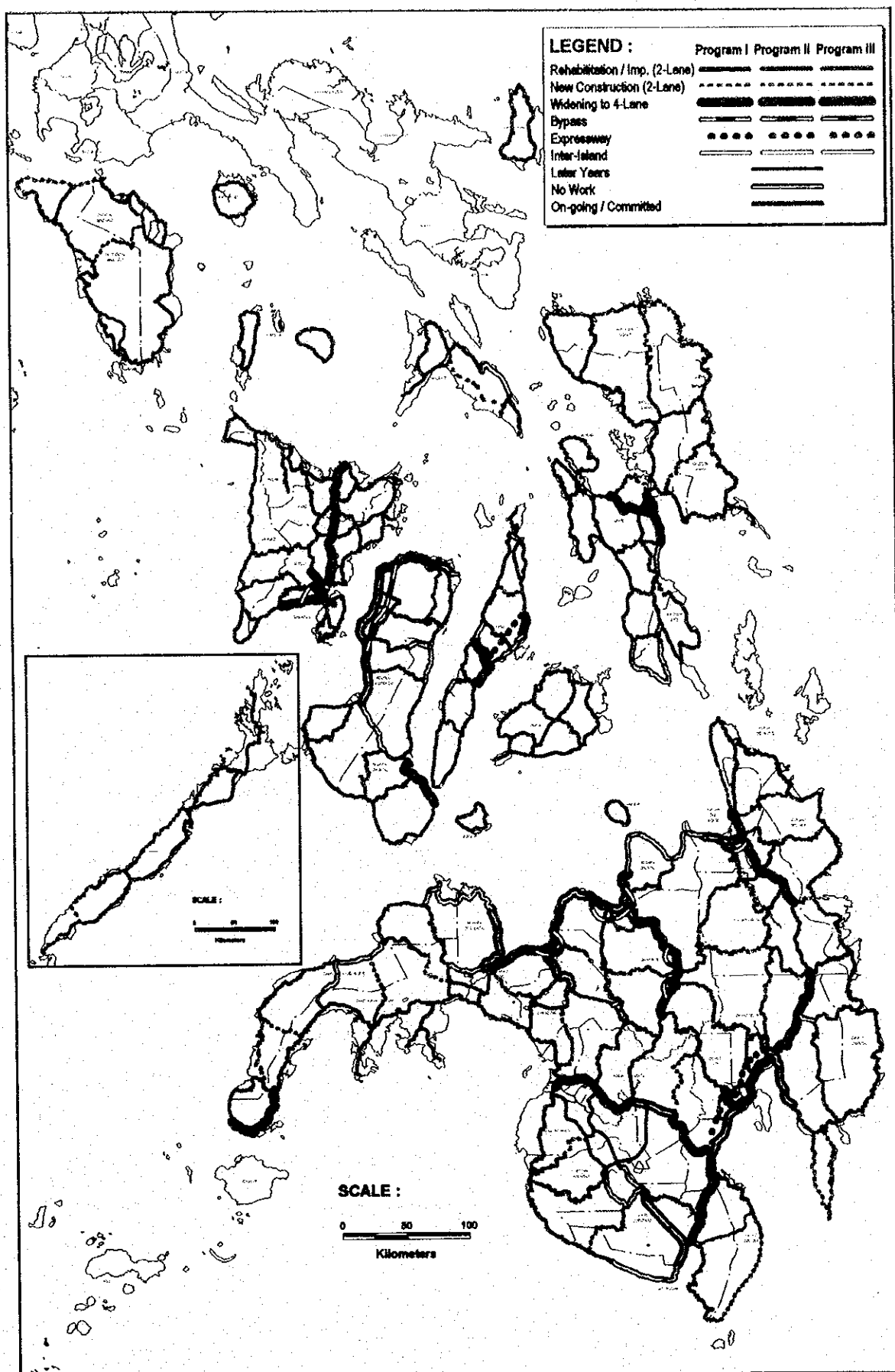
The plan period was divided into following three periods. A project starts at its plan period but will not necessarily to be completed within each period.

- Program I : First 6 years (1999-2004)
- Program II : Second 6 years (2005-2010)
- Program III : Third 6 years (2011-2016)

PHYSICAL TARGET OF EACH PROGRAM

Physical Target		(km)			
Project	Group	Program I	Program II	Program III	Total
1	2-lane Projects	4,044	3,426	4,540	12,010
	- Reh. A	765	377	150	1,292
	- Reh. B	1,041	663	939	2,643
	- Imp.	2,165	2,075	2,348	6,586
	- New	73	311	1,105	1,489
2	Widening	350	620	799	1,769
3	Expressway	-	169	46	215
	Bypass	-	51	98	149
	Inter-Island	-	3	-	3
Total		4,394 *	4,269	5,483	14,146

* Many projects will be completed in the Second Period.



13. IMPLEMENTATION SCHEDULE

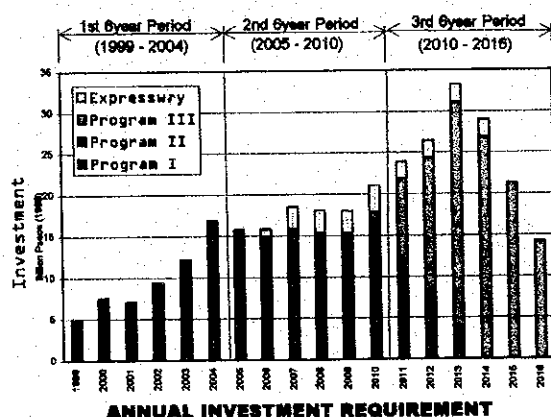
IMPLEMENTATION SCHEDULE

The implementation schedule was developed according to the priority and the period required for the detailed design, the right-of-way acquisition/ tendering and construction.

Construction Cost (Million Pesos)	No. of Contract	Const'n Period (Year)	Det. Design Period (Year)
Below 120	1	1	1
120 - 500	1 - 2	2	1
500 - 1,000	2 - 3	3	1
1,000 - 2,000	3 - 4	4	1.5
Over 2,000	4 or more	5	1.5

ANNUAL FUND REQUIREMENT

Based on the implementation schedule, the annual fund requirement was computed for two cases, one is excluding and the other is including expressways. For the former case, the total fund requirement is 291.4 billion pesos with an average annual investment for the First, Second and Third 6-year period of 9.6, 15.7 and 23.2 billion pesos, respectively. For the latter case, 313.5 billion pesos are required for the Plan Period with an average annual investment of 9.7, 17.9 and 24.7 billion pesos for the First, Second and Third 6-year period, respectively.



(Billion Pesos)		
Year	Excluding Expressways	Including Expressways
1999	5.021	5.021
2000	7.506	7.506
2001	7.065	7.065
2002	9.284	9.381
2003	11.984	12.178
2004	16.792	16.889
First 6-Year	57.652	58.040
2005	15.561	15.755
2006	14.897	15.807
2007	15.771	18.522
2008	15.242	18.078
2009	15.154	17.990
2010	17.785	21.066
Second 6-Year	94.410	107.218
2011	21.714	23.925
2012	24.245	26.456
2013	31.052	33.263
2014	26.782	28.993
2015	21.335	21.335
2016	14.224	14.224
Third 6-Year	139.352	148.196
TOTAL	291.414	313.454

POSSIBLE INVESTMENT AMOUNT

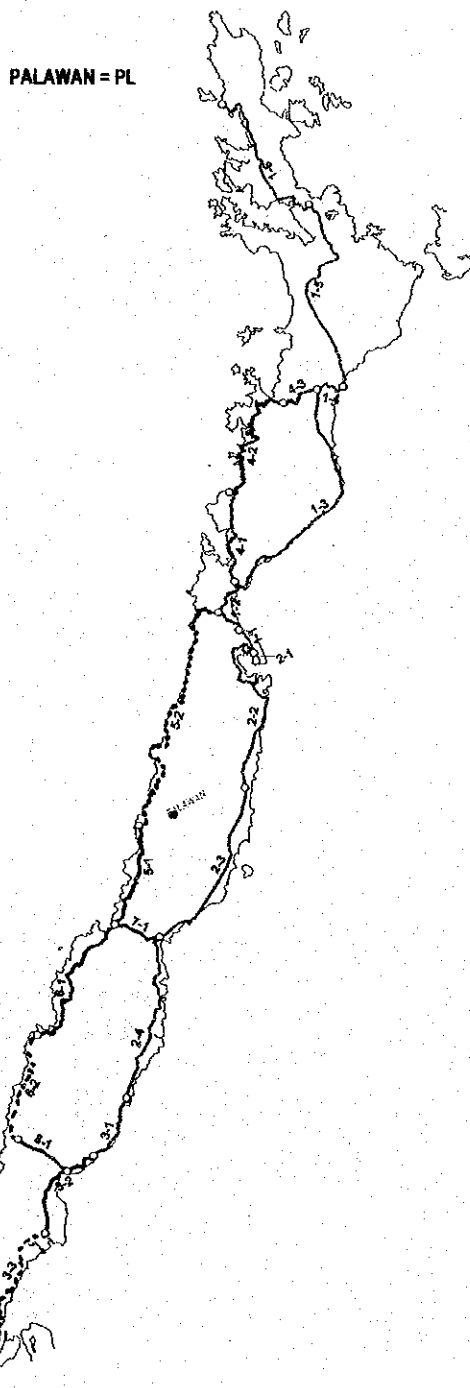
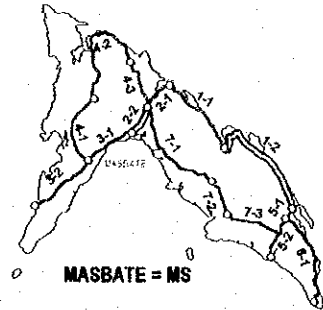
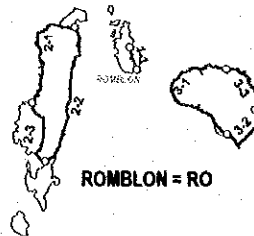
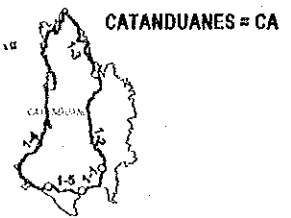
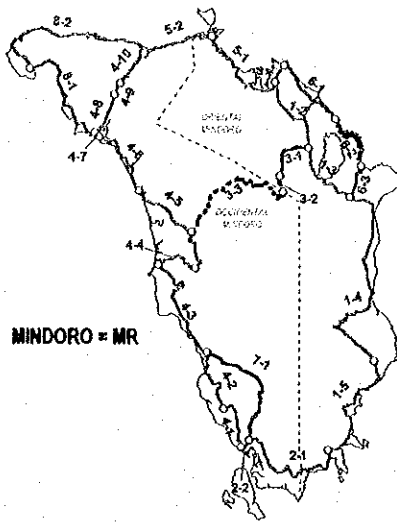
Possible investment amount for the Master Plan projects was estimated for three cases based on past trend and future economic growth.

(Billion Pesos)			
	Low Assumption	Medium Assumption	High Assumption
First 6-Year Period	53.2	59.3	66.6
Second 6-Year Period	89.3	94.4	104.4
Third 6-Year Period	126.5	132.9	145.6
Total	269.0	286.6	316.6

Note: Current 6-Year (1993 ~ 1998) 40.1 Billion Pesos

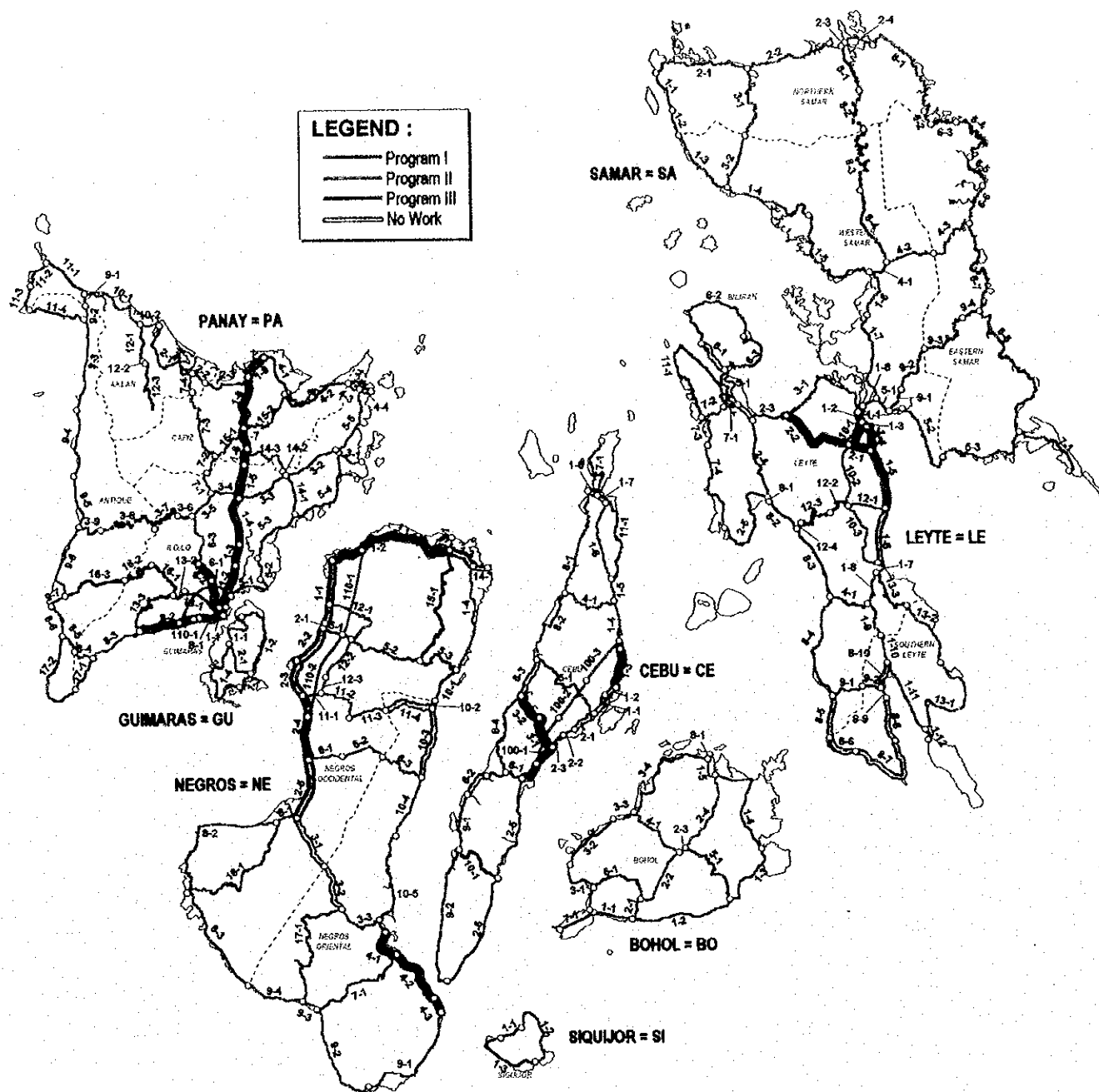
Investment requirement excluding expressways for the First and Second 6-year period is within the possible investment amount under the medium assumption, and the Third 6-year period within the high assumption.

Investment requirement including expressways exceeds the amount estimated under the high assumption case in the Second and Third 6-year periods. In order to realize the two expressway projects, fund sources such as co-finance with private sector investment are required, unless a special road fund is raised.



IMPLEMENTATION SCHEDULE (REGION IV-B/ V)

Project No.	Project Cost (Million Pesos)	First 5-year Program			Second 5-year Program			Third 5-year Program		
		1999 - 2004			2005 - 2010			2011 - 2016		
MA 1-1	572.0									
MA 1-2	595.1									
MR 1-1	61.9									
MR 1-2	241.5									
MR 1-3	273.0									
MR 1-4	981.8									
MR 1-5	918.2									
MR 2-1	894.9									
MR 2-2	28.4									
MR 3-1	309.4									
MR 3-2	195.8									
MR 3-3	2124.0									
MR 4-1,4,5,8-10	1845.7									
MR 4-2	418.4									
MR 4-3	1185.2									
MR 4-6	424.9									
MR 4-7	6.0									
MR 5-1	705.7									
MR 5-2	631.6									
MR 6-1	782.2									
MR 6-2	1095.4									
MR 6-3	112.2									
MR 7-1	941.4									
MR 8-1	969.6									
MR 8-2	2217.4									
PL 1-1,2,3,4	1721.9									
PL 1-5	1634.7									
PL 1-6	1486.7									
PL 2-1	22.9									
PL 2-2	611.1									
PL 2-3	608.2									
PL 2-4	482.8									
PL 3-1	510.4									
PL 3-2	789.4									
PL 3-3	1465.5									
PL 4-1	835.8									
PL 4-2	2718.1									
PL 4-3	511.8									
PL 5-1	760.7									
PL 5-2	3447.8									
PL 6-1	1279.3									
PL 6-2	1176.9									
PL 7-1	320.6									
PL 8-1	429.1									
RO 1-1	472.2									
RO 2-1	860.4									
RO 2-2	926.4									
RO 2-3	443.8									
RO 3-1	1206.1									
RO 3-2	460.7									
RO 3-3	537.6									
CA 1-1	103.9									
CA 1-2	909.3									
CA 1-3	1769.5									
CA 1-4	1014.0									
CA 1-5	81.2									
MS 1-1	61.5									
MS 1-2										
MS 2-1	90.5									
MS 2-2										
MS 3-1	322.4									
MS 3-2	517.8									
MS 4-1	596.9									
MS 4-2	1074.5									
MS 4-3	301.5									
MS 5-1,2	162.5									
MS 6-1	705.7									
MS 7-1	1049.5									
MS 7-2	373.6									
MS 7-3	562.1									



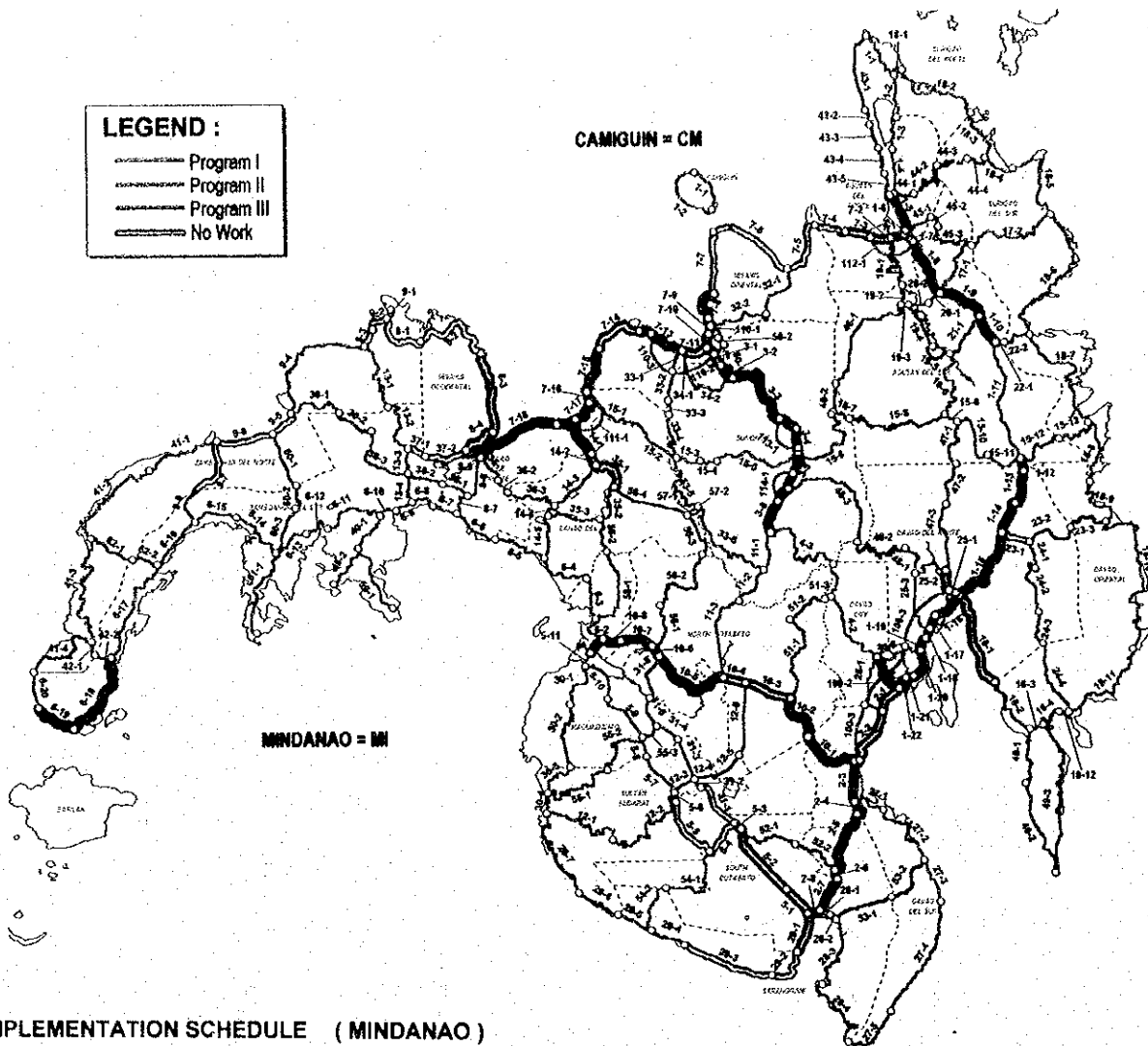
IMPLEMENTATION SCHEDULE (VISAYAS)

Project No.	Project Cost (Million Pesos)	First 5-year Program 1996 - 2004	Second 5-year Program 2005 - 2010	Third 5-year Program 2011 - 2016
PA 1-1	19.8			
PA 1-2	174.6			
PA 1-3	274.0			
PA 1-4	54.1			
PA 1-5	158.0			
PA 1-6	260.6			
PA 1-7	524.2			
PA 1-8	138.4			
PA 1-9	326.5			
PA 2-1	59.2			
PA 2-2	160.5			
PA 2-3	67.9			
PA 3-1	217.5			
PA 3-2	254.3			
PA 3-3	621.2			
PA 3-4	17.5			
PA 3-5	235.9			
PA 3-6	415.4			
PA 3-7	89.6			
PA 3-8	219.4			
PA 3-9	123.8			
PA 4-1	347.5			
PA 4-2	428.6			
PA 4-3	149.7			
PA 4-4	127.8			
PA 4-5	212.5			
PA 4-6	1017.5			
PA 4-7	1598.0			
PA 4-8	571.4			
PA 4-9	119.5			
PA 4-10	192.8			
PA 4-11				
PA 4-12				
PA 4-13				
PA 4-14				
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PA 4-98				
PA 4-99				
PA 4-100				

Project No.	Project Cost (Million Pesos)	First 5-year Program 1996 - 2004	Second 5-year Program 2005 - 2010	Third 5-year Program 2011 - 2016
PA 5-1	155.6			
PA 5-2	64.1			
PA 5-3	218.1			
PA 5-4	322.0			
PA 5-5	231.3			
PA 5-6	74.0			
PA 5-7	231.9			
PA 5-8	57.9			
PA 5-9	196.8			
PA 5-10	228.9			
PA 5-11	212.4			
PA 5-12	116.3			
PA 5-13	565.0			
PA 5-14	150.6			
PA 5-15	70.1			
PA 5-16	201.6			
PA 5-17	189.9			
PA 5-18	586.3			
PA 5-19	307.5			
PA 5-20	205.9			
PA 5-21	119.9			
PA 5-22	175.5			
PA 5-23	1094.0			
PA 5-24	456.0			
PA 5-25	22.7			
PA 5-26	311.6			
PA 5-27	215.3			
PA 5-28	150.0			
PA 5-29	333.6			
PA 5-30	228.4			
PA 5-31	463.6			
PA 5-32				
PA 5-33				
PA 5-34				
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PA 5-98				
PA 5-99				
PA 5-100				

Project No.	Project Cost (Million Pesos)	First 6-year Program 1999 - 2004	Second 6-year Program 2005 - 2010	Third 6-year Program 2011 - 2018
PA 12-1	300.8			
PA 12-2	388.0			
PA 12-3	519.0			
PA 13-1	149.5			
PA 13-2	59.1			
PA 13-3	864.7			
PA 14-1	185.3			
PA 14-2	39.1			
PA 14-3	524.7			
PA 15-1	378.0			
PA 15-2	410.2			
PA 16-1	459.5			
PA 16-2	1148.9			
PA 16-3	696.9			
PA 17-1	306.0			
PA 17-2	856.4			
PA 110-1	1043.6			
IL 2-1	14173.0			
GU 1-1	206.3			
GU 1-2	550.0			
GU 1-3	181.4			
GU 1-4	633.6			
GU 2-1	332.1			
NE 1-1			(No Work)	
NE 1-2	291.1			
NE 1-3	32.6			
NE 1-4	1514.5			
NE 2-1	233.9			
NE 2-2	238.5			
NE 2-3	322.8			
NE 2-4	366.1			
NE 2-5	46.6			
NE 3-1	741.6			
NE 3-2			(No Work)	
NE 3-3	50.1			
NE 4-1	74.3			
NE 4-2	238.4			
NE 4-3	9.0			
NE 5-1	814.9			
NE 5-2	16.1			
NE 5-3	112.7			
NE 5-4	24.2			
NE 5-5	344.6			
NE 5-6	561.4			
NE 5-7	113.3			
NE 5-8	417.6			
NE 5-9	595.9			
NE 5-10	866.6			
NE 6-1	130.0			
NE 6-2	807.9			
NE 6-3	152.0			
NE 6-4	167.8			
NE 6-5	33.9			
NE 6-6	127.0			
NE 6-7	109.8			
NE 6-8			(No Work)	
NE 6-9	68.9			
NE 6-10	150.9			
NE 6-11	55.0			
NE 6-12	136.1			
NE 6-13	362.0			
NE 6-14			(No Work)	
NE 6-15	322.3			
NE 6-16	214.6			
NE 6-17	26.7			
NE 6-18	19.1			
NE 6-19			(No Work)	
NE 6-20	1026.2			
NE 6-21	1450.4			
NE 6-22	1272.3			
NE 6-23	1456.6			
NE 6-24	1465.0			
CE 1-1			(No Work)	
CE 1-2			(No Work)	
CE 1-3				
CE 1-4	27.8			
CE 1-5	388.1			
CE 1-6	107.0			
CE 1-7	19.7			
CE 1-8	194.0			
CE 1-9			(No Work)	
CE 1-10			(No Work)	
CE 1-11			(No Work)	
CE 2-1				
CE 2-2	641.1			
CE 2-3				
CE 2-4				
CE 2-5	409.6			
CE 2-6	89.4			
CE 2-7	101.4			
CE 2-8	231.9			
CE 2-9	535.4			
CE 2-10	86.1			
CE 2-11	311.2			
CE 2-12	990.5			
CE 2-13	153.0			
CE 2-14	128.3			
CE 2-15			(No Work)	
CE 2-16	268.7			
CE 2-17	761.6			
CE 2-18	459.9			
CE 2-19			(No Work)	
CE 2-20	379.6			
CE 2-21	208.9			
CE 2-22	979.7			
CE 2-23	761.5			
CE 2-24	379.1			
CE 2-25	1467.6			
CE 2-26	5896.9			
CE 2-27	3311.3			
CE 101,102,103	242.5			

Project No.	Project Cost (Million Pesos)	First 6-year Program		Second 6-year Program		Third 6-year Program	
		1999 - 2004	2005 - 2010	2011 - 2018	2019 - 2024	2025 - 2030	2031 - 2036
BO 1-1	125.8						
BO 1-2	293.1						
BO 1-3	227.7						
BO 1-4,5	215.8						
BO 2-1	101.4						
BO 2-2	164.2						
BO 2-3	33.0						
BO 2-4	413.1						
BO 3-1	122.3						
BO 3-2	164.2						
BO 3-3,4	407.0						
BO 4-1	429.8						
BO 5-1	892.8						
BO 6-1	462.7						
BO 7-1	51.0						
BO 8-1	11.0						
SI 1-1	32.6						
SI 1-2	141.5						
SI 1-3	197.8						
LE 1-1	337.7						
LE 1-2	49.4						
LE 1-3	113.1						
LE 1-4	33.0						
LE 1-5	49.6						
LE 1-6	218.3						
LE 1-7	118.9						
LE 1-8	656.6						
LE 1-9							
LE 1-10							
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SA 4-1							
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SA 6-7							
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SA 7-1							
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SA 9-4							



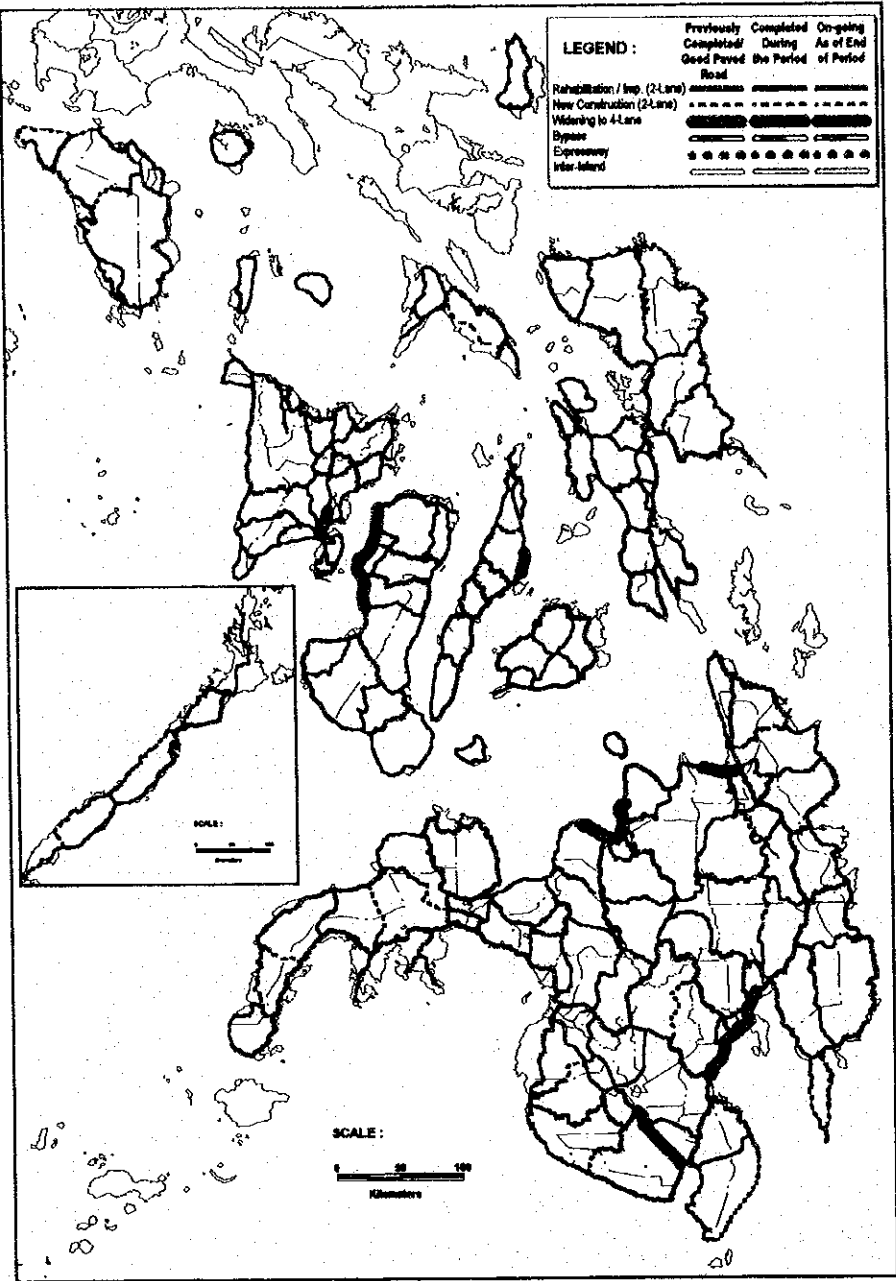
IMPLEMENTATION SCHEDULE (MINDANAO)

Project No.	Project Cost (Million Pesos)	First 6-year Program 1999 - 2004	Second 6-year Program 2005 - 2010	Third 6-year Program 2011 - 2016
CM 1-1	170.0			
CM 1-2	370.6			
MI 1-1	219.4			
MI 1-2	205.1			
MI 1-3	76.2			
MI 1-4	173.7			
MI 1-5	282.4			
MI 1-6	617.2			
MI 1-7	18.9			
MI 1-8	46.4			
MI 1-9	25.6			
MI 1-10	57.0			
MI 1-11	561.0			
MI 1-12	953.4			
MI 1-13	704.0			
MI 1-14	696.0			
MI 1-15	99.1			
MI 1-16	229.7			
MI 1-17	280.5			
MI 1-18	557.6			
MI 1-19	341.0			
MI 1-20	411.2			
MI 1-21	836.0			
MI 1-22	956.2			
MI 1-23	500.6			
MI 1-24	415.9			
MI 1-25	116.2			
MI 1-26	41.0			
MI 1-27	87.9			
MI 1-28	141.1			
MI 1-29	293.8			
MI 1-30	133.4			
MI 1-31	221.3			
MI 1-32	311.3			
MI 1-33	681.3			
MI 1-34	396.4			
MI 1-35	216.2			
MI 1-36	803.7			
MI 1-37	92.8			
MI 1-38	340.4			

Project No.	Project Cost (Million Pesos)	First 6-year Program 1999 - 2004	Second 6-year Program 2005 - 2010	Third 6-year Program 2011 - 2016
MI 2-8	5.5		(No Work)	
MI 3-1	281.3		(No Work)	
MI 3-2	84.9			
MI 3-3	240.8			
MI 3-4	421.5			
MI 3-5	1305.6			
MI 3-6	81.7			
MI 3-7	220.5			
MI 3-8	127.6			
MI 3-9	411.4			
MI 3-10	229.5			
MI 3-11	585.7			
MI 4-1	452.6		(No Work)	
MI 4-2	807.6		(No Work)	
MI 5-1	324.2		(No Work)	
MI 5-2	681.7		(No Work)	
MI 5-3	56.9		(No Work)	
MI 5-4	40.7		(No Work)	
MI 5-5	187.8		(No Work)	
MI 5-6	99.2		(No Work)	
MI 5-7	280.2		(No Work)	
MI 5-8	243.2		(No Work)	
MI 5-9	74.1		(No Work)	
MI 5-10	267.9		(No Work)	
MI 5-11	486.8		(No Work)	
MI 6-1	91.9		(No Work)	
MI 6-2	235.5		(No Work)	
MI 6-3	242.4		(No Work)	
MI 6-4	1424.5		(No Work)	
MI 6-5	784.6		(No Work)	
MI 6-6	633.9		(No Work)	
MI 6-7	284.9		(No Work)	
MI 6-8	1372.8		(No Work)	
MI 6-9	991.1		(No Work)	
MI 6-10	1064.4		(No Work)	
MI 6-11	146.1		(No Work)	
MI 6-12	519.6		(No Work)	
MI 6-13	335.5		(No Work)	
MI 6-14	40.0		(No Work)	
MI 6-15	243.7		(No Work)	
MI 6-16	60.6		(No Work)	
MI 6-17	66.8		(No Work)	
MI 6-18	205.1		(No Work)	

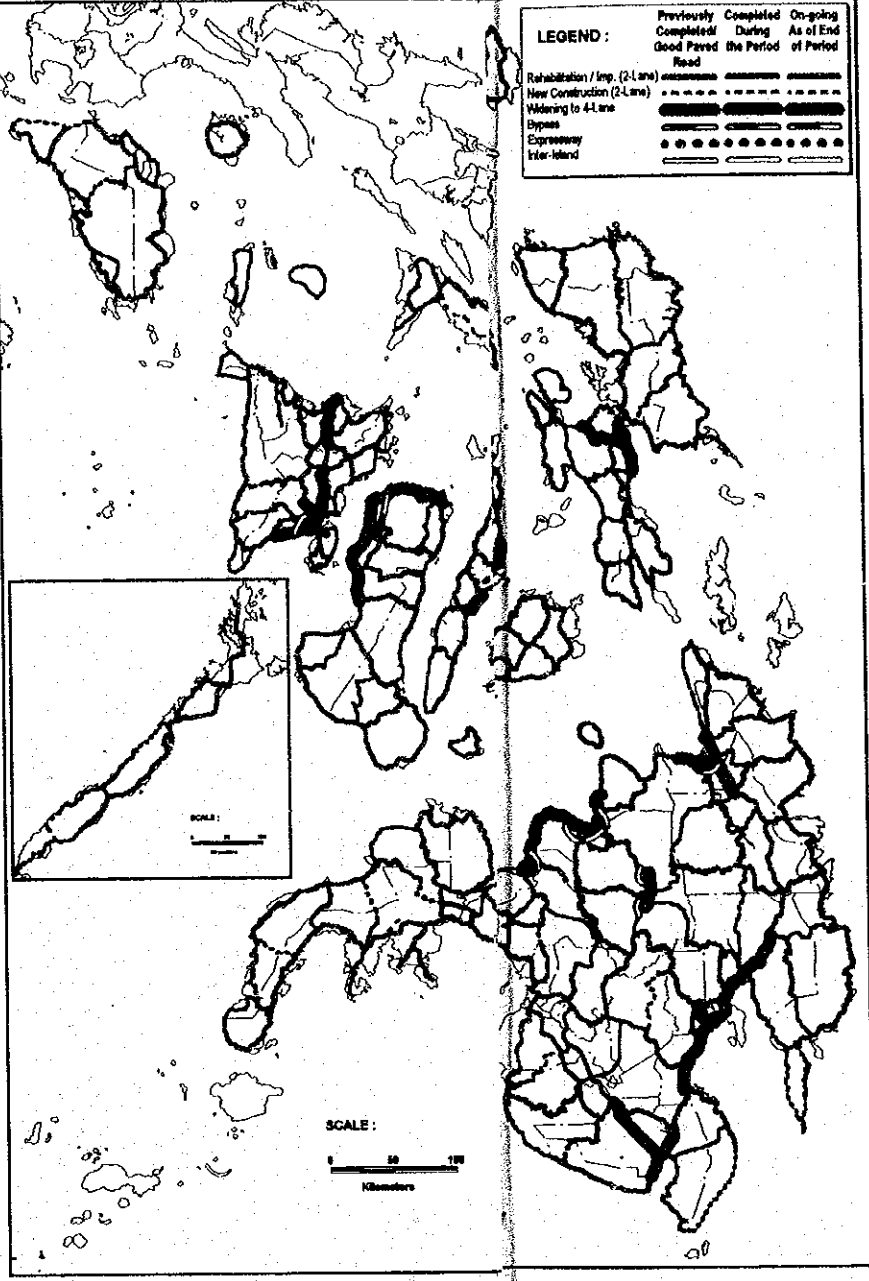
Project No.	Project Cost (Million Pesos)	First 6-year Program 1999 - 2004	Second 6-year Program 2005 - 2010	Third 6-year Program 2011 - 2016
MI 7-9	41.0			
MI 7-10	93.6			
MI 7-11	335.5		(No Work)	
MI 7-12	207.6		(No Work)	
MI 7-13	32.9		(No Work)	
MI 7-14	483.1		(No Work)	
MI 7-15	560.0			
MI 7-16	35.5			
MI 7-17	593.7			
MI 7-18	49.8			
MI 7-19	134.1			
MI 7-20	50.3			
MI 7-21	370.8			
MI 7-22	322.8			
MI 7-23	1465.9			
MI 8-1				
MI 8-2				
MI 8-3				
MI 8-4				
MI 8-5	1470.6			
MI 8-6	1091.6			
MI 8-7	133.1			
MI 8-8	131.8			
MI 9-1				
MI 9-2				
MI 9-3	191.0			
MI 9-4				
MI 9-5				
MI 9-6	139.9			
MI 9-7	294.6			
MI 9-8	747.9			
MI 9-9	110.5			
MI 9-10	549.3			
MI 10-1				
MI 10-2				
MI 10-3	414.3			
MI 10-4				
MI 10-5	194.2			
MI 10-6	294.2			
MI 10-7	916.8			
MI 10-8	31.7			
MI 10-9	135.9			
MI 10-10	190.5			
MI 10-11	328.8			
MI 10-12	89.7			
MI 10-13	237.3			
MI 10-14	517.0			
MI 10-15	841.8			
MI 10-16	1076.8			
MI 10-17	1529.4			
MI 10-18	100.2			
MI 10-19	75.6			
MI 10-20	96.8			
MI 10-21	363.2			
MI 10-22	824.4			
MI 10-23	559.4			
MI 10-24	63.8			
MI 10-25	193.3			
MI 10-26	72.0			
MI 10-27	465.2			
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14. DEVELOPMENT OF ROAD NETWORK



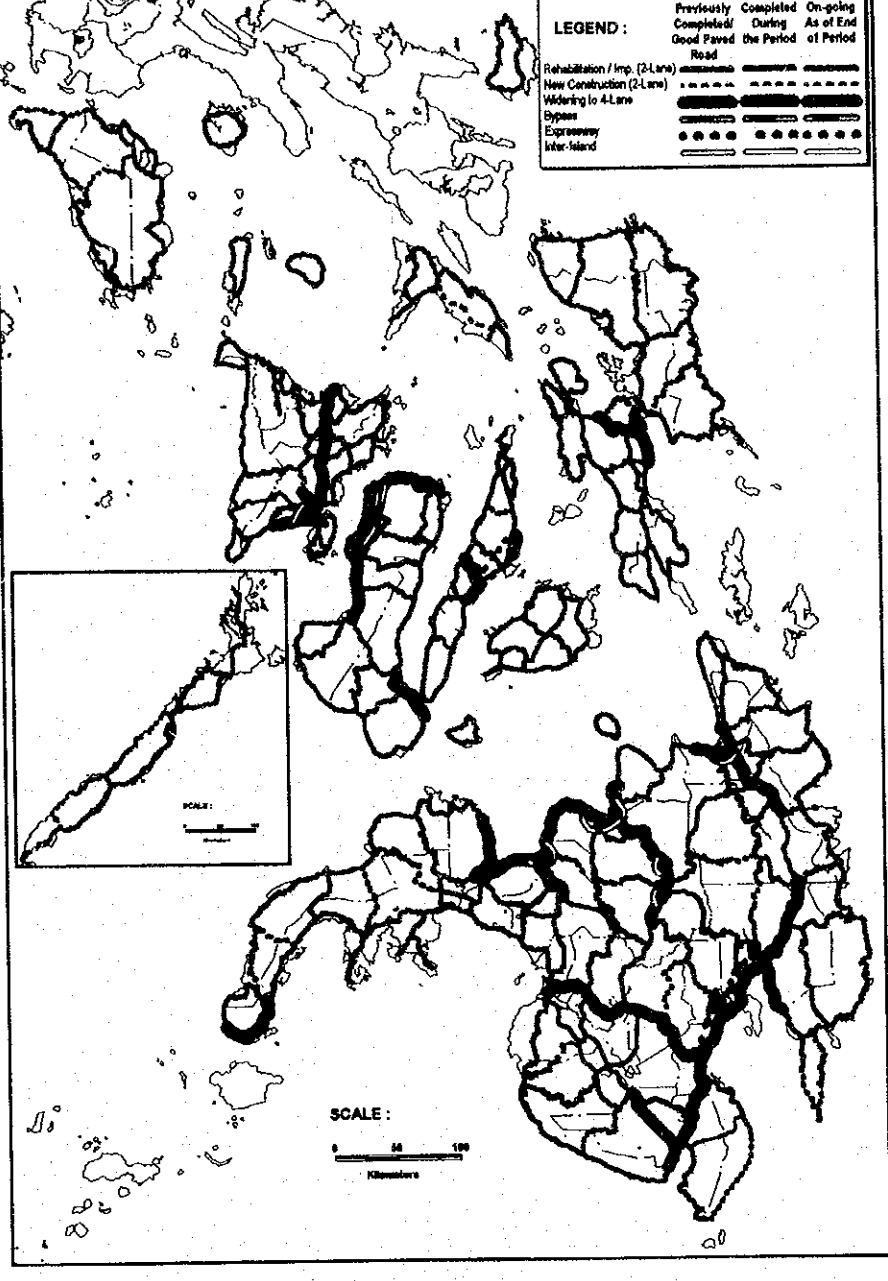
ROAD DEVELOPMENT AT THE END OF YEAR 2004

First 6-Year Investment (1999-2004) : 58.0 Billion Pesos
Program I PHYSICAL TARGET : 4,394 km (*)
(*) Many projects will be completed in the second 6-Year Period



ROAD DEVELOPMENT AT THE END OF YEAR 2010

Second 6-Year Investment (2005-2010) : 107.2 Billion Pesos
Program II PHYSICAL TARGET : 4,269km



ROAD DEVELOPMENT AT THE END OF YEAR 2016

Third 6-year Investment (2011-2016) : 148.2 Billion Pesos
Program III PHYSICAL TARGET : 5,483 km

15. EVALUATION OF MASTER PLAN

ECONOMIC EVALUATION OF MASTER PLAN

Economic benefit of the Plan was estimated on the following:

- Savings in the traffic cost
- Regional development benefit
- Benefit from bridge improvement and disaster prevention works

Economic viability of the Master Plan as a whole and of each Program was assessed. All cases were evaluated and were found to be economically highly feasible.

Economic Evaluation Result			
	EIRR (%)	B/C	NPV (Million Pesos)
Master Plan	41.3	2.92	150,133
Program I	44.2	3.66	99,141
Program II	31.1	2.49	90,964
Program III	24.2	1.79	62,411

IMPACT ON TRANSPORT EFFICIENCY

Major improvement will be made on vehicle-hours and vehicle operating costs. Vehicle-hours (or travel time) are estimated to be reduced by 14%, 30% and 44% in the year 2004, 2010 and 2016, respectively. The vehicle operating cost is estimated to be reduced by 10% (or 9.7 billion pesos per year), 21% (or 27.2 billion pesos per year) and 30% (or 47.9 billion pesos per year) in year 2004, 2010, and 2016, respectively. Whereas, the vehicle-km are almost the same level for "without" and "with" cases, as major OD routes are almost the same for both cases.

IMPACT ON ROAD NETWORK DEVELOPMENT

Although the national road density will not substantially improve, the paved national road density and the pavement ratio will drastically improve.

	Present (1995)	2016
National Road Density	0.21	0.23
Paved Nat'l Rd Density	0.11	0.22
Pavement Ratio	51%	91%

Currently inaccessible vast areas will be provided with a road network, particularly in Mindanao Island. The topographically constrain areas such as the central mountainous area of Mindoro, the south-western coastal area of Palawan, the western mountainous area of Panay and the northern mountainous area of Samar Islands will remain inaccessible.

All of the North-South Backbone Roads and Strategic Roads (A) will be rehabilitated or improved within the plan period. Whereas, 10% of the East-West Lateral Roads and 29% of the Strategic Roads (B) will remain unimproved or as a missing link.

TIME-DISTANCE REDUCTION

Time-distance reduction (or travel time reduction) will greatly contribute to activating socio-economic activities between and among major urban centers as well as between production area and consumption area. The islands will be more united and integrated and development efforts will be more efficient and effective.

Improvement of Transport Efficiency

End Year of Each 6-Year Period		Vehicle-Km Per day (in 1,000)	Vehicle-Hr. Per day (in 1,000)	Vehicle Operating Cost		
				Million P/Year	Million P/day	Per Vehicle-Km (Pesos)
2004	Without	30,480	889	94,044	257.7	8.455
	With	30,395	768	84,297	231.0	7.600
	Reduction	85 (0.3%)	121 (14%)	9,747 (10%)	26.7	0.855 (10%)
2010	Without	40,199	1,228	127,524	349.4	8.692
	With	39,999	857	100,287	274.8	6.870
	Reduction	200 (0.5%)	371 (30%)	27,237 (21%)	74.6	1.822 (21%)
2016	Without	49,392	1,554	161,425	442.3	8.955
	With	48,562	863	113,566	311.1	6.408
	Reduction	830 (1.7%)	691 (44%)	47,859 (30%)	131.2	2.549 (28%)

IMPACT ON REGIONAL ECONOMY AND DEVELOPMENT

Transport cost reduction leads to:

- Lower prices of farm-inputs and higher farm-gate prices, resulting in higher income for farmers, upgrading their living standards and incentives for them to produce more.
- Cheaper selling prices of products, resulting in higher purchasing power for people to buy more and higher needs to produce more.

Travel time reduction leads to:

- Closer markets in terms of time-distance, resulting in more business chances for traders and producers and more active inter-regional and inter-urban centers trades which will contribute for more integrated development.

Improved accessibility leads to:

- More chances of developing un-utilized potential areas and more opportunities to access various markets in terms of different kinds of demands as well as locations.
- Effective land use and unity of nation.

The Master Plan is expected to contribute to the improvement of living standards of the Study Area which will lead to the preservation of peace.

FINANCIAL EVALUATION OF EXPRESSWAY PROJECTS

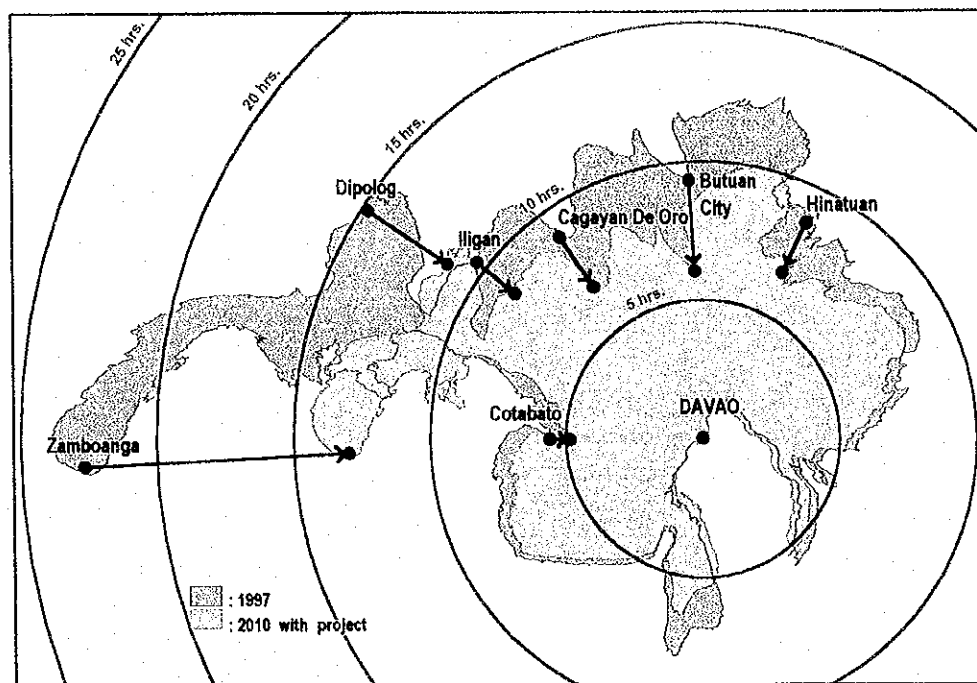
Financial evaluation was undertaken for the expressway projects, i.e., Cebu City Expressway and Davao City Expressway. Two cases of toll rates were tested as follows:

Vehicle Type	Case 1	Case 2
Car / Jeepney	0.75 P/km	1.50 P/km
Bus / Truck	1.00 P/km	2.00 P/km

Financial evaluation results were as follows:

	FIRR	
	Case 1	Case 2
Cebu City Expressway	1.5 %	5.8%
Davao City Expressway	0.8 %	3.3%

- If the fund source is only the private sector, both projects may not be financially feasible.
- In order to make projects financially feasible, the introduction of public investment including utilization of soft loan (interest rate of about 2% per annum) might be necessary.
- Toll rates must be equal to or higher than the Case 2. However, if a toll rate is too high, the expressway would attract less traffic, thus careful study on toll rates will be necessary.



CHANGES IN TRAVEL TIME FROM DAVAO CITY

16. ENVIRONMENTAL CONSIDERATIONS

ENVIRONMENTAL CHARACTERISTICS OF THE STUDY AREA

Protected Areas: There are 28 National Parks, 2 Marine Parks, 7 Protected Landscapes / Seascapes, 9 Game Refuge and Bird Sanctuaries, 6 Integrated Protected Areas System (IPAS) areas, 11 Wilderness Areas and 53 Watershed Forest Reserves.

Ethnic Groups: In the Study Area, there are Mangyan tribes (7 groups, 122,100 persons) in Mindoro, Palawan (5 groups, 70,800 persons) in Palawan, Negrite (2 groups, 30,500 persons) in Panay, Negros, Samar, Leyte and Mindanao, Mindanao Lumad (15 groups, 1,996,000 persons) in Mindanao, Muslim groups (14 subgroups, 2,526,000 persons) in Palawan and Mindanao

Ancestral Domain Claims: According to the law, all government programs shall not be implemented within any ancestral domain without the written consent of the indigenous cultural community. There are 49 major ancestral domain claims in the Study Area.

Squatter Areas: Major squatter areas are mainly located on riversides and old town of big cities. Squatters are also found along roads and under bridges in rural areas.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) SYSTEM

An Initial Environmental Examination (IEE) is required for projects in Environmentally Critical Areas (ECA). DENR Regional Offices review IEE and an Environmental Compliance Certificate (ECC) is required.

An Environmental Impact Statement (EIS) is required for Environmentally Critical Projects. Major road projects are under this category. The Environmental Management Bureau (EMB) reviews the EIS and ECC is required.

By type of work under this Study, required are:

Reh. A and B : ECC is usually exempted.
Imp. : IEE within ECA. EIA when a road alignment is changed.

New Construction
and Groups 2 & 3: EIA is needed.

Environmental considerations should be made as soon as the project is conceptualized. During the feasibility study stage, an IEE and EIA if needed should be prepared including a survey of project acceptability by concerned people and mitigation measures for social impacts. All efforts should be made to minimize the adverse environmental impacts.

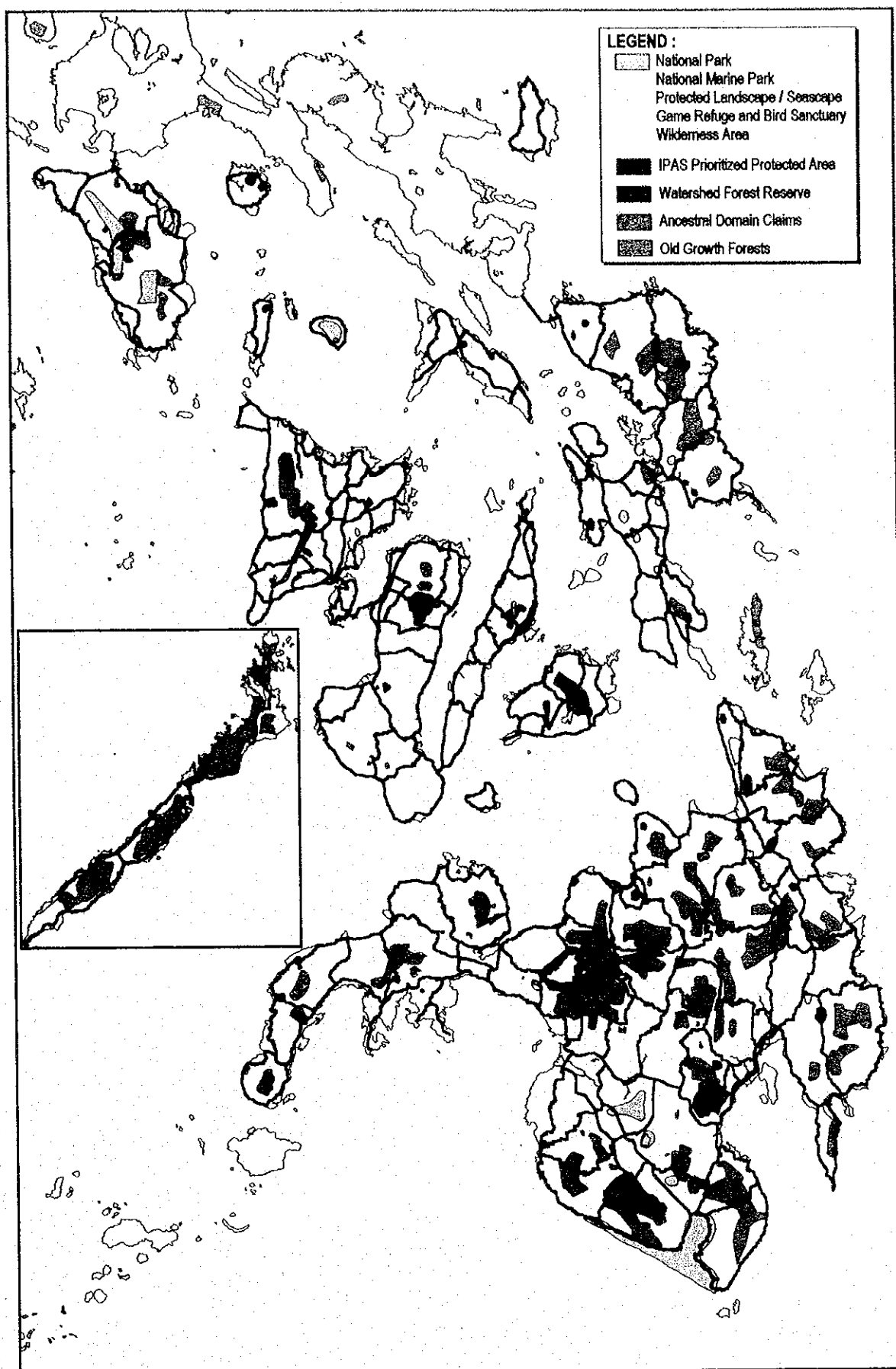
During the detailed design stage, mitigation measures should be incorporated in the design and cost estimate. EIA should be undertaken and EIS should be submitted to EMB as early as possible to secure ECC.

During and after construction, environmental monitoring should be implemented to preserve the environments.

SOCIAL IMPACT

One of the critical issues is the adverse social impact in connection with the road right-of-way acquisition and relocation of project affected people. All possible mitigation measures should be planned and implemented including the following:

- Project campaign to concerned people and LGUs for better understanding of project needs and impacts.
- Constant dialogue with project affected people and LGUs to create consensus for the project and resettlement plan.
- Cost estimate of ROW acquisition and compensation costs based on a prevailing market prices.
- Preparation and development of a resettlement site for which cost should be included in the project cost.
- Training program for the project affected people's livelihood.



ENVIRONMENTAL CHARACTERISTICS OF THE STUDY AREA

17. RECOMMENDATIONS

REINFORCEMENT OF PLANNING BODY

The Planning Service is the body to select, schedule and program all projects of DPWH in close coordination with NEDA, DPWH Regional Offices, Regional Development Councils, and LGUs. In order to systematically and successfully implement the Master Plan recommendations, the role of the Planning Service is quite important. In the preparation of the Annual Program, the Master Plan should be always referred to and the previous accomplishment on the Master Plan be always reviewed. While there are strong local demands for road development, they should be implemented harmoniously with the Master Plan scenario. The following two Divisions are recommended to be organized through the restructuring of the Planning Service:

Arterial Roads Division

- To plan and program the arterial roads projects under this Master Plan and the Luzon Master Plan (LISR) from the view points of national level transport efficiencies (top-down oriented projects)
- Over 50% of major road projects are and will be foreign-financed. Foreign fund preparation at proper timing is one of the important roles.

Minor Roads Division

- To plan and program the minor roads projects accommodating local demands and requests (bottom-up oriented projects)
- Regional balance of road investments should be made under this Division.

Another important body is the PMO-Feasibility Studies. It should prepare an annual schedule for feasibility studies based on the Master Plan, especially projects intended for foreign-assistance. Necessary budgetary support should be made according to the annual schedule.

For expressway projects, PMO-BOT should take the initiative in planning, inviting private investors and arranging for public and private sectors co-financing.

ROAD FUNDS

Still a lot have to be done for the road network development and maintenance of roads. The road funds need to be steadily increased.

Capital Investment Fund

Capital investment requirement and the road transport sector tax revenue were estimated as follows:

	(Billion Pesos)			
	1997 (Actual)	First 6-Year Period	Second 6-Year Period	Third 6-Year Period
Capital Investment Requirement (A)	22.8	171.5	302.0	421.3
Road Transport Sector Tax Revenue (B)	59.7	480	650	890
A / B x 100	38%	36%	46%	47%

Notes • Prices are at 1998 constant prices except for 1997 values.
• Figure in () shows capital investment requirement for the Study Area.

In 1997, only 38% of the road transport sector tax revenue was spent for the national road development. To cope with increasing capital investment requirement, higher share of the road transport sector tax revenue should be exclusively allocated to the national road development fund as follows:

Period	% Share of Fund to Road Transport Sector Tax Revenue
First 6-Year Period	38% (Maintain present share)
Second 6-Year Period	46%
Third 6-Year Period	47%

Maintenance Fund

Maintenance budget needs to be increased by 1.7 to 2.2 times (an average of 2 times) depend on road conditions of District Offices in order to maintain present level of pavement conditions. Maintenance budget in 1997 was 3.59 Billion pesos which will need to be increased to 7.2 Billion pesos.

Trucks are the main "causers" of pavement deterioration and bridge damages, however, vehicle registration fee of trucks is cheaper than other types of vehicles.

Improved road condition will benefit the road users ("beneficiaries"). Slight increase in fuel tax could be paid off by reduction in the vehicle operating cost.

Additional taxation on fuels and vehicle registration fee (for example, 1.00 pesos per liter for gasoline, 0.50 pesos per liter for diesel and 1,000 to 6,000 pesos per year for vehicle registration fee) should be subject to raise the national road maintenance fund which should preferably be treated as special (or earmarked) tax and exclusively used for the maintenance purpose.

IMPROVEMENT OF ROAD MAINTENANCE

- **Maintenance Level and Prioritization**
Higher maintenance level and higher priority should be set for paved roads in order to protect the past investment. Whereas, maintenance level and priority of unpaved roads should be relaxed in order to effectively utilize the limited maintenance budget.
- **Maintenance By Administration (MBA)**
 - Purchase new sets of maintenance equipment
 - Increase productivity of staff by training.
- **Maintenance By Contract (MBC)**
 - Increase contract size to promote maintenance oriented contractors.
 - Maintenance contract should be flexible to cope with immediate maintenance needs.
 - Supervisory/management staff of District Offices be strengthened.
- **MBC share**
MBC share should be gradually increased to the planned target of 70%.

STRONGER ROAD BUILDING AGAINST NATURAL CALAMITIES

The Philippines is exposed to stern natural environments. Roads are frequently damaged by natural calamities. Stronger roads against natural calamities should be planned, designed and constructed. River-related road damages are also increasing due to lack of flood control measures. River control works alongside a road such as spur dikes and other river training works should be jointly implemented with road construction.

ROAD ROW ACQUISITION AND RELOCATION OF PROJECT AFFECTED PEOPLE

Road right-of-way acquisition and relocation of project-affected people are major causes of delayed implementation due to late start of activities and lack of budgetary support. Resettlement plan should be prepared during the feasibility study stage and the parcellary survey should be undertaken as soon as the road alignment is determined. ROW acquisition and resettlement of project-affected people should be completed before construction starts. For project-affected people, measures should be taken to mitigate their sufferings.

REVIEW AND UPDATING OF THE MASTER PLAN

The Master Plan must be reviewed and updated periodically (or at least every 6 years) by reflecting progress of the proposed road projects, prevailing economic conditions and the focus of Government's policies.

EARLY EXECUTIONS OF FEASIBILITY STUDIES

To implement projects as scheduled, feasibility studies, especially for those projects planned to be implemented in the latter part of the 1st 6-Year period and the early part of 2nd 6-Year period should be conducted immediately, since the projects in the early part of the 1st 6-year period are mostly on-going, committed projects on the detailed design already completed. Studies should include route selection and environmental assessment as well as technical, economical and financial analysis. Major projects to be studied immediately are:

- Mindanao East-West Lateral Road (MI 15)
- Palawan North Road (PL 1-5 & 6)
- Surigao - Davao Coastal Road (MI 18-7, 8, 9)
- Liloy - Siocon - Zamboanga Road (MI 41-1, 2, 3)
- Kalamansig - Isulan - Matalam Road (MI 12-1, 2)
- Capacity Expansion Projects
 - Iloilo - Roxas Road (PA 1)
 - Bacolod - San Carlos Coastal Road (NE 1-1, 2, 3)
 - Butuan - Cagayan de Oro - Iligan - Tubod Road (MI 7-8 to 17)
 - Sayre Highway (MI 3-4, 5)
- Cebu City Expressway
- Iloilo - Guimaras Link (Guimaras Bridge)

JICA Secretariat, Advisory Committee and Study Team

JICA Secretariat

- | | | | |
|----|----------------------|---|--|
| 1) | Mr. Takao KAIBARA | : | Director, First Social Development Study Div. |
| 2) | Mr. Makoto ASHINO | : | Deputy Director, First Social Development Study Div. (Jan. 1997 ~ June 1998) |
| 3) | Ms. Eri HONDA | : | Deputy Director, First Social Development Study Div. (June 1998 ~ Mar. 1999) |
| 4) | Mr. Hiroyuki KANZAKI | : | First Social Development Study Div. (Jan. 1997 ~ July 1997) |
| 5) | Mr. Koichi KITO | : | First Social Development Study Div. (July 1997 ~ March 1999) |

JICA Advisory Committee Members

- | | | | |
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| 1) | Mr. Minobu MORIKAWA | : | Chairman (Jan. 1997 ~ Dec. 1997) |
| 2) | Mr. Kozo FUJISHITA | : | Chairman (Dec. 1997 ~ March 1999) |
| 3) | Mr. Kiyohisa KONDO | : | Road Planning |

JICA Study Team Members

- | | | | |
|-----|-----------------------|---|---|
| 1) | Mr. Kunihiro SAWANO | : | Team Leader, Highway Planner |
| 2) | Mr. Naoyuki MINAMI | : | Regional Planner |
| 3) | Mr. Takao MITSUISHI | : | Transport Planner |
| 4) | Mr. Mitsuo HATAKEYAMA | : | Deputy Team Leader, Highway/Structural Engineer |
| 5) | Mr. Kouzou FUJII | : | Disaster Prevention Engineer |
| 6) | Mr. Keiji AOKI | : | Traffic Engineer |
| 7) | Mr. Tetsuo WAKUI | : | Transport Economist |
| 8) | Mr. Shuichi YASHIRO | : | System Analyst |
| 9) | Mr. Kanji WATANABE | : | Environmental Engineer |
| 10) | Mr. Kazufumi HONMA | : | Construction Engineer / Cost Estimator |

DPWH Steering Committee, Technical Working Committee and Counterpart Team

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- | | | |
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| Mr. Jose P. GLORIA | : | Member, Project Manager, PMO-FS |
| Mr. Geronimo S. ALONZO | : | Member, Project Manager, PMO-FS |
| Mr. Takaaki KUSAKABE | : | Member, JICA Highway Advisor |
| Mr. Seiichi ONODERA | : | Member, JICA Highway Advisor |

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- | | | |
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| Mr. Geronimo S. ALONZO | : | Vice Chairman, Project Manager, PMO-FS |
| Ms. Rebecca T. GARSUTA | : | Member, Planning Service |
| Mr. Faustino STA. MARIA, JR. | : | Member, PMO-FS |
| Ms. Merlinda ALCARAZ | : | Member, Planning Service |
| Ms. Solita V. GENOTA | : | Member, Planning Service |
| Mr. Takaaki KUSAKABE | : | Member, JICA Highway Advisor |
| Mr. Seiichi ONODERA | : | Member, JICA Highway Advisor |

DPWH Counterpart Team

- | | | |
|------------------------------|---|---|
| Mr. Faustino STA. MARIA, JR. | : | Project Coordinator, Sr. Traffic Engineer |
| Mr. Ephraim CAPUCCO | : | Highway Planner |
| Mr. Carmelino TIZON | : | Highway Planner |
| Ms. Victoria CORPUZ | : | Regional Planner |
| Ms. Marietta VELASCO | : | Highway Engineer |
| Mr. Marino AMORES | : | Structural Engineer |
| Mr. Maximo MONTANA II | : | Maintenance Engineer |
| Mr. Edmundo MANGAOIL | : | Disaster Prevention Engineer |
| Mr. Cesavio VICENTE | : | Traffic Engineer |
| Ms. Bella RESURRECCION | : | General Economist |
| Mr. Alvin MADRID | : | Systems Analyst |
| Mr. Romeo LESCANO | : | Environmental Specialist |
| Ms. Elizabeth LLANERA | : | Highway Engineer |
| Ms. Shirley CASTRO | : | Highway Engineer |
| Ms. Giles MIRANDA | : | Highway Engineer |
| Ms. Angellita LUZ | : | Highway Engineer |
| Ms. Rebecca TENIOZO | : | Economist |
| Mr. Joel VILORIA | : | Economist |
| Ms. Gloria MALINIT | : | Economist |

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