社会開発協力部報告書

No. 8

DCUTCLUS

DAVAO CITY URBAN TRANSPORT
CUM LAND USE STUDY

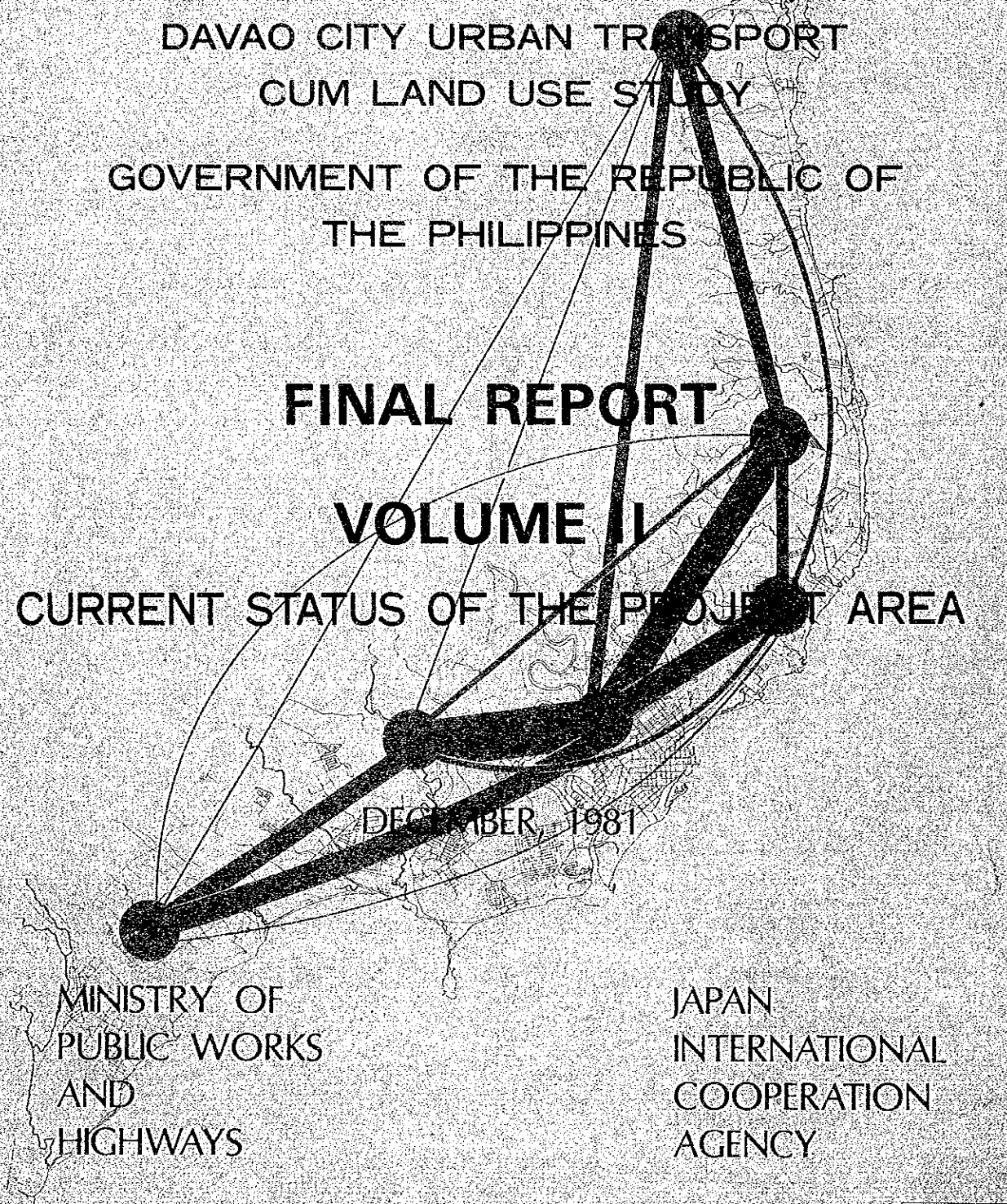
GOVERNMENT OF THE REPUBLIC OF
THE PHILIPPINES

FINAL REPORT

VOLUME II

CURRENT STATUS OF THE PROJECT AREA

DECEMBER, 1981



MINISTRY OF
PUBLIC WORKS
AND
HIGHWAYS

JAPAN
INTERNATIONAL
COOPERATION
AGENCY

DCUTCLUS

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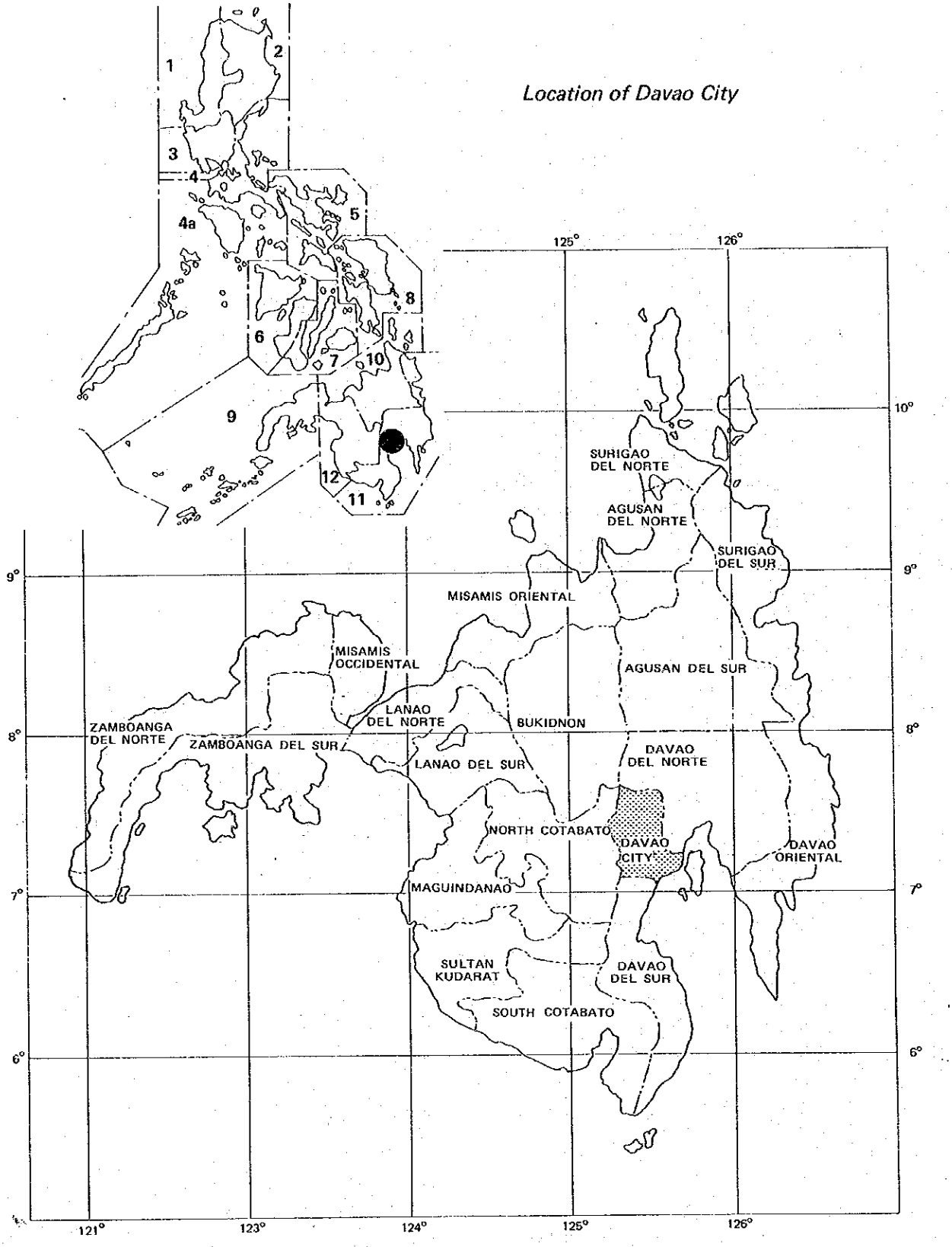
Location of Davao City
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ZAMBOANGA DEL NORTE
ZAMBOANGA DEL SUR
LANAO DEL NORTE
BUKIDNON
LANAO DEL SUR
DAVAO DEL NORTE
NORTH COTABATO
DAVAO CITY
DAVAO ORIENTAL
MAGUINDANAO
SULTAN KUDARAT
DAVAO DEL SUR
SOUTH COTABATO

PREFACE

In response to the request of the Government of the Republic of the Philippines, the Japanese Government decided to conduct a study on the Davao City Urban Transport Cum Land Use Project and entrusted it to the Japan International Cooperation Agency (JICA). The J I C A sent to the Philippines a survey team headed by Mr. Tetsuo Wakui from August 1979 to October 1981, under the guidance of the Supervisory Committee headed by Dr. Yoshiro Watanabe, professor of the Tsukuba University.

The team had discussions with the officials concerned of the Government of the Philippines and conducted a field survey in Davao city. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

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

December 1981

Keisuke Arita
President
Japan International Cooperation Agency

REPUBLIC OF THE PHILIPPINES
MINISTRY OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE MINISTER
MANILA

MESSAGE

We are pleased to have the Final Report on the Davao City Urban Transport Cum Land Use Study (DCUTCLUS).

In no small measure, the Study reflects the technical cooperation of the Government of Japan, through the Japan International Cooperation Agency (JICA), and the Philippine Government, through the Ministry of Public Works and Highways with the assistance of other agencies. The Study, which took two and a half years to complete, aims at the formulation of a comprehensive urban transportation and land use master plan for the large and progressive City of Davao in Mindanao. The cooperation and support of local government authorities in this undertaking underscore their concern to long-term solutions beneficient to the public interest and welfare of the residents of the Project Area.

It is the desire of the national leadership that area development planning adhere to the requirements of growth and national priority targets by clearly defining the issues, problems and options. President Ferdinand E. Marcos, through the organizational frame work of the Ministry of Public Works and Highways, has provided the leadership to document, validate and propose institutional as well as legislative actions to a variety of problems of the City of Davao spawned by rapid population growth and other factors.

The Study, therefore, is creditably the right step towards the right direction for the modernization and balanced growth of this burgeoning metropolis, particularly with respect to the vital transport systems that must be provided in relation to the overall development plan for the city.

It is my hope that the present leaders and future generations of Davao City will be guided by this Study.

May I commend all the members of the DCUTCLUS Steering Committee led by Project Director Prudencio F. Baranda, Project Manager Esther L. Alino, and her staff for a job well done. Special thanks is also extended for the invaluable help of former Mayor Luis T. Santos and the present Davao City Administrator, Mayor Elias B. Lopez, and the local authorities, as well as to Mr. Tetsuo Wakui and the team of Japanese consultants for their tireless efforts to realize the Study.

JESUS S. HIPOLITO
Minister
Ministry of Public Works and Highways

MESSAGE FROM CITY MAYOR

It is with genuine pleasure that I take this opportunity to extend my congratulations to the Philippine and Japanese teams which produced this final report on the Davao City Urban Transport Cum Land Use Study (DCUTCLUS).

As Mayor of Davao City, I am happy to know that there are other people who are also very much concerned with the planning of Davao City's future development. Considering the size of this city, we certainly need all the assistance we can get from other sources.

We are therefore thankful to the Ministry of Public Works and Highways (MPWH) and the Japan International Cooperation Agency (JICA) for having initiated and concluded this study which, to my mind, may prove very useful to the development of our beloved city in the years to come.

The thoroughness of this study shows the deep interest of those involved in this joint efforts between the Philippine and Japanese governments.

In the final analysis, however, is the crucial question on whether these plans contained in this study are implementable or not. This, of course, brings into mind the possible sources of funds needed to transform these plans to reality.

I would suggest, therefore, that those involved in this study should take one step further beyond the context of mere planning and venture into the next logical sequence, which is the realm of reality and implementation.

Again, please accept my warmest best wishes for a job well done.

October 20, 1981
City Hall, Davao City

ELIAS B. LOPEZ
Mayor, City of Davao

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CHAPTER 1 INTRODUCTION

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CHAPTER 1

INTRODUCTION

1.1 Background and Purpose

The City of Davao, the economic, cultural, and administrative center of Mindanao, has been mandated by a Presidential Decree as the Regional Government Center of Southern Mindanao. The 1980 population of the City is estimated at 611,000, which is the second largest in the Philippines, after only that of Metro Manila.

This population concentration in Davao was practically a post-war phenomenon. The City's demographic and economic growths have been so rapid that urban infrastructure development could hardly catch up with demand explosion, and disorderly urban sprawl, traffic jam in peak hours, and other urban problems have emerged. If left alone, these problems will be seriously aggravated in the future.

In realization of this situation, did the Government of the Republic of the Philippines set up, within the organizational frame of the Ministry of Public Works and Highways, a team for a Davao City Urban Transport Cum Land Use Study and a steering committee consisting of representatives from agencies concerned. The DCUTCLUS Team undertook the study during the past two and a half years with technical cooperation from Japan through the Japan International Cooperation Agency and completed the entire process of the study by the end of 1981.

The Terms of Reference for the DCUTCLUS Project set forth two purposes of the study: the formulation and implementation of an Urgent Implementation Program for the remedy of impending problems from which Davao City was currently suffering, and the laying down of a transportation and land use master plan which would provide the City with a guide for development and transportation/traffic administration up to the year 2000.

(i) Urgent Implementation Program

This Program, a part of which is to be implemented and executed by DCUTCLUS Team in 1981/1982 with a budget allocated to the Team, includes the following:

- A Traffic control plan for Poblacion and the vicinity;
- A plan for the improvement/development of streets in downtown Poblacion;
- A PUJ rerouting scheme.

(ii) Transportation Cum Land Use Masterplan

A short term plan to cover up to 1985, a medium term plan covering up to the year 2000 are to be formulated through analyses, forecasts, and programming with the year 2000 as the target year and 1990 as the year for interim review.

- Establishment of a socio-economic framework
- Formulation of medium and long term land use plans
- Designing of a transportation facilities development master plan

- Designing of a public transportation master plan
- Formulation of an investment program
- Pre-feasibility studies of major projects.

1.2 Study Area and Project Area

The Socio-economic study is to survey Davao City as a whole, while the transportation and the land use plans are to be formulated for only the coastal part of the City in a total land space of about 18,000 hectares. The former is referred to as "The Study Area", and the latter, "the Project Area". The part of Davao City outside the Project Area is referred to as "the Non-Project Area."

The Project Area covers the alluvial plains extending along the coast for about 40 kilometers with a breadth of three to five kilometers. All of urban activities in the coastal parts of Davao City are not only currently limited to this Area but will not extend beyond it, inasmuch as urbanization can hardly be spread across the mountains which stand behind it.

A person-trip survey, the most important of the data generating efforts, has been conducted covering approximately 85% of the Study Area. After an aero-photographic survey maps of the entire Project Area have been drawn at the scale of 1:10,000 and those of Poblacion and the vicinity 1:5,000.

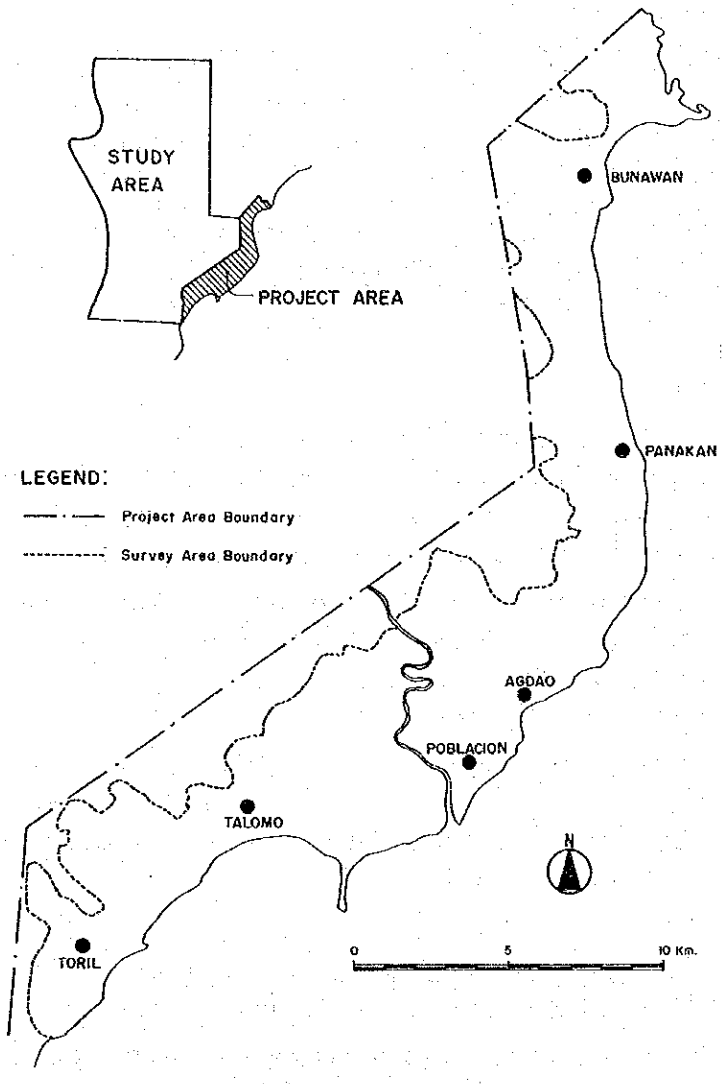

Figure 1.1 Study Area and Project Area

1.3 Study Methodology

1) Approach

In addition to the two purposes discussed in Sub-Chapter 1 above, this Project involved an incidental but important objective of developing skills in the area of transportation and land use planning. In order to achieve this objective, universal approaches and methods which can be applied to other similar projects have been selected as much as possible in each of analysis, forecasting, and programming stages, as follows:

(1) Data Collection and Analysis

a. In the absence of maps of the Project Area which contain adequate information on the current land use and, therefore, can become a land use planning base map, topographical and geographical maps of the required scale have been drawn through aerial photographic survey.

b. In order to understand the transportation demand structure of the area, a person trip survey is conducted through interviews at homes, together with such underlying surveys as screen line survey, cordon line survey, and roadside traffic counting.

c. Available data is to be used as much as possible with regard to population dynamics, business locations, and transportation facilities, provided that any missing information in these areas is to be obtained through independent investigations.

d. The data thus gathered are to be processed into geographical distributions, time series fluctuations, their correlations with other indicators, their comparison with data of other cities, and so forth for input at forecasting and planning stages.

(2) Forecasting

a. Population, labor force, production, and other socio-economic indicators are to be estimated for the Study Area through the extrapolation of past trends, the breaking down of national, regional, or other wide level planning into Davao City Unit, and the use of per capita indicators for planning.

b. Demands for commercial, industrial, housing, and public use land spaces are to be forecast based on the estimated socio-economic indicators. In this process, the per capita indicators prepared by the Ministry of Human Settlement (MHS) for planning are to be used.

c. Transportation demand is to be forecast through the so-called four step method, namely: trip generation, distribution, modal split, and assignment. The modal split forecast is to place a greater emphasis on policy preference of future split than on the past trend.

(3) Planning

a. Existing plans and projects are to be reviewed for their effectiveness and feasibility and incorporated into the Master Plan as need be.

b. A land use plan is to be formulated through the geographical distribution of said demands for various land spaces over the desirable future urban develop-

ment pattern map drawn based on an inventory of available land spaces for their quantity, quality, and location.

c. The primary requisite to the transportation plan to be developed is that it must be able to meet the future transportation demand.

d. Care is to be used so as not to allow the plans to remain a mere dream but to ensure that they will be fully feasible based on the amount of public investment funds to be available, as estimated through macro-economic approach.

e. All prepared projects are to be compared and analyzed for their mutual relationship and, as appropriate, grouped into packages.

f. Paying attention to these packages, an investment schedule to cover through the year 2000 is to be drawn with care so as not to cause uneven concentration of investments in any particular year or years.

g. Based on this investment schedule, the economy of the Master Plan as a whole and of each of major project packages is to be assessed. If any of them fails to prove economically justifiable, the plan is to be revised.

h. In addition, financial evaluation is to be done of projects wherein initial investments and administrative expenses are to be met with operational incomes.

2) Reporting

The DCUTCLUS Study was completed by the end of 1981 and the findings have been compiled into a report consisting of the four volumes listed below. In addition, an Urgent Implementation Program was proposed in August 1980, approved by the Steering Committee, and is now being implemented by the DCUTCLUS Team. All the maps and computer printouts generated in the process of the Study have been submitted to MPWH under a separate cover.

Volume 1 Executive Summary

Volume 2 Current Status of the Project Area

1. Introduction
2. A Profile of the Study Area
3. Intercity Transport System
4. Current Status of Road Facilities
5. Road Traffic
6. Person Trips in the Survey Area
7. Current Status of Public Transportation
8. Traffic Control Analysis

Volume 3 Plans and Recommendations

1. Introduction
2. Problem Identification and Planning Theme
3. Socio-Economic Framework and Land Use Plan
4. Future Transportation Demand Estimation
5. Alternative plans: Formulation and Evaluation
6. Road Network Masterplan

7. Public Transport plan
8. Investment Program
9. Project Evaluation
10. Recommendations to Authorities

Volume 4 Supporting Report

1. Survey Manuals
2. Technical Reports
3. Supporting Reports
4. Selected Data

1.4 Study Organization

1) Organization of DCUTCLUS

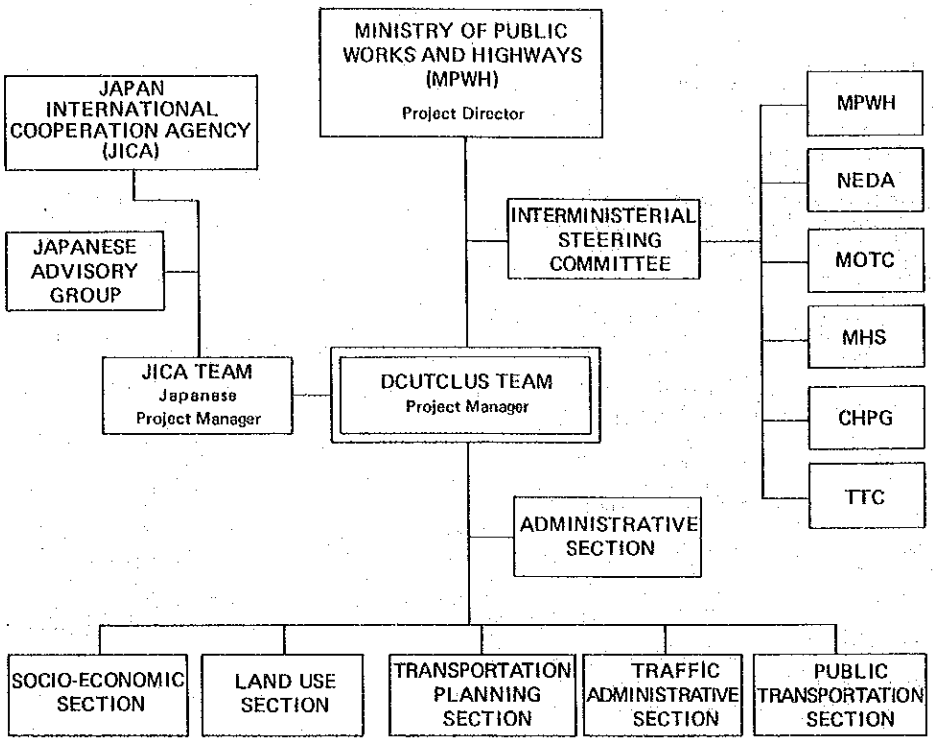

Figure 1.2 Organization of DCUTCLUS

Table 1.1 Steering Committee Meeting

	Date	Place	Agenda
1st	Oct. 30, 1979	Manila	• Methodology and schedule of Person Trip Survey and other traffic surveys
2nd	Nov. 28, 1979	Davao City	• Progress of Person Trip Survey and other traffic surveys
3rd	Feb. 13, 1980	Davao City	• Conceptual Land Use Plan • Reporting on Field Surveys
4th	July 8, 1980	Manila	• Socio-Economic Framework • Person Trip Data Processing • Major Characteristics of Current Person Trips
5th	Sept. 25, 1980	Manila	• Socio-Economic Framework and Land Use Plan • Urgent Traffic Recommendations
6th	Nov. 27, 1980	Davao City	• Finalization of Urgent Traffic Recommendations • Future Traffic Demand Forecast
7th	March 3, 1981	Davao City	• Outline of Medium and Long-Term Alternative Transport Plans • Implementation of Urgent Projects
8th	Aug. 27, 1981	Manila	• Outline of Master Plan
9th	Sept. 29, 1981	Davao City	• Submission and Presentation of Draft Final Reports

2) Participants

STEERING COMMITTEE MEMBERS

Chairman:	Prudencio F. Baranda	Director, PPDO, MPWH
Members:	Laureano S. Mendiola	Director, MPWH, Region XI
	Orlino P. Tuzon	Director, MOTC
	Jesus M. Sunga	Director, NEDA
	Benedicto Selerio	Director, TTC, UP
	Rodolfo Parane	Major, CHPG, Manila
	Benjamin T. Yu	Major, CHPG 11, Davao City
	Guillermo Celis	NEDA, Region XI
	Jose Tadeo Sayson	MHS, Region XI
Coordinator:	Linda Templo	PPDO, MPWH

DCUTCLUS TEAM

Esther L. Aliño	Project Manager
Servillano Z. Quirante	Public Transportation Planner
Sixto Caday	Road/Street Network Planner
Loreto Joaquin	Traffic Management Planner
Pelagio Bantol	Land Use Planner
Josefina Detablan	Socio-Economic Planner
Carlota Contreras	Socio-Economic Planner
Bayani P. Lorenzo	Actg. Administrative Officer
Edgar Fabregas	Researcher

Supporting Staff

Nelia Domigpe	Senior Researcher
Carlito Buenafe	Junior Civil Engineer
Teddy Templo	Junior Civil Engineer
Ma. Mayumi Baclig	Researcher
Elena Fernandez	Researcher
Jane Jamora	Researcher
Demetrio Agustin, Jr.	Researcher
Eustaquio Patana, Jr.	Researcher
Paz Palaran	Researcher
Lina Baguasan	Researcher
Corazon Rioferio	Researcher
Leticia Laderas	Researcher
Jaime Batobalani	Researcher
Virgilio David	Copywriter
Carmelita Torres	Senior Clerk
Luisito Manalili	Bookkeeper
Horacio Almario	C.E. Draftsman
Ariel Saldua	C.E. Draftsman
Samson Saldua	C.E. Draftsman
Gerardo Rañon	C.E. Draftsman
Other Staff	

JICA SUPERVISORY COMMITTEE

Yoshiro Watanabe	Chairman of the Group Professor, University of Tsukuba
Sukeyuki Wada	Vice Chairman of the Group Fukuoka City
Kazuo Sato	Vice Chairman of the Group Ministry of Construction
Michio Noma	Ministry of Construction
Katsutoshi Okawa	Ministry of Construction
Yukio Yamauchi	Ministry of Construction
Kengo Nishi	Ministry of Construction
Yasusuke Agata	Ministry of Construction

Japan International Cooperation Agency (JICA)

Yasushi Hirotani	Head of Development Survey Division Social Development Cooperation Dept.
Hisashi Fujishita	Development Survey Division
Ichiro Kubota	Development Survey Division
Kyojin Mima	Development Survey Division
Koichi Goto	Manila JICA Office
Hiroyuki Arai	Manila JICA Office

JICA Team

Yasuhiro Kimura	Team Leader
Tetsuo Wakui	Team Leader
Ken Takagi	Socio-Economic Planner
Yukuo Senba	Socio-Economic Planner
Isao Suzuki	Land Use Planner
Akio Morikawa	Land Use Planner
Kenji Funaki	Road/Street Network Planner
Mitsuo Hatakeyama	Road/Street Network Planner
Kazuhiro Hasegawa	Road/Street Network Planner
Masato Kotoh	Systems Analyst
Kenji Hiramoto	Systems Analyst
Yoshimi Ikeda	Systems Analyst
Koichi Kaneko	Public Transportation Planner
Nobuho Sone	Traffic Management Planner
Takashi Shoyama	Financial and Economic Analyst
Kiyoshi Arai	Land Measuring Specialist

INDIVIDUALS AND ORGANIZATIONS CONSULTED

The following are Agencies and Individuals consulted during the Study and whose advice and help have been invaluable to the team:

AGENCIES

Central Government Offices

- Ministry of Public Works and Highways
- Ministry of Transportation and Communication
- National Economic & Development Authority
- Constabulary Highway Patrol Group
- National Census & Statistics Office
- Central Bank
- TEAM Project
- Philippine National Railways
- Transport Training Center, University of the Philippines
- Philippine Ports Authority
- Export Processing Zone Authority
- National Transport System Study

Regional Offices

- Ministry of Works and Highways
- National Economic & Development Authority
- Constabulary Highway Patrol Group
- Ministry of Human Settlement
- Ministry of Public Works
- Ministry of Education & Culture
- Ministry of Public Information
- Bureau of Land Transportation
- Board of Transportation
- Highway District Engineer's Office
- Integrated National Police
- Davao Gulf Master Plan Study Office
- Regional Cities Development Project (RCDP)
- Southern Philippine Development Authority
- Commission on Election
- Philippine Atmospheric Geophysical & Astronomical Service Administration (PAGASA)
- Bureau of Soils
- Cotabato-Agusan River Basin Development Project Office (CARBDP)

City Government Offices

- Office of the Mayor
- City Council
- City Planning & Development Office
- City Engineer's Office
- City Assessor's Office
- Davao City Transport & Traffic Management Council (DCTTMC)
- Slum Improvement and Resettlement Office (SIR)
- Barangay Secretariat/Barangay Hall

Japanese Government Agencies

- Japan International Cooperation Agency (JICA)
- Embassy of Japan
- Overseas Economic Cooperation Fund (OECF)

Other Agencies

- SOPI, Davao Chapter
- Davao City Chamber of Commerce and Industry
- Davao City Contractors Association
- Jeepney Owners Association
- Kabataang Barangay
- Davao City Print & Broadcast Media
- F.F. Cruz
- Acre Survey & Development
- Asian Data Entry Corporation

INDIVIDUALS

Dr. Salvador Reyes	Former TTC Director & Steering Committee Member
Col. Pablo Magaro	Former Steering Committee Member
Maj. Aniano Fajardo	— do —
Jesse Evidente	Project Director, RCDP
Tatsuro Ogihara	JICA Expert to MPWH
Tateo Ashimi	JICA Expert to MPWH
Kenjiro Izumi	Embassy of Japan
Tamio Shimogami	Embassy of Japan
Hisao Tanimoto	OECF, Manila
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Glicerio Canela	Highway District Engineer
Marcelino Gorospe	Former District Engineer
Juanito Abergas	Asst. District Engineer
Ben Ortiz	Board of Transportation
Chito Gavino III	Architect, CPDO
Renato Ramos	CPDO, Urban IV
Hector Esguerra	CPDO
Emilio de Peralta	City Engineer
Vicente Garcia, Jr.	Former City Secretary
Cesar Nuñez	City Secretary
Nestor Gil	Project Manager, Urban IV
Jose Dalodo	Chief, INP Traffic Div.
Gil Abarico	City Press Secretary
Bert Tesorero	Former Chairman DCTC
Antonio Uy	President, SOPI Davao Chapter
C.M. Dayrit	MOTC, Manila
N.C. Gaviola	MOTC, Manila
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Noel Montinola	Traffic Management, Counterpart
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Eloy Bonus	Region III
Rommel Falcon	Region IV-A
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Precioso Sañosa	Region V
Dannie Bustillo	Region VI
Nydia Tiongzon	Region VII
Pergentino Mercado	Region VIII
Tita Rayo	Region X
David Sindol	Region XII

CHAPTER 2 A PROFILE OF THE STUDY AREA

Tables and Figures

CHAPTER 2

A PROFILE OF THE STUDY AREA

2.1 Nature

2.1.1. Geographical Position

Davao City is situated in the grid defined by 6°58′ to 7°34′ N latitude and 125°14′ to 125°40′ E longitude in the southeastern part of Mindanao, the second largest island in the Philippines. The City is approximately 946 kilometers from Manila and covers a large area of 244,000 hectares divided into nine districts: Poblacion, Bunawan, Buhangin, Talomo, Toril, Tugbok, Calinan, Baguio, and Paquibato. It borders Davao del Norte on the north, Davao del Sur on the south, Davao Bay on the east, and Cotabato on the west.

2.1.2 Topography

The entire area of Davao City is mountainous except for sporadic flats and plateaus. Mount Apo, an active volcano, whose height of 2,953 meters above sea level makes it the highest mountain in the Philippines, is located on the west of Davao City. A coastal strip of land with a width of two to seven kilometers on Davao Gulf and a small area reaching Calinan are the flat lands (with a slope of 4° to 5°). This coastal belt is the Project Area.

Davao City, in its entirety, drains into Davao Gulf. The largest body of water flowing from the city into the Gulf is the Davao River, which originates in Davao del Norte and runs through about the middle of Davao City or the west of Poblacion. The second largest is the Talomo River, which flows down the eastern slope of Mt. Apo and into the Gulf.

2.1.3 Climate and Vegetation

In comparison with other parts of the Republic, Davao City enjoys a relatively mild tropicalclimate. On many days the weather is fine during the day and it rains at night. The typhoon belt avoids Davao City. The monthly medium temperature varied from the highest of 33.16°C in April to the lowest of 21.61°C in January during the decade of 1968 to 1977, while monthly average precipitation ranged from the heaviest of 235.35 millimeters in Agugust to the lightest of 77.63 millimeters in March. Atmospheric humidity in Davao remains between 77% and 83%. The City is shielded from strong winds by the surrounding mountains and enjoy northernly breeze blowing from the Gulf. The seasonal climate pattern remained generally uniform during the said ten-year period according to the records of the weather station in Sasa.

Four types of vegetation cover Davao City: grasslands, forests, swamps, and cultivated lands. Grasslands cover undulating areas, while swamps, thick with mangrove trees, are found in the coastal areas. All kinds of tropical plants may be grown in the generally fertile coastal plains and some parts of the upland areas, which are in fact cultivated with coconuts, corn, abaca, rice, banana, and many other crops. The absence of typhoons makes the areas ideal for the cultivation of fruits, vegetables, and

other crops.

2.1.4 Seismicity

Earthquakes, caused by changes in the earth's crust structure, occur frequently in Davao City, which is only 60 kilometers from the foutling line extending the entire length of the Philippine Archipelago. During the period of 1969 to 1972, the seismological observatory recorded the highest intensity of V.

2.1.5 Mineral Resources

Silica and limestone represent the only exploited mineral resources. According to a 1978 survey, 11,642 tons and 237,669 tons, respectively, were mined, both used for the production of construction cement. The occurrence has been known of chrome, copper, gold, silver and lead ores, as well as of limestone, phosphate, hydrochloric acid, and sulphur, in Davao del Sur, but little progress has been made in their pre-commercial mining exploration.

2.2 Land Use

2.2.1 Davao City

Davao City land use can be classified roughly into the following three:

Agricultural land:	cultivated lands, swamps, and ponds
Forest land:	Woods and forest, and shrubberies
Urban land:	Commercial, industrial, and residential areas and open spaces

Their total sizes and proportionate percentages to the City's total land area are:

Agricultural land:	105,000 hectares (43%)
Forest land:	117,000 hectares (48%)
Urban land:	22,000 hectares (9%)

Agricultural lands are found in Bunawan, Buhangin, and Talomo Districts, where flat lands suitable for cropping are ubiquitous, as well as in Tugbok, Calinan, and Baguio Districts. Forest lands cover Paquibato and Baguio Districts in the northern parts of Davao City. Urban development is seen in Poblacion, Bunawan, Buhangin, Talomo, and Toril Districts along Davao Gulf. Also, small scale urban lands are seen formed in some inland parts, such as Calinan Proper and Mintal Proper.

2.2.2 Project Area

Urbanized parts of the Project Area are Poblacion, Bunawan and Buhangin Districts in the north, and, in the south, Talomo and Toril Districts along the Gulf. These urbanized areas constitute only 19% (3,500 hectares) of the total Project Area space of 18,100 hectares.

Poblacion urbanization started from the market near Bankerohan Bridge and the vicinity of Sta. Ana Port and gradually extended into commercial areas along San Pedro Street, C.M. Recto Avenue, and Magsaysay Avenue. When Poblacion was about fully developed, urbanization then progressed along the two arterial roads extending in north-south direction: Davao-Cotabato Road and Davao-Agusan Road. Areas adjacent to Poblacion, such as Bucana, Agdao, and Buhangin are particularly highly developed. Toril, which is in the south of the Project Area, forms an independent town, although in a fairly smaller scale than Poblacion.

The heaviest concentration in the Project Area of commercial and business activities is found in Pablacion, particularly along C.M. Recto Ave., San Pedro St., E. Quirino Avenue, and R. Magsaysay Avenue. No other substantial concentration of commercial activities is seen, but a fair size of commercial area exists in Toril, where demands for daily necessities are fully met, and small scale commercial areas occur sporadically along said arterial roads.

Aside from the concentration of factories in the coastal areas of Panacan and Sasa, isolated industrial areas are seen along the road which connects Bunawan and Toril.

In Davao City, economic and housing development has lagged behind the rapid population increases during the recent years, and many parts of area between M. Quezon Boulevard and the shore are occupied by squatters. In Poblacion, many residential areas are heavily populated and the environment of life is particularly unfavorable in the squatters' quarters near the shore, where as many as 500 people live in each hectare of land on the average. On the other hand, there are residential areas of a favorable environment, such as GSIS Housing, Ecoland Subdivisions, and Insular Villages. Additional residential areas are seen scattered along arterial roads. Isolated housing areas, or subdivisions, are also being developed along such roads.

The Mayor's Office and many other institutional facilities are concentrated in Poblacion which functions as administrative, distribution, cultural, educational, and many other center of Davao City. Schools and other public facilities of varied scales are also found in each barangay.

Open spaces consist of parks, cemeteries, golf courses, airfields, and river valleys. Magsaysay Park in Sta. Ana and Shrine Hill in Ma-a provide the populace with space for rest and recreation, but park capacities as a whole are still far from being adequate.

The current land use, discussed in the above, has been compiled into Table 2.1 (the distribution of land area by use) and Figure 2.1 (a land use map). It can be seen from the Table and Figure that there still remain in the Project Area substantial number and sizes of land spaces at present mostly devoted to coconut, can be developed in the future along with the progress of urbanization in this area. It should be noted, however, that such development must be accomplished according to a pre-established plan, rather than the undesirable haphazard fashion in which the current development is taking place, so as that the convenience of local inhabitants will be assured and natural environment preserved.

Table 2.1 Land Use in 1979

	ha	%
Residential	2,549	14
Commercial	283	1
Industrial	322	2
Institutional	202	1
Open space	160	1
Agricultural and others	14,584	81
Total	18,100	100

SOURCE: DCUTCLUS

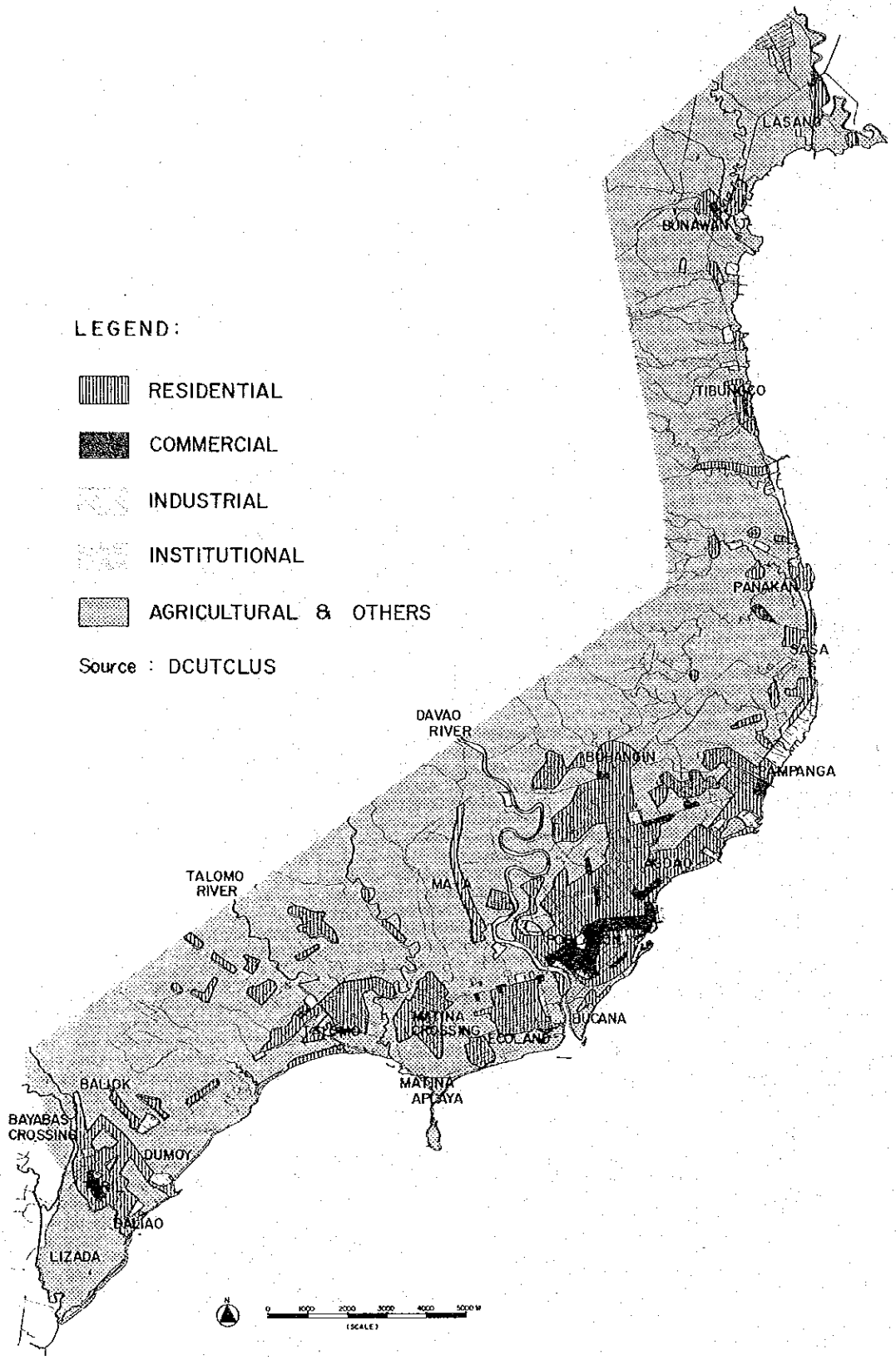


Figure 2.1 Present Land Use (1979)

2.3 Socio-Economic Framework

2.3.1 Population

The 1975 census of 484,678, which was 23.5% greater than the 1970 census of 392,475, indicated that the population of Davao City had recently been increasing by a fairly high average annual rate of 4.3% (see Table 2.2), meanwhile, the population of the Philippines shows 2.8% increase.

Table 2.2 Population in Davao City (1903 – 1975)

Year	Population	Annual Growth Rate (%)
1903	8,560	
		6.3
1918	21,538	
		7.4
1939	95,546	
		1.7
1948	111,263	
		6.1
1960	225,712	
		5.7
1970	392,473	
		4.3
1975	484,678	

REMARK: The 1980 census preliminary report indicated a population in Davao City of 611,311. On this basis, average annual population increase from 1975 to 1980 was 4.8%. This means that the population growth, which had been somewhat slowed down since 1960, was again accelerating since 1975.

SOURCE: NCSO (National Census and Statistics Office)

Davao City population constitutes 1.2% of the entire Philippine population of 42,070,000, or 17.9% of the population of Region XI, to which Davao belongs (see Table 2.3).

Table 2.3 Population and Population Density (1975)

	Area (km^2)	Population (persons)	Density (persons/km^2)	Distribution (%)
Philippines	300,000	42,070,600	140.2	100
Mindanao	101,999	9,147,000	89.2	21.7
Region XI	31,693	2,711,278	85.7	6.4
Davao del Sur	6,378	436,263	146.8	2.2
Davao City	2,440	484,678	198.6	1.2
Metro Manila	636	4,970,006	7,814.5	11.8

Source: NCSO

Population density in Davao City is 198.6 persons per square kilometer, which is higher than the overall Philippine density of 140.2 persons per square kilometer, and much higher than that of Region XI of 85.7 persons per square kilometer. The indicated density of Davao City, however, is still far from being that of urban population, when compared with 7,814.5 persons per square kilometer in Metro Manila.

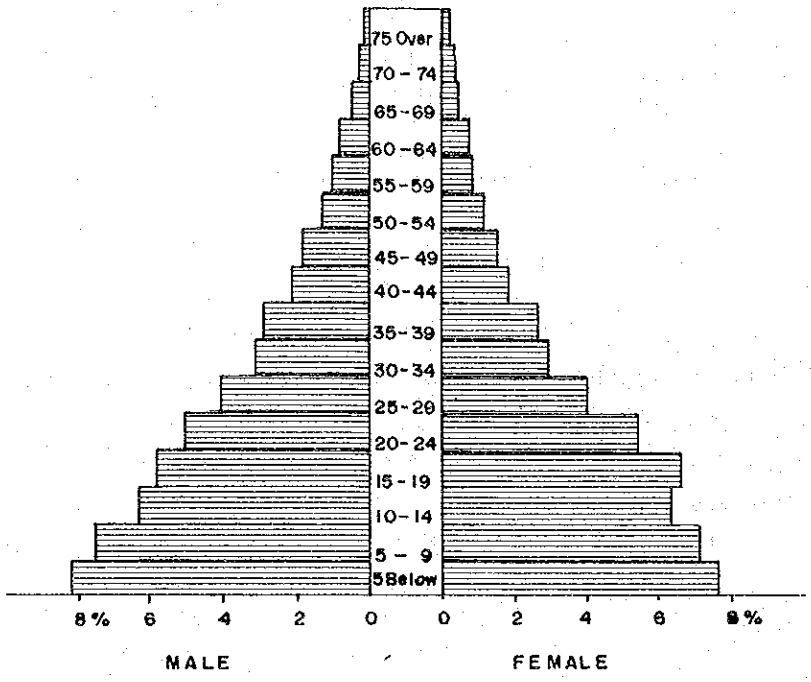
Of the nine districts of Davao City, Poblacion has the largest population of 120,000, or one-fourth of the entire City population (see Table 2.4), followed by coastal districts: Buhangin, Talomo and Toril. These coastal areas, including Bunawan, hold about 360,000 people, or about three-fourths of the entire City population. District population density is heaviest in Poblacion with 199 persons per hectare, while that in other districts is 10 persons or less per hectare.

Table 2.4 Population by District (1975)

District	Area (ha)	Population (persons)	Population Density (persons/ha.)	Distribution (%)
Poblacion	1,028	122,375	119.02	25.2
Bunawan	6,550	39,045	5.96	8.1
Buhangin	9,222	75,246	8.16	15.5
Talomo	11,040	71,570	6.48	14.8
Toril	32,300	55,677	1.72	11.5
Paquibato	65,635	25,562	0.39	5.3
Baguio	82,735	26,062	0.32	5.4
Calinan	22,360	39,300	1.76	8.1
Tugbok	13,130	29,841	2.27	6.1
Total	244,000	484,678	1.98	100.0

Source: NCSO

Davao City has a pyramidal demographic tree usually seen in areas of sustained population increases (see Figure 2.2 for population distribution by sex and by 5-year age increments). Children under the age of 15 constitute 43% of the total City population, while those from 15 to 64 years of age represent 55% and thsoe of ages greater than 64, two percent. Thus, dependency ratio — the ratio of unproductive population (ages under 15 and ages over 64) to productive population (ages between 14 and 65) — is a substantial 0.82, which is a burden on economic growth and income level improvement.



Source : NCSO

Figure 2.2 Population by Sex and Age Group (1975)

Estimation based on average annual increase rate for each barangay from 1970 to 1975 results in an estimated 1979 population of 371,740 in the Project Area and 188,260 in the non-Project Area, for a total Davao City population of 560,000 (See Table 2.5).

Table 2.5 Population in 1979

Year	Project Area	Non Project Area	Davao City
1970	264,242	128,231	392,473
1975	318,720	169,958	484,678
1979	371,740	188,260	560,000

Source: DCUTCLUS

2.3.2 Employment

The 1970 population census indicated that employment (in terms of the number of people at work) in Davao City was 127,931 in that year, 42% of which was in primary industry, 17% in secondary, and 41% in tertiary (see Table 2.6).

Table 2.6 Employment by Industry (1970)

Sector		Employment	Share (%)
(1)	Primary	54,167	42.3
	– Agriculture, Fisheries and Forestry	54,167	42.3
(2)	Secondary	21,470	16.8
	– Mining	339	0.3
	– Manufacturing	14,714	11.5
	– Electricity, Gas and Water	551	0.4
	– Construction	5,866	4.6
(3)	Tertiary	52,294	40.9
	– Commerce	13,473	10.5
	– Transport, Communication and Storage	8,682	6.8
	– Service	26,723	20.9
	– Others	3,416	2.7
	Total	127,931	100.0

Source: NCSO

Employment in Davao in 1979 is estimated at 182,000 by multiplying the Davao population by the rate of employment (31.8%) which was estimated using such ratios for Davao del Sur in 1970 and 1975 as references. Employment in the Project Area was 115,000 as found by the P.T. Survey in 1979. Then, employment in non-Project Area must be 67,000.

The urban and rural employment structures in Davao del Sur in 1975 were referred to in estimating the industrial breakdowns of employment in the Project Area and employment in non-Project Area (see Table 2.9). The P.T. Survey showed that a fair number of students were included in the employment statistics, indicating that many students work to support themselves.

Table 2.7 Employment by Industry, Davao del Sur and Davao City

	Davao del Sur				Davao City	
	1970		1975		1970	
		%		%		%
Primary	149,060	(59)	171,726	(58)	54,167	(42)
Secondary	30,548	(12)	31,968	(11)	21,470	(17)
Tertiary	73,059	(29)	90,311	(31)	52,294	(41)
Total	252,667	(100)	294,005	(100)	127,931	(100)
Total Population	785,000		936,000		392,473	
Ratio of Employment	32.2		31.4		32.6	

* Figures in Parenthesis show share

Source: NCSO

Table 2.8 Employment by Industry, Davao del Sur, 1975

	Urban		Rural		Total	
		%		%		%
Primary	18,717	(20.1)	153,009	(76.1)	171,726	(58.4)
Secondary	18,321	(19.7)	13,647	(6.8)	31,968	(10.9)
Tertiary	56,034	(60.2)	34,277	(17.1)	90,311	(30.7)
TOTAL	93,072	(100)	200,933	(100)	294,005	(100)

* Figures in parenthesis show share.

Source: NCSO

Table 2.9 Employment of Project Area and Non-Project Area in 1979

Sector	Project Area		Non-Project Area		Davao City	
		%		%		%
Primary	24,000	(21)	51,000	(76)	75,000	(41)
Secondary	22,000	(19)	5,000	(8)	27,000	(15)
Tertiary	69,000	(60)	11,000	(16)	80,000	(44)
Total	115,000	(100)	67,000	(100)	182,000	(100)

* Figures in parenthesis show share.

Source: DCUTCLUS

2.3.3 Economy

(1) Production in Region XI

The 'GDP" of Region XI was 4,182 million Pesos in 1972 and was estimated to be 6,497 million Pesos (at 1972 constant price) in 1979, at an average annual growth rate of 6.58, (see Table 2.10). By industrial sector, agriculture forestry-fishery sector produced about 46% of these Regional GDP (or, in this report, "gross regional and domestic products" abreviated "GRDP"), while industrial and service sectors produced only 18% and 36%, respectively. Average per capita GRDP grew slightly from the 1,747 Pesos in 1972 to 1,915 Pesos in 1979.

(2) Primary Industry

The principal agricultural crops of Davao City are bananas, coconuts, rice, corn (maize), ramie, and other fruits. Bananas now the greatest producer, has replaced ramie as the chief export. Coconut, the second greatest produce used for industrial purposes, is another major export.

Commercial forests in Davao City cover a total area of 63,113 hectares, and in 1977 a total of 56,627,974 board feet of lumber was produced, about one-third of which, or 18,448,410 board feet was exported.

A 1978 survey showed that there were 4,634 fishermen in Davao City and that the total fish landed was 4,283 tons. About 2,000 tons of tuna fish were exported. Some additional fishery activities are seen in coastal area fishponds.

(3) Secondary Industry

DCUTCLUS conducted in 1980 an industrial study of the Project Area, which showed that, of the total 156 industrial establishments in the Area, 31% were in food, beverage, and tobacco industry, 27% were dealing in wood and wood products, and 15% were in machines, equipment, and other fabricated metal products. Food and beverage plants were located chiefly in Poblacion and Talomo, while wood and wood product activities were found in Bunawan, Buhangin, and Talomo, and medium and heavy industries were concentrated in mostly the area north of Poblacion.

Table 2.10 Gross Regional Domestic Products

ITEMS	1972	1973	1974	1975	1976	1977	1978	1979	AVERAGE ANNUAL GROWTH RATE 72-79
GROSS REGIONAL DOMESTIC PRODUCT[2/] (million pesos at 1972 prices)	4,182	4,454	4,363	4,623	4,937	5,286	6,021	6,497	6.5 %
GRDP BY SECTOR [2/] (million pesos at 1972 prices)									1.3 %
Agriculture, Forestry & Fishery	1,934	2,060	1,981	2,119	2,265	2,422	2,806	2,960 (46)	6.3 %
Industry	690	735	767	789	842	907	1,204	1,166 (18)	7.8 %
Manufacturing	587	625	617	625	664	712	777	881	6.0 %
Mining & Quarrying	2	2	4	5	6	5	8	9	24.0 %
Construction	92	98	134	146	160	175	223	253	15.5 %
Electricity, Gas & Water	9	10	12	12	13	14	18	19	11.3 %
Service	1,557	1,658	1,615	1,716	1,829	1,957	2,192	2,371 (36)	6.2 %
Transport, Communication & Storage	92	98	99	107	116	126	175	220	13.3 %
Commerce	1,199	1,277	1,230	1,305	1,389	1,481	1,535	1,632	4.5 %
Other Services	266	283	286	304	325	350	482	499	9.4 %
POPULATION [1/] (thousands as of July 1)	2,394	2,496	2,603	2,715	2,879	3,053	3,237	3,393	5.1 %
PER CAPITA GRDP	1,742	1,784	1,676	1,703	1,715	1,731	1,861	1,915	

Note: Totals may not sum due to rounding.

Source: [1/] Estimated based on 1970 and 1975 Census data, Long-Term Philippine Development Plan and Southern Mindanao 5-Year Development Plan

[2/] Estimated based on Long-Term Philippine Development Plan and Southern Mindanao 5-Year Development Plan

In terms of the number of workers, these industries were predominantly small in scale: those with only 10 to 19 workers accounted for 35% of them and those with 20 to 99 workers, 43% — few had 100 or more workers. Although wood and wood products industry realized the highest amount of annual gross revenue, average such revenue per worker was only 16,000 pesos under the pressure of low labor productivity due to the overwhelmingly large number of workers utilized in this industry. On the other hand, capital intensive industries naturally enjoyed a high average annual gross revenue of 68,000 Pesos per worker.

(4) Service Industry

According to the 1978 NCSO report, of the total 9,047 enterprises existed in Davao City, 86% or 7,731 were in service industry. The breakdown of this service industry was: 63% were in retail and wholesale business, 25% were in community service, 7% were in transportation and communication, and 5% were in banking. Most (88%) of these service activities were concentrated in Poblacion.

2.4 Financial Status

2.4.1 City Government Revenue and Expenditure

(1) Revenue

The overall financial capability of Davao City covering a five year period from 1975-1979 with emphasis on the 1979 financial data is presented in the following table:

Table 2.11 Income of Davao City 1975 - 1979

(Thousand Pesos in Current Prices)

Revenue	1975	(%)	1976	(%)	1977	(%)	1978	(%)	1979	(%)
I. Revenue from Taxation										
Bus. & Occupation Taxes	11,241		12,126		15,902		15,402		15,178	
Property Tax	4,998		8,588		–		–		–	
Other taxes & duties	1,246		4,542		11,228		17,289		39,088	
Local Gov't. share from Internal Revenue	–		–		9,926		9,924		3,462	
Sub-Total	17,485	(48)	25,256	(54)	37,056	(56)	42,616	(68)	57,728	(83)
II. Non-Tax Revenue										
A. Operational Receipts										
Earnings & other Credits	–		–		5,759		9,273		8,474	
Misc. Inc. & Receipts	–		–		8,286		10,394		3,302	
Sale of Assets	–		–		3		–		4	
Income from Public Enterprises	–		–		664		–		–	
Incidental Revenue	3,014		1,099		–		–		–	
Receipts from Operation	3,575		4,277		–		–		–	
B. Non-Operational Receipts										
Return of Advances	323		4,616		–		–		–	
Borrowings	–		–		14,975		–		–	
C. National Gov't Aides & Allotments										
Internal Revenue Allotments	9,932		9,982		–		–		–	
National-Municipal	1,936		1,906		–		–		–	
Sub-Total	18,780	(52)	21,880	(46)	29,887	(44)	19,667	(32)	11,780	(17)
GRAND TOTAL	₱36,265		₱47,136		₱66,743		₱62,282		₱69,508	

Source: Statistics Division, Ministry of Finance, Manila

Davao City revenue increased yearly since 1975, with the exception of 1978, that is, from the P36,265,000 in 1975 to P69,508,000 in 1979 with an average annual growth rate of 17.7 per cent. The decrease of P4,461,000 in 1978 is chiefly attributable to the city's non-borrowing from the national and other local governments, as shown under "Non-Operational Receipts". However, there was no apparent change in the economic condition of the city in that year, as other revenue items showed little difference from 1977 performance.

Innovative measures for efficient collection of city tax begun in 1977. A new classification of the city's revenues was evolved with the shift of the city's fiscal set-up from fiscal year to calendar year./2

In 1979, the government introduced a package of domestic tax measures which were designed to supplement existing revenue measures and help achieve equity, energy conservation and efficiency objectives. The regional budgeting system was adopted to minimize regional disparities and to allocate resources more equitably./3 The city's revenue was reclassified into four (4) major groups, namely:

1. *Revenue from Taxation,* which accounted for 48 to 83 per cent share of the total revenue during the five (5) years period under review, includes real property taxes, business and occupational taxes, other taxes and duties local government share from internal revenue collection;

2. *Operational Receipts,* which includes earnings and other credits from operation and service income, income from government business operation, interest income, fines and penalties and other miscellaneous receipts.

3. *Non-Operational Receipts,* and
4. *Internal Revenue Allotment*

In 1979 total from taxation amounted to P57,728,000 or 83 per cent of the total revenue of P69,508,000. Non-tax Revenue had P11,780,000 or 17 per share of the total.

(2) Expenditure

The city's expenditure is categorized into two major groups namely:

A. *Operation Expenditure,* which includes general administration of government, public welfare and internal safety economic and social development, inter-government aids and debt services;

B. *Capital outlays,* which includes real property and equipment expenditures.

The three major expenditure items of the city were for public welfare and internal safety (36%), inter-government aids (25%) and economic and social development (18%), wherein the latter expenditure were channeled to social settle-

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/1 Source: Statistics Division, Ministry of Finance, Manila
/2 Source: 1979 Davao City Profile, Vol. 1
/3 Source: Development Bank of the Philippines 1979 Annual Report

ment development and general public services. For the period 1975-1979, the city increased the total expenditure from ₱38,981,000 to ₱65,242,000.

This increase was attributed to the increase of the city's revenue. During the period, the expenditure on public welfare and internal safety, inter-government aids and real property increased rapidly.

It seems clear that the city's increased financial resources have credibly contributed to the city's growth and development.

Table 2.12 Revenue Realized in Davao City CY 1977 - 1979

(In thousand pesos)

	1977	1978	1979
Total Funds Available for Expenditures			
Gross Fund Balance at the Beginning of the calendar year	10,834	10,369	10,726
Plus:			
Actual Income Realized during current calendar year	55,909	51,913	58,782
GRAND TOTAL	66,743	62,282	69,508

Source: Statistics Division, Ministry of Finance, Manila

As shown in the Table 2.12, gross fund balance of each year is carried forward to the next year to form part of the latter year's total funds available for expenditures.

Davao City is now a dynamic metropolis in the Southern Philippines and there appears a great potential for the city to increase revenues, and hence increase its debt capacity.

2.4.2 National Government Expenditures/1

Major capital projects in Davao City have been implemented by the central line agencies such as the Ministries of Public Highways and Public Works, the Philippine Ports Authority, and the waterworks districts./2 These projects have been executed with funds from the national government and other sources such as foreign aids, grants, and loans.

Table 2.14, shows that average central government line agency expenditure, by types of project, in Davao City during the past three to five years.

/1 Due to unavailability of pertinent data on this subject, the Financial Study conducted by Alexander Grant & Company in connection with Regional Cities Development Project (RCDP) sponsored by the World Bank, was considered a good reference and was continuously referred to throughout the report.

/2 The waterworks districts are quasi-private corporations operating under the supervision of the Local Water Utilities Administration (LWUA)

Table 2.13 Expenditures of Davao City
1975 - 1979

(current price in thousand pesos)

	1975	(%)	1976	(%)	1977	(%)	1978	(%)	1979	(%)
A. Operation Expenditure										
1. General Adm. of Government	5,759	(15)	8,052	(15)	7,137	(11)	7,672	(12)	5,629	(9)
2. Public Welfare & Internal Safety	8,762	(22)	18,276	(35)	17,345	(26)	23,190	(37)	23,516	(36)
3. Gov't. Finance & Adjudication	4,575	(12)	—		—		—		—	
4. Eco. & Social Development	11,529	(30)	4,927	(9)	7,494	(11)	5,423	(9)	11,827	(18)
5. Operation of Eco. Enterprises	1,610	(4)	1,744	(3)	930	(1)	1,782	(3)	—	
6. Debt Service	329	(1)	329	(1)	328	(1)	4,951	(8)	101	
7. Inter-Gov't. Aide	1,758	(4)	2,229	(4)	3,504	(5)	3,703	(6)	16,267	(25)
Sub-total	34,322	(88)	35,557	(67)	36,738	(55)	46,721	(75)	57,340	(88)
B. Capital Outlays										
1. Real Property	2,931	(8)	12,182	(23)	5,874	(9)	4,750	(8)	7,902	(12)
2. Equipment	1,728	(4)	4,474	(8)	17,269	(26)	1,268	(2)	—	
Sub-Total	4,659	(12)	16,656	(32)	23,143	(35)	6,018	(10)	7,902	(12)
C. Other Disbursement										
1. Loans, Advances & Transfers	—		321	(1)	6,277	(9)	9,119	(15)	—	
TOTAL EXPENDITURES	₱38,981	(100%)	₱52,534	(100%)	₱66,158	(99%)	₱69,858	(100%)	₱65,242	(100%)

Source: Financial Study, RCDP, 1979

Table 2.14 Central Government Line Agency Expenditure by Project Type, Davao City

Line Agencies / Projects ₱000	Amount
Ministry of Public Highways	
Roads and Bridges	23,975
Road improvement	660
Ministry of Public Works	
School Buildings	3,265
Other Buildings	–
Portworks	2,220
Waterworks	6,743
Philippine Ports Authority	–
Average Annual expenditure (averaged over three to five years)	36,863

Source: Financial Study, RCDP, 1979

As shown in Table, Davao City enjoyed varying amounts of yearly capital expenditures by the Central government line agencies. The Ministry of Public Highways, spent P24,635,000 for Davao City, about 97 per cent, of which went to construction of roads and bridges. The RCDP report identified Davao as the recipient of the largest share (76%) of the amount that went for the construction of roads & bridges among all other regional cities under the RCDP. Davao City has also been the recipient of the largest share of school building construction funds (47%) and "Other Project" funds (69%) under the Ministry of Public Works capital expenditures. In Davao City, the MPW averaged P5,485,000 capital expenditures per year, with 60 per cent going to the construction of school buildings and 40 per cent to other projects in the city.

Table 2.15 Central-Municipal Government Sharing of Expenditures for Davao City by Categories

Line Agencies/Projects	Davao City (%)
Roads and Bridges	
Ministry of Public Highways	95
City Government	5
Road Improvements	
Ministry of Public Highways	35
City Government	65
Buildings	
Ministry of Public Works	64
City Government	36
Other Projects	
Ministry of Public Highways	1
Ministry of Public Works	34
City Government	65

Note: Other projects include construction/repairs/ maintenance of plaza, parks, monuments, flood/river control projects, drainage & shore protection projects.

Source: Financial Study, RCDP, 1979

No pattern is evident from the Table above with respect to the relative percentages of expenditures by the national and city government on any type of project over the past three to five years. The operation of the public works program had been greatly hampered by the poor procurement procedures.

Project appropriations in Davao City for 1980 are presented in Table 2.16. This is about double the average annual expenditures for the past 3-5 years. Table 2.17 shows the infrastructure investment requirements by package for Region XI and Davao City from 1981 through 1985.

Table 2.16 Central Government Line Agency Appropriations for 1980

Line Agencies/Projects (₱000)	Davao City
Ministry of Public Highways	
Roads & Bridges	25,630
Road Improvements	47,050
Ministry of Public Works	
School Buildings	5,083
Other Buildings	–
Portworks	6,200
Philippine Ports Authority	
Portworks	5,202
Total	89,165

Source: Financial Study, RCDP, 1979

Table 2.17 Infrastructure Investment Requirements by Package, Region XI, 1981–1985

(In thousand pesos at 1979 prices)

	FINANCIAL REQUIREMENTS											
	1981		1982		1983		1984		1985		1986	
PROJECT PACKAGE	Reg. XI	Dvo. City	Reg. XI	Dvo. City	Reg. XI	Dvo. City	Reg. XI	Dvo. City	Reg. XI	Dvo. City	Reg. XI	Dvo. City
Regionwide	139,478	–	128,007	–	142,659	–	138,246	–	142,287	–	690,677	–
Roads and Bridges	49,498	6,838	57,252	7,058	55,242	6,550	52,952	5,883	41,512	5,513	256,456	31,842
Rural Water Supply	19,114	1,663	20,268	1,713	21,226	1,613	22,478	1,663	23,683	1,713	106,769	8,365
Municipal Waterworks	11,947	–	12,936	–	12,962	–	13,818	–	15,280	–	66,943	–
Flood Control & Drainage	29,086	1,920	59,385	2,064	79,926	2,280	77,160	2,520	59,956	2,760	305,514	11,544
Social Infrastructure	–	1,620	–	–	–	–	–	–	–	–	–	1,620
Other Services	8,977	–	7,546	–	8,851	–	11,239	–	14,500	–	51,113	–
TOTAL	258,100	12,041	285,395	10,835	320,866	10,443	315,893	10,066	297,218	9,986	1,477,472	53,371

Source: Regional Development Investment Program, 1981 - 1985
NEDA, Region XI, Davao City

2.4.3 Financial Institutions

(1) Development Bank of the Philippines

The Development Bank of the Philippines (DBP):

i) Is committed to the goals of employment generation, industry dispersal, export promotion, and regional and social development. DBP has harnessed its resources to accelerate national development in various fronts trhough the establishments of a national networks of branches, the acceptance of savings and time deposits to mobilize idle capital, and the encouragement of foreign investment.

ii) Acts as a prime catalyst for development by granting, through its branches in the city, sumptuous loans to pioneering industries as well as those already established particularly those of small-and medium-scale.

The bank's investment exposure to 27 differnet industries and other commercial establishments in the City reached P946,625.00 in 1977. It is hopefully speculated that more industries will be served by the bank in the future.

Table 2.18 Summary of Loans Granted by the Development Bank of the Philippines in Davao City for 1977

(In Thousand Pesos)

TYPE	NUMBER	AMOUNT
Ceramics	1	30,000
Hauling of sand & gravel		100,000
Machine Shop	1	150,000
Printing Press	1	110,000
Professional	8	157,000
Public Utility	3	77,000
Tricycles	8	63,285
Food Manufacture	2	108,300
Furniture Factory	1	50,000
TOTAL	27	946,625

Source: 1979 Davao City Profile

(2) **Other Banks**

Table 2.19 shows 124/1 financial institutions operating within Davao City as of 1977. About 44 percent of these financial institutions belong to insurance companies and 23 per cent are under commercial banking.

Majority of these financial institutions are conveniently located along the main streets of the City Proper. However, these banks, as well as DBP, should be stimulated to reinvest greater amounts of local funds secured through loan redemption to the local industries.

/1 Latest data for 1979 in the city is 150 financial institutions, representing 54 per cent of the regional total of 279.
Source: Southeastern Mindanao Trade Profile TAC, Ministry of Trade, Region XI

Table 2.19 Summary List of Financial Institutions in Davao City as of 1977

BANK CLASSIFICATION	NO.	NO. OF SEPARATE OFFICES		LOCATION
		TOTAL	BRANCH	EXTENSION/AGENCY	
1. Commercial Banks	29	37	29	8	City Proper & Toril
2. Thrift Banks					
2.1 Savings & Mortgage Banks	3	8	4	4	City Proper
3. Savings & Loan Association	1	–	–	–	City Proper
4. Mutual Building & Loan Association	1	–	–	–	City Proper
5. Development Banks	2	–	–	–	City Proper
6. Specialized Government Non-Bank Entities					
6.1 G.S.I.S.	1	–	–	–	Davao City*
6.2 S.S.S.	1	–	–	–	Davao City*
7. Other Finance Companies					
7.1 Finance Companies	12	–	–	–	City Proper
7.2 Investment Companies	4	–	–	–	City Proper
8. Pawnshops	11	–	–	–	City Proper
9. Lending Investors	4	–	–	–	Davao City*
10. Insurance companies					
10.1 Life Insurance	13	–	–	–	Davao City*
10.2 Non-Life Insurance	42	–	–	–	
TOTAL	124				

Source: 1979 Davao City Profile

* No available data as to the exact location in the City

2.5 Infrastructure and Urban Facilities

2.5.1 General

Various infrastructure and urban facilities– with the exception of roads and related facilities to be discussed at a later chapter – will be discussed here in summary as classified as follows:

a) Transportation and Communication Facilities
   - i) Ports and Harbors
   - ii) Airports
   - iii) Telecommunication

b) Utilities and Housing
   - i) Electric power
   - ii) Water Supply
   - iii) Flood Control, Drainage, and Sewer System
   - iv) Waste Disposal System
   - v) Housing

c) Social Service Facilities
   - i) Educational
   - ii) Medical
   - iii) Police and Fire Protection

2.5.2 Transportation and Communication

(1) Port and Harbor

Davao City has two public ports (Sta. Ana and Sasa) and a number of private ports (such as one at Tefasco and Panacan).

Sta. Ana Port (pier) is located on the east of Poblacion and handles domestic passengers (a total of 204,920 passengers in 1978) and cargo (271,000 tons in 1978). The port facilities consist of a finger type pier (97 meters long and 22 meters wide), warehouses, and offices. Another pier (99 meters x 14 meters) is currently under construction on the north of the existing pier. The effective depth of water is 4.6 meters. It is believed, however, that the cargo handling capacity of Sta. Ana pier is limited due to the fact that the warehouses are small and the access road passes through the downtown area of Poblacion.

Sasa Port (wharf) is located 10 kilometers north of Poblacion and handles both domestic and international passengers and cargo. After the addition of three berths for a total length of 405 meters in 1977 and the expansion of its hinterland in 1980, the port premises cover a land area of 167,550 square meters, has four berths for a total extension of 515 meters, and has warehouses and offices. The effective depth of water is nine meters, which is sufficient to accommodate large vessels. While the number of passengers handled at this wharf is limited, the wharf is a nodal point of domestic and international marine cargo transportation, handling a substantial volume of such cargo (684,000 tons in 1978). It also constitutes a nodal point of land transportation with a large number of container yards existing in areas surrounding it and its linkage with Davao-Agusan Road.

The Philippine Port Authority (PPA) submitted a final report of the Davao Gulf Masterplan Study in February 1981, in which PPA recommended the improvement of Sta. Ana Pier and Sasa wharf and the construction of new port at Panabo.

(2) Airport

One of Philippine international airports is located in Sasa, Davao City. This is Bangoy International Airport, which is about nine kilometers from, and within a quick 15-minutes reach from, Poblacion via Davao-Agusan Road. The airport facilities — terminal building, runway with a length of 2,154 meters and a width of 36 meters, taxi-way, and apron — are presently adequate under the usually fine weather, but the runway will have to be extended in order to accommodate large jet airplanes.

Bangoy International Airport is the third largest after Manila and Cebu in terms of the numbers of flights and passengers. It handled a total of 420,000 air passengers in 1979, which was about 7% of the total 5,890,000 passengers in the Philippines and about one-fifth of that handled at Manila International Airport. Currently, regular flight service is available to and from Manila, Cebu, Cagayan de Oro, and Zamboanga. On these routes, the number of flights for one week in June 1981 was 50, 14, 6, and 6, respectively. The aircraft in service is BAC 1-11.

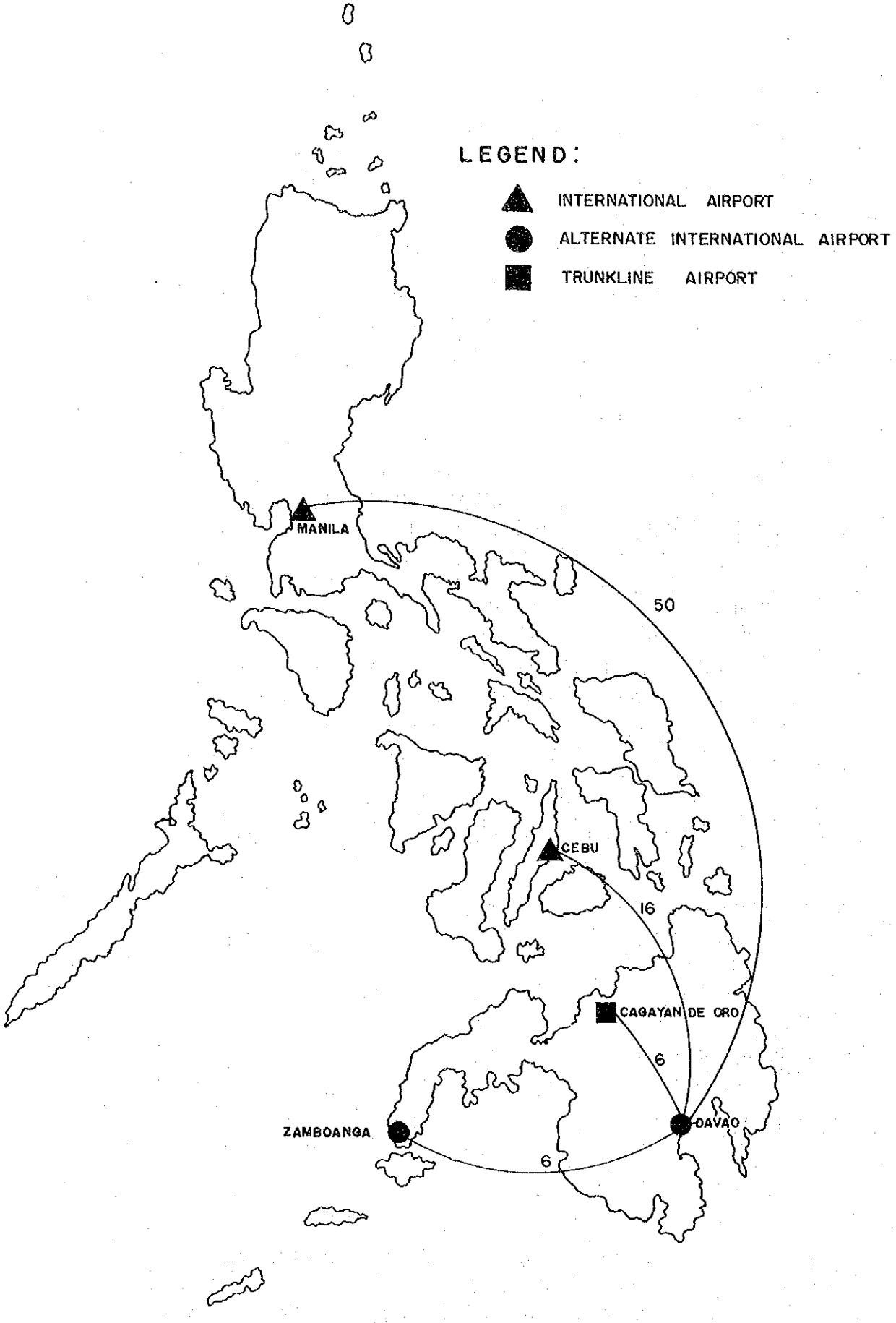


Figure 2.3 Number of Frequencies per Week as of June 30, 1981

Table 2.20 Facilities of Bangoy Airport

	Dimension	Remarks
Runway	2.154 m x 36 m	Concrete Paved
Taxiway	66 m x 21 m	Concrete Paved
Apron	200 m x 100 m	Concrete Paved
Terminal Bldg.	1,600 m^2	2 – 5 Storey

Source: Profile of Davao City, 1979 and RCDP Report

(3) Telecommunication

Two telephone companies currently operate in Davao City: the Davao City Telephone System (DCTS, a Davao City government enterprise), with a total subscribers of 3,950 and a waiting list of about 1,500 scattered in a relatively wide area of about 20 square kilometers, and the Philippine Long Distance Telephone Company (PLDTC), which enjoy the monopoly of long distance lines and has a total subscribers of 7,700 practically all concentrated in a relatively narrow area of Poblacion and the vicinity.

Problems that need to be remedied are the total absence of coordination or exchange between these two telephone companies and their insufficient facility development efforts that have lagged behind swell in the demand, as it is reflected the very large number on their waiting lists in comparison with the number of their subscribers.

Table 2.21 Number of Existing and Wait-Listed Subscribers of Davao City, 1979

	No. of Subscribers	
	Existing	Wait-Listed
The Davao City Telephone System	3,950	1,500
The Philippine Long Distance Co.	7,700	1,700
Total	11,650	3,200

Source: RCDP Report

2.5.3 Utilities and Housing

(1) Electric Power

In Davao City electric power is being supplied from three sources: Bajada Diesel Power Plant owned by the Davao Light and Power Company (DLPC), and Mintal Hydro Plant and Maria Cristina Hydro-Electric Plant both owned by the National Power Corporation (NPC).

The rated capacity of Bajada Plant is 58,700 kilowatts, but, because five or six of the total 13 power generators are usually inoperative due to some mechanical troubles, its actual capacity is only about 25,000 kilowatts. Mintal Plant is of a little importance with a small power generating capacity of only about 3,000 kilowatts and serving only Tugbok District and the vicinity. Maria Cristina Plant has been supplying up to 45,000 kilowatts of power to Davao City since December 1979, when it was connected with and became a nodal point on the Mindanao Power Grid, which was being developed by NPC to cover the entire island of Mindanao.

Before Maria Cristina Plant started to supply power, the power demand of Davao City, which was estimated at about 50,000 kilowatts, could not be fully supplied and a black-out or "brownout" of eight to 10 hours each day was quite common. This total power shut-off or inadequate power supply continuing for a certain period of time almost every day constituted a serious bottleneck to the industrial activities in Davao City.

Table 2.22 **Monthly Average Electricity Consumption, Davao City, 1977**

	No. of Customers	Electricity Consumption (KWH/month)	Share in Consumption (%)	Ave. Electricity Consumption per Customer (KWH/month/cust.)
Residential	34,390	3,567,823	21	104
Commercial	9,010	2,247,317	13	249
Industrial	745	10,160,711	60	13,639
Other	49	998,490	6	20,377
Total	44,194	16,974,341	100	384

Source: Profile of Davao City, 1979

(2) Water Supply

Deep wells in Dumoy, which produce water with a quality that is potable without treatment, are the source from which the Davao City Water District (DCWD) supplies water to 35% of the City inhabitants. The remaining 65% of the inhabitants depend on

private wells, rain falls, water peddlers, and truck transportation for water. Although the Dumoy wells were known in 1980 to have a total reservoir of about 7.5 million tons, therefore, can be further exploited, DCWD water system expansion project has been discontinued after reaching from Poblacion to Agdao in north; further extension of this project is strongly demanded.

The securing of water supply to Panacan is very important in order to support the large number of factories operating there, but, in consideration of the distance between Dumoy and Panacan, it will be necessary that new water sources be sought for in the vicinity of Panacan for this purpose.

(3) Flood Control, Drainage, and Sewer System

Drainage facilities are totally inadequate in Davao City. Aside from the revetments of the Davao River for a total extension of only about one kilometer and drainage culverts for a total extension of only a several hundred meters, draining totally depends on open ditches, which are ill-managed and are often non-functional due to the accumulation of dirt and trashes. A number of areas in the City have not even open ditches.

As a result, Davao City often suffers from flooding. Particularly in such parts of Poblacion as areas along Sta. Ana Avenue and those along C.M. Recto Avenue, as well as in areas along the Davao River and in the upstream Calinan, even light rain falls often result in flooding. Therefore, the lack of adequate drainage system is one of the most serious problems facing Davao City and must be remedied urgently in order that the health and properties of the inhabitants be protected.

(4) Waste Disposal System

While rainwater, sewage, and industrial waste water (including sludge) are discharged through the drainage "system" discussed in the above, solid wastes are either incinerated or collected and carried to a dump by a dump truck.

Trash (solid waste) collection and disposal by the Refuse Control Division (RCD) of the City's Department of Public Services covers only Poblacion and a number of surrounding subdivisions and is enjoyed by only about one-half of the City's population. The RCD service is available only in Poblacion and the surrounding commercial districts. In markets and almost all of subdivisions, only one trash collection station is provided for each market or subdivision. An estimated 80 or 100 tons of trash is daily collected, carried by dump trucks, and discarded without any treatment in Ma-a by RCD, and sanitation condition is extremely undesirable in the vicinity of the dump area.

The remaining one-half of the City inhabitants who live in areas where RCD service is not available depend on private service or subdivisional cooperation for the collection and disposal of their trash.

(5) Housing

The 1970 census revealed that a total of 63,844 dwelling houses existed in Davao City, of which 56% were in rural areas, and that, of this total, 43,975 were owner's houses, of which 68% were in rural areas. In urban areas, owner's houses counted 13,870 and rented houses, 10,631. Owner's houses represent a greater ratio to total houses in rural areas than in urban. Independent houses accounted for 85% of all houses

in the City, but this ratio was only 75% in urban areas, where the remainder were apartment houses or those combined with stores or shops.

In the absence of housing data from the 1975 census, it is believed that housing is in a fair shortage in view of the Davao City Engineer's Office survey finding that only 5,476 units of houses were built between 1970 and 1975, while the number of households increased by 16,860. An important housing problem in addition to quantity shortage is qualitative one that a large number of existing houses are too old. Due, however, to the difficulty of complete reconstruction from financial reasons, most of such old houses are being subjected to partial makeshift repairs with only few of them being completely remodelled. Besides, as many as 52% of all homes use kerosene rather than electricity, 61% utilize rainwater, and 19% have no toilet facility. The citizens' living condition cannot be said desirable.

A serious problem in Davao City in connection with housing is that as many as 12,529 squatter families occupy land spaces of 412 hectares in 40 districts. Davao City authorities are making efforts to resettle these squatters to Panacan or Mintal. Such resettlement program alone will be short of completely solving the problem, and, in realization of the need of policy action to create employment opportunities along with their resettlement, "slum area improvement projects" (such as SIR Project and BLISS Project) are being implemented for the concurrent construction of houses and public facilities.

Private housing development activities are fairly high in Davao City. In 1978, 29,983 housing lots for a total land space of 2,127 hectares were developed in 121 housing areas. Such activities are particularly vigorous in areas surrounding Poblacion, such as Talomo and Buhangin. However, dwelling house construction increased by an annual average rate of only 1.7% from 1970 to 1975 partly due to the fact that increase in construction material cost was faster than increases in the income of the citizens. Private housing development taking place at scattered locations away from arterial roads in a haphazard fashion adds to the problem of securing various services for the inhabitants and to public investment burden. Therefore, it is desired that housing development will be accomplished by public organizations under well-developed plans.

2.5.4 Social Service Facilities

(1) Educational

Davao City enjoys an abundance of high quality educational facilities. The average number of primary school children of 28 per teacher (1977/1978 school year) in Davao is far better than the national average of 40 per teacher. Similarly high standards are shown by secondary (high schools) and tertiary (colleges/universities) educational facilities. The standard is particularly very high of college level education, to which students are attracted not only from within the City but also from every quarter of Mindanao.

The real problem in the area of education is not school education itself but is what comes from the society, or the receptacle of the product of education. That is, few jobs are available within the City by which school graduates may further develop and refine what they have learned and acquired in the school, and disappointed young workers are being attracted away to Manila, the United States, or Europe.

Table 2.23 Number of Educational Facilities and Pupils/ Students, Davao City, 1977 / 1978

	Number of Educational Facilities			Number of Pupils/Students
	Public	Private	Total	
Elementary	228	20	248	98,934
Secondary	22	26	48	39,336
Tertiary	2	23	25	26,152
Vocational/Technical	1	9	10	2,541
Total	253	78	331	166,963

Source: Ministry of Education and Culture

(2) Medical

Sanitation is not very good in Davao City, judging from the assortment of diseases with high incidence. According to the 1977 statistics of the City's Health Department in the descending order of incidence, these diseases are: pneumonia, gastro-enteritis, amoebic dysentery, pulmonary tuberculosis, influenza, bronchitis, typhoid fever, measles, El Tor (cholera) vibrio, and malaria.

In Davao City presently there are two public hospitals with 600 beds in total and seven private hospitals with 865 beds. Average number of inhabitants per hospital bed was about 650 in 1979, which was three times better than the national average of 2,000 persons per bed. These hospitals are supplemented by health centers established in about 30 barangays and private clinics.

Although the number of medical facilities existing in Davao City is statistically adequate, the problem lies in the fact that little medical service is available to rural inhabitants, because such facilities are mostly concentrated in Poblacion and ambulances for the emergency transportation of patients to hospitals in Poblacion are in shortage.

(3) Police and Fire Protection

It is claimed that crime rate is lower in Davao City than in other cities of the Philippines. The claim is right if the discussion is limited to larceny and other similarly minor crimes, but the incidence is not necessarily low of serious crimes such as bus raiding and incendiarism by guerrilas.

The numbers of policemen and police outposts in Davao City are below, by fair margins, the Philippine standards of one policeman per each 800 inhabitants and one outpost per each 10,000 inhabitants. The strengthening of Davao police force and the establishment of additional outposts are in urgent need.

Upon information of the outbreak of a fire, a fire truck can be dispatched from the Central Fire Station near Sta. Ana Pier or from one of three substations located in Bangoy, Lanang, and Toril to any point in Davao City within a matter of several minutes. This fire fighting system, however, functions only incompletely due to two reasons. First, fire trucks and fire fighting apparatus are old and ill-maintained, and they often fail to properly function. Of the total 22 fire trucks assigned to these fire station/sub-stations, only six are fully operative. Secondly, public alarm stations established at 50 locations in the City are all out of order, and, therefore, fire information inevitably depends on telephone system, but not only the number of telephones available but also the number of telephone lines is limited and lines are usually too busy to serve this emergency purpose.

CHAPTER 3 INTERCITY TRANSPORT SYSTEM

Tables and Figures

CHAPTER 3

INTERCITY TRANSPORT SYSTEM

3.1 General

3.1.1 Transportation in the Philippines

Road, railway, marine, and air transportation constitute the transport system of the Philippines. In this nation, which comprises thousands of islands of varying sizes, inter-island traffic inevitably depends almost entirely on marine and air transportation, the only inter-insular land (road/railway) transportation currently being that between Leyte and Samar via the bridge. It is expected, however, that land transportation will gain a fair share of inter-insular traffic when the Pan-Philippine Highway is constructed to cover all the way from Luzon to Mindanao. Short distance inter-island passenger movements are predominantly by marine transportation, and long distance, by air, while practically all goods conveyed between islands are by marine transportation.

The mode of intra-island transportation varies by the areal size and population of the island, industrial and road development levels in the island, and other factors. Generally speaking, small (size/population) islands depend on marine transportation, while larger islands show greater reliance on land transportation. Air transportation is often utilized even for intra-island travels by passengers on the two major islands of the Republic—Luzon and Mindanao. Nevertheless, land and marine transportation remain to be the standard modes of transport in the nation as a whole.

A national inventory of transport facilities as of 1978 included roads for a total length of approximately 125,000 kilometers (of which 22,600 kilometers were national roads), railroads for a total length of 930 kilometers (all on Luzon Island), 832 sea ports (some three-quarters each of passengers and goods were concentrated to 18 of these ports), 206 airports (of which 83 were state-owned, and 4 of the 83 were international airports).

Yearly growths in total road length and their breakdown by administrative classification are presented in Table 3.1.

Table 3.1. Road Development, the Philippines, 1969 - 1978

YEAR	NATIONAL ROADS (km)	PROVINCIAL ROADS (km)	CITY ROADS (km)	MUNICIPAL ROADS (km)	BARANGAY ROADS (km)	FEEDER ROADS (km)	TOTAL (km)
FY 1969	18,540	23,312	5,232	16,176		16,176	63,260
FY 1970	19,198	25,219	6,254	16,854		10,424	77,950
FY 1971	20,066	27,879	6,805	18,781		13,714	87,246
FY 1972	21,315	28,103	6,714	18,636		13,714	88,483
FY 1973	21,415	28,123	7,397	19,444		16,651	93,030
FY 1974	21,516	28,144	8,340	21,561		18,769	98,330
FY 1975	21,665	28,175	2,680	7,512	44,399		104,430
CY 1976	21,796	28,186	2,726	7,902	52,271		112,881
CY 1977	22,333	28,224	3,004	9,141	56,518		119,220
CY 1978	22,600	28,243	3,133	9,793	61,366		125,135

Note: FY – Fiscal Year, CY – Calendar Year

Source: MPWH

Of the total 125,135-kilometer road length as of 1978, approximately 20% were paved, about 50% were gravel-surfaced, and about 30% were dirt-surfaced (most of barangay roads). Twenty percent of newly constructed roads are being concrete paved, 10% asphalt-paved, and 7% gravel-surfaced. The pavement ratio continues to rise steadily under Ministry of Public Highways objective to pave all national roads with an ADT of 400 vehicles or more.

3.1.2 Transportation in Mindanao

In Mindanao Island, where roads have not yet been developed to facilitate the formation of an integral economic interaction to cover the entire territory of the island, the mobility of passengers and goods is still limited. This constitutes the islands decisive difference from Luzon Island, whose parts are closely linked with each other and with Metro Manila by road transportation. Traffic in Mindanao Island can be characterized and contrasted against that in Luzon Island as follows:

i) Roads are yet to be developed. The ratio of paved roads is low and their condition is poor as shown in Table 3.2. No railway exists on the island.

ii) Traffic is chiefly confined to the boundary of each of the several isolated economic spheres which exist centering around such major cities on the island as Davao,

Cagayan de Oro, and Butuan. For traffic between these economic spheres, road transportation is chiefly relied upon for short distances, with increased reliance on marine transportation for longer distances and for goods conveyance than for passenger travel. In any event, these economic spheres have a greater communication with Metro Manila and other non-Mindanao locations than with each other. In other words, Mindanao consists of "islands" of economies, rather than being an integral insular economy of its own.

Table 3.2 Road Conditions in Mindanao in Comparison with LUZON, 1977

(Unit: Km)

	MINDANAO				LUZON			
	Good	Fair	Bad	Total	Good	Fair	Bad	Total
Gravel	297	1,328	1,925	3,548	138	1,571	1,753	3,462
	(6)	(27)	(39)	(71)	(2)	(22)	(25)	(50)
Bituminous Surface Treatment	31	79	33	143	24	345	113	482
	(1)	(2)	(1)	(3)	(0)	(5)	(2)	(7)
Asphalt Concrete	19	142	76	237	428	460	396	1,284
	(0)	(3)	(2)	(5)	(6)	(7)	(6)	(18)
Cement Concrete	970	71	12	1,053	1,292	282	191	1,765
	(19)	(1)	(2)	(21)	(18)	(4)	(3)	(25)
TOTAL	1,317	1,618	2,046	4,981	1,882	2,658	2,453	6,993
	(26)	(32)	(41)	(100)	(27)	(38)	(35)	(100)

Note:
1) Mindanao comprises Regions IX A, IX B, X, XI and XII while Luzon is composed of Regions, I, II, III, IX A and XI B.
2) Good: flat, regular non-skid surface, fair: slightly uneven surface with light damage patched or cracked up to 20% surface patched or cracked.
3) Barangay roads and other less important roads are not included.

iii) Road traffic volume is small. The large ADT volume observed on Bankerohan Bridge in Davao City of about 30,000 vehicles is nothing unusual in Metro Manila, where ADT is as heavy as about 100,000 vehicles in EDSA, Taft, P. Burgos, and so forth. Inter-city traffic shows even a greater contrast between the two islands; the ADT of approximately 2,000 vehicles counted between Davao and Digos, a nearby city, during the 1976 NTSS Team Traffic Survey, ranked among heavy ADT's in Mindanao, where most of trunk roads had an ADT of only less than

1,000 vehicles, whereas, in Luzon Island trunk roads in provinces near Metro Manila showed an ADT of 10,000 to 20,000 vehicles and many other trunk roads, several thousands.

3.2 Road Transport in Mindanao

3.2.1 Passenger Transport

(1) General

For passenger transportation in Mindanao, jeepneys play an important role for short distance travels and buses for long distance. The traffic counts taken at various points in Region XI by the Ministry of Public Highways in 1976, summarized in Table 3.3, show that:

i) Passenger cars and jeepneys have greater shares in urban areas, while

ii) Buses and trucks have greater shares in rural areas (it is assumed that trucks are used for moving not only goods but also passengers for short distances).

The trip length of jeepneys is usually short, as reflected by the fact that their activities are concentrated in urban areas. Even in the case of those which come in and out of Davao City, the longest routes end at Panabo (about 35 kilometers from Davao) in the north and at Digos (about 50 kilometers) in the south. The trip length of trucks is also short, although the frequency of their use is high in rural areas, inasmuch as they are chiefly used for carrying forest and plantation workers.

It can be concluded from above that inter-city passenger transportation depends almost entirely upon buses – particularly long distance buses called "provincial buses."

Table 3.3 Summary of Traffic Count in Region XI, 1976

	RURAL	URBAN	TOTAL
Light Vehicle	41%	50%	46%
Jeepney	24	37	32
Bus	12	4	7
Truck	23	9	15
Total	100	100	100
Total Vehicle Counted (000)	10	15	25

Source: MPWH

(2) Passenger Flows via Provincial Buses

An outline of passenger flows in and out of Region XI, which encompasses Davao City, may be understood from the only available data on such flows via provincial buses as revealed by the 1976 NTSS Survey. First, inter-regional movements are summarized in Table 3.4.

Table 3.4 Bus Passenger Trip among Mindanao Regions, 1976, (Trips/Day)

ORIGIN	IXB	X	XI	XII	TOTAL ORIGINS	% SHARE
IXB	0	6	3	3	12	0
X	30	1,372	948	796	3,147	30
XI	11	832	4,538	711	6,092	56
XII	76	959	242	228	1,505	14
TOTAL DESTINATIONS	117	3,169	5,731	1,738	10,756	100
% SHARE	1	29	54	16	100	

Note: Figures above are numbers of samples taken
Source: N.T.S.S.

The above table supports the following comments:

i) Movements between points within same region represent more than half, or 57%, of total trips. The share of intra-regional travels to total is particularly high in Region XI, in which Davao City exists.

ii) The few intra-regional trips registered in Region XII is explained by the discouraging road conditions between the northern and southern parts of the region and the poor security in the region.

Region XI (which includes Davao City) shows a limited road traffic going to the adjoining regions, which is more or less true with all regions of Mindanao. On this island, road transportation activities are confined to each of relatively small isolated traffic spheres centering around such major cities as Davao, Cagayan de Oro, and Butuan.

Inter-provincial passenger flows via provincial buses have been translated into an OD table as shown in Table 3.5. Despite said limitations of the data and the fact that the data is based on samples, and, therefore, unreliable in terms of absolute values, the following are indicated.

i) Passenger flow is most vigorous around Davao City, such as in Davao del Sur and Davao del Norte. The radius of influence of Davao City extends beyond the boundary of Region XI but reaches only to parts of Maguindanao of Region XII, Agusan del Norte of Region X, and so forth.

ii) Next vigorous passenger flow is seen in Misamis Oriental of Region X, which encompasses Cagayan de Oro. Cagayan de Oro has much communication with Iligan (Lanao del Norte).

iii) Agusan del Norte, which encompasses Butuan, is to be mentioned as the third. Butuan and the vicinity have much communication with Davao and Cagayan de Oro and together function as a node of provincial bus transportation in Mindanao.

Table 3.5 Bus Passenger Trip Among Mindanao Provinces, 1976 (trips/day)

	FROM \ TO	ZAMBO. N.	ZAMBO. S.	AGUSAN N.	AGUSAN S.	BUKIDNON	MISAMIS OCC.	MISAMIS OR.	SURIGAO N.	S. COTABATO	DAVAO N.	DAVAO S.	DAVAO OR.	SURIGAO S.	LANAO N.	LANAO S.	MAGUINDANAO	N. COTABATO	SUL. KUD.	TOTAL
IX B	ZAMBOANGA DEL NORTE			1	1							1		1						4
	ZAMBOANGA DEL SUR				1		1	1	1					1	2	1				8
X	AGUSAN DEL NORTE	1	3			13	2	366	90	15	78	250	6	271	21	11	4	5	1	1,392
	AGUSAN DEL SUR			29		1		6	2	4	5	29	2	33	1		2	3		117
	BUKIDNON		2	9			8	9	5	2	1	11		1	23	5				76
	MISAMIS OCCIDENTAL		1	2					1		2		1		4					11
	MISAMIS ORIENTAL	3	21	269	19	1	79		38	9	15	71	2	8	623	85	3	1	1	1,248
	SURIGAO DEL NORTE			147	10		1	10		2	2	14	1	113	2		1			303
XI	SOUTH COTABATO			18	16	2	2	16	6		31	499	15		2	8	2	11	15	643
	DAVAO DEL NORTE	1		178	37			2	2	55		1,388	198	6	3		12	43		1,925
	DAVAO DEL SUR	6	3	218	132	7	5	40	28	466	945		533	31	16	3	111	473	5	3,022
	DAVAO ORIENTAL			8				1	5	9	110	234					1	4		372
	SURIGAO DEL SUR	1		69	23		1	4	11	1	2	4	2			1		1		130
XII	LANAO DEL NORTE	8	65	17	2	51	112	730	13	3	2	19		2		8	2			1,034
	LANAO DEL SUR			8				1		2		1		1						13
	MAGUINDANAO			9	3			2	2	93	10	81	2		2	2		148	62	416
	NORTH COTABATO		3	2				3	1	1	9	5	7	1	1		3			36
	SULTAN KUDARAT				3						1	1		1						6
	TOTAL	20	98	984	502	75	211	1,191	206	661	661	1,213	769	470	700	124	141	689	122	G. Total 10,756

Source: NTSS

(3) Provincial Bus Operation in and around Davao City

Approximately 20 provincial bus operators are in business currently in Davao City, serving in two directions, north and south, from terminals at Bankerohan, Magsaysay, San Pedro, or Agdao in Poblacion. The number of runs of provincial buses of these operators to each destination are shown in Table 3.6.

The shortest northbound route is that which terminates at Tagum (approximately 40 kilometers) and the longest, at Cagayan de Oro (about 400 kilometers).

Most of the routes remain within Davao del Norte and Davao Oriental of Region XI, but about 30% of them go to Cagayan de Oro, Butuan, or Surigao.

The shortest southbound route is that which ends at Digos (about 50 kilometers) and the longest, at Cotabato (about 200 kilometers). The shortest of provincial bus routes—both north bound and south bound alike— is longer than the longest of jeepney routes, and this shows a clear division of function between modes of transportation by route distance. Among southbound routes, Davao shows the heaviest communication with Maguindanao Province of Region XII (with about 50% of total bus runs), followed by Davao del Sur and South Cotabato Provinces of Region XI.

Although direct comparison is unreasonable due to dissimilar methods, the above data shows somewhat greater inter-regional passenger flows than that of the NTSS data, provided that they agree in the finding that the radius of influence of Davao City is limited to portions of the southeastern and northern parts of Mindanao Island. (For further detail, see Chapter 7)

3.2.2. Goods Transport

(1) General

The transportation of goods on Mindanao Island is all performed practically by such cargo vehicles as vans/pick-up trucks, light trucks, heavy trucks (including truck-trailers), with few goods carried by jeepneys or provincial buses. These cargo vehicles represent approximately 30% of the total volume of goods flow in entire Mindanao (vans/pick-up trucks representing 12%, light trucks, 17%, and heavy trucks, 1%), but this ratio is low at about 15% in areas where economic activities are high, such as in Region XI. (See Table 3.3)

Light trucks (average capacity of 6.6 tons) count the largest of all cargo vehicles, followed by vans/pick-up trucks (average capacity of 1.5 tons). Heavy trucks (average capacity of 11.2 tons) are very few in number. In consideration of traffic volume and per-vehicle capacity, therefore, it can be asserted that the majority of goods are carried by light trucks. The average loading factor of cargo vehicles is 65%, but that of vans/pick-up trucks is low and that of heavy trucks is high. Said average factor is, however, about 10% lower than such average factor in Luzon Island, indicating that goods transportation demand is still not so large in Mindanao Island.

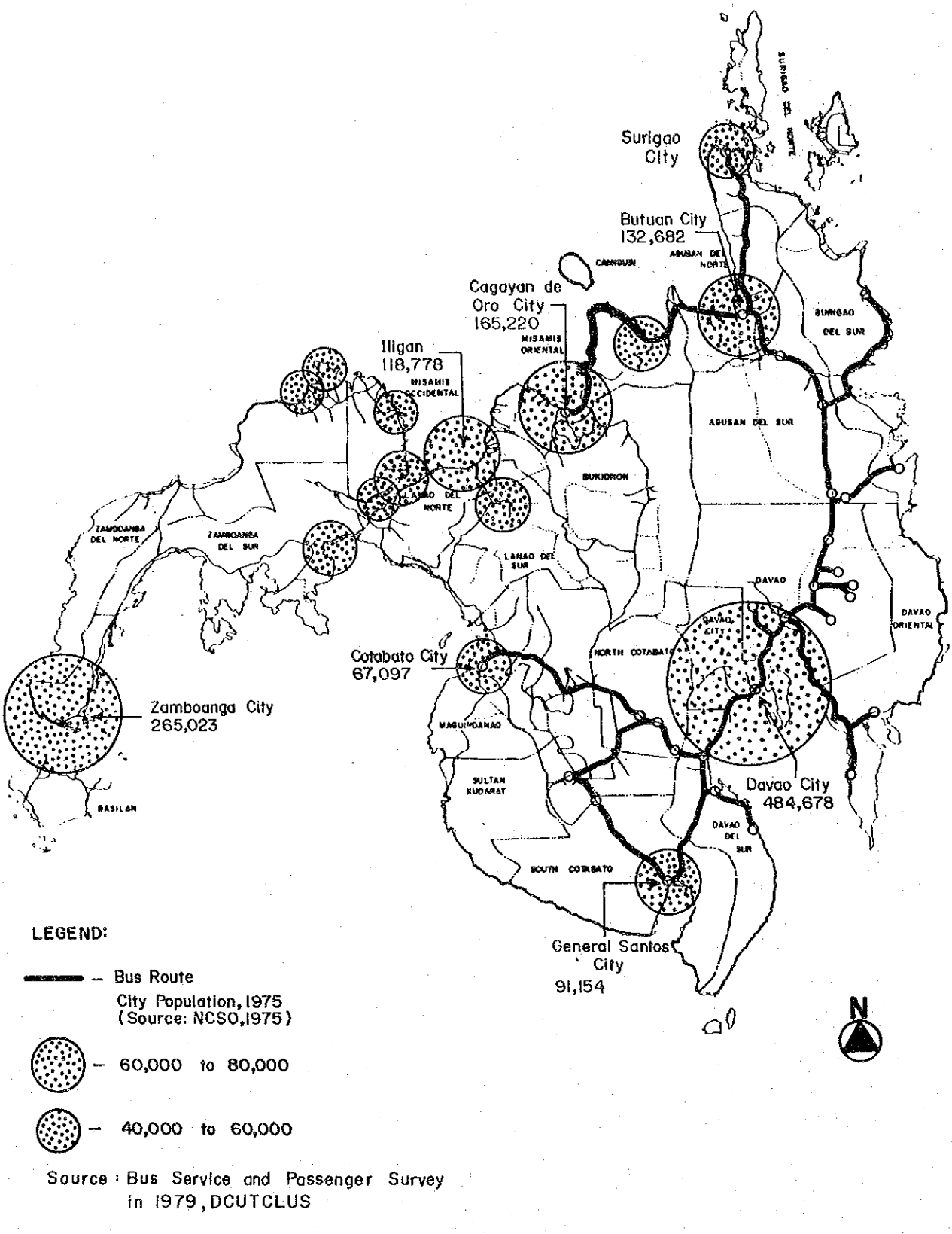
The length of cargo vehicle trips is generally greater than that of passenger vehicle trips. The large proportion of total volume of goods which cargo vehicles represent in rural areas is not only because of small number of passenger vehicles in such areas, but also because of the long cargo vehicle trip length.

Overloading of cargo vehicles is less severe than in Luzon Island but is quite common in Mindanao, where large trucks loaded up to about 250% of capacity are not

Table 3.6 Frequency of Provincial Bus Service from Davao City by Destination, 1979

DESTINATION	DAILY NUMBER OF DEPARTURES	ESTIMATED NUMBER OF PASSENGERS PER DAY AND PER DIRECTION
NORTH BOUND		
Cagayan de Oro	57	1,122
Tagum	41	902
Sto. Tomas	40	880
Mati	37	814
Butuan	23	506
Compostela	21	462
New Bataan	15	330
Monkayo	13	286
Mangagoy	13	286
Segaboy	6	132
Nabunturan	6	132
Surigao	3	66
Masara	2	44
Camanlangan	2	44
Tandag	1	22
TOTAL	274	6,028
SOUTH BOUND		
Miral	75	1,650
Cotabato	69	1,518
General Santos	51	1,254
Malita	51	1,122
Kidapawan	37	814
Digos	32	704
Marbel	30	660
Tacurong	23	506
Malalag	16	352
Maitum	3	66
TOTAL	393	8,645
GRAND TOTAL	667	14,674

Source: Bus Service and Passenger Survey in 1979, DCUTCLUS



Source : Bus Service and Passenger Survey in 1979, DCUTCLUS

Figure 3.1 Routes of Provincial Bus to/from Davao

rare. The overloading practice is believed chiefly attributable to the fact that current tariff of ₱0.40 to 0.50 per ton per kilometer (although official tariff established by BOT is ₱0.50 to 0.60/ton/kilometer) is, at the loading factor of 100%, barely enough to pay for the estimated running expense of ₱0.30 per ton per kilometer.

Table 3.7 Loading Characteristics of Good Vehicles, Mindanao 1975

VEHICLE TYPE	SHARE IN TOTAL VEHICULAR TRAFFIC (%)	AVERAGE LOAD (tons)	AVERAGE CAPACITY (tons)	LOADING FACTOR	SHARE IN TOTAL GOODS TRANSPORTED (%)
VAN/PICK-UP	12	0.5	1.5	0.36	5
LIGHT TRUCK	17	4.5	6.6	0.69	85
HEAVY TRUCK	1	8.6	11.2	0.77	10
TOTAL	30	3.0	4.7	0.65	100

Source: N.T.S.S.

(2) Goods Flow in Mindanao

The 1975 NTSS Survey findings is the only data available also on goods flow in Mindanao. Inter-regional goods flow is shown in Table 3.8.

The flows indicated for Regions X and XI represent 38%and 43%, respectively, of the total goods flow in Mindanao, showing that economic activities are high in these regions. The flow of goods is particularly vigorous in and around Cagayan de Oro of Region X and Davao of Region XI.

The situation noted with regard to passenger flow via provincial buses is also true but is even more apparent with regard to goods flow via cargo vehicle — more apparent because goods flow more heavily depends on marine, rather than road transportation than does passenger flow, the total volume of inter-regional goods flow via road transportation is smaller than that of intra-regional flow. Improvement of roads and security level in Mindanao will result in a higher share of road transportation in total goods flow.

The greatest inter-regional good flow of 872 tons per day is seen between Regions XI and XII, followed by 623 tons per day between Regions X and XII and 359 tones per day between Regions X and XI. Almost no goods flow via road transportation is seen in and out of Region IX, which heavily relies on marine transportation because of very poor road conditions.

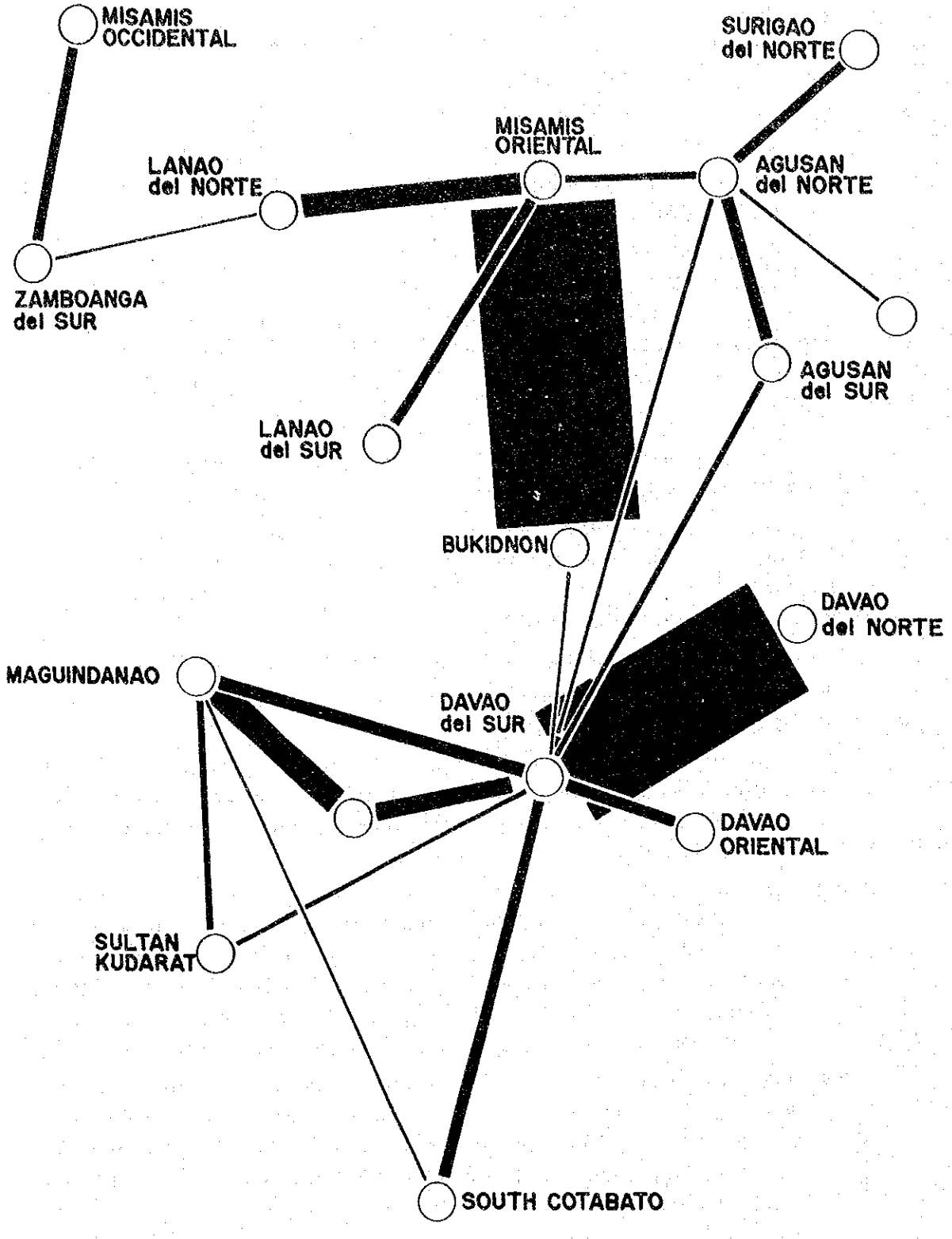
In comparison to the intra-regional goods flow of 88% of total, intra-provincial goods flow is only 46% of total.

Davao del Sur and Misamis Oriental occupy substantial shares of total inter-provincial goods flow. The former encompasses Davao City and the latter, Cagayan de Oro, but both show greater volumes of influx than outflow, presumably because of large volumes of agricultural products shipped out via the ports and of high consumption in these cities. In terms of share in interprovincial goods flow, these two provinces are followed by Bukidnon and Davao del Norte, but the volume of outgoing goods from these provinces is greater than incoming, both shipping out more than 1,000 tons per day of goods each, Bukidnon to Misamis Oriental and Davao del Norte to Davao del Sur. These two channels represent a large volume of goods flow, all other inter-provincial channels in Mindanao being insignificant with only less than 500 tons per day each. (See Fig. 3.2.)

Table 3.8 Regional Goods Flows in Mindanao, 1975 (tons/day)

REGION	INTRA-REGIONAL FLOW	OUTGOING FLOW	INCOMING FLOW	TOTAL FLOW
IX	791	131	63	888
X	5,255	485	642	5,819
XI	6,181	430	679	6,735
XII	1,372	851	513	2,054
TOTAL	13,599	1,897	1,897	15,496

Source: NTSS



Source: NTSS

SCALE:
(1 mm.) = 100 TONS / DAY

Figure 3.2 Inter-Provincial Goods Flow in Mindanao, 1975

A number of provinces show no goods flowing in from or out to some other province in the same region. Typical pairs of such provinces are:

Maguindanao – Lanao del Norte/Sur
Surigao del Sur – Davao del Norte/Sur
Zamboanga del Norte – All other Provinces

The indicated total absence of inter-provincial goods flow is attributed mainly to underdeveloped roads and poor security.

Of the items of goods transported, agricultural products represent an overwhelming majority – 60% of more of goods flowing into Davao City or Cagayan de Oro City. In general, agricultural and forestry products and mineral ores constitute a majority of goods flowing from rural areas to urban, while construction materials, processed foods, and agricultural products are the mainstream flowing in the opposite direction.

(3) Goods Flow in and around Davao City

The 1975 NTSS Commodity Flow Survey utilized two survey stations in Davao City: Tibungco on Davao-Agusan Road and Matina on Davao-Cotabato Road.

The re-tabulations of the prime data obtained through this Survey are presented in Table 3.9. It should be noted that the values shown on this Table, which present a cross-section of goods flow between Tibungco and Matina, do not necessarily represent inter-provincial long distance trips.

Goods flow in and around Davao City may be characterized as follows:

i) Influx is more than double the volume of outgoing goods – a trend similarly shown by inter-provincial goods flow.

ii) Goods flow is greater to and from north than flow to and from south. Outflow volume is about the same in both directions, but influx from north reaches 1.5 times that from south, making the total flow to and from north 1.3 times that of total southern flow.

iii) Agricultural and forestry products–such as fruits, vegetables, coconuts, copra, and timbers–represent a majority of goods flowing from both north and south as a general trend. Aside from this trend, unique product flowing from north is mineral ores from Davao del Norte or Davao del Sur (Davao City) and that from south is beverages shipped from bottling plants in the vicinity of Talomo or Dumoy in Davao City, the hauling distance being rather short in both cases.

iv) Industrial products – such as chemical products, cement, and petroleum products – represent a majority of goods flowing to both north and south. A fair volume – although less than influx – of agricultural and forestry products is being shipped out from Davao City, suggesting that Davao is performing the function of a sort of distribution center.

v) The origins and destinations of goods flowing to and from Davao City are concentrated in neighboring provinces such as Davao del Sur, Davao del Norte, and South Cotabato, making the distance of transportation rather short.

vi) Light trucks with a capacity of 6 to 7 tons are most commonly used, but the utilization of vans/pick-up trucks is high for the transportation of meats, tobacco

products, textile products, and electric appliances and that of large trucks (11 to 12 tons) is high for the transportation of coconuts, timber, cement, non-ferrous metal construction materials, and beverages.

Table 3.9 Goods Flow in Davao City

Goods Item	No. of Vehicles/Day			Tonnages/Day			No. of Vehicles/Day			Tonnages/Day		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Palay	25	5	30	132	23	155	36	6	42	207	25	232
Rice	39	39	78	46	108	154	39	11	50	188	18	206
Unmilled Corn	22	24	46	64	53	117	83	12	95	391	38	429
Milled Corn	56	10	66	46	42	88	20	2	22	63	10	73
Other Cereals	7	–	7	44	–	44	1	1	2	4	–	4
Fresh Fruits and Vegetables	304	50	354	1,076	179	1,255	158	13	171	307	14	321
Coconut and Copra	266	3	269	1,192	11	1,203	182	21	203	1,071	134	1,205
Fresh Fruits and Other Marine Products	11	30	41	7	10	17	15	14	29	9	11	20
Livestock and Poultry	71	7	78	45	4	4	42	8	50	62	4	66
Abaca and Abaca Products	28	–	28	106	–	106	6	2	8	16	1	17
Tobacco	–	–	–	–	–	–	1	–	1	3	–	3
Sugar Cane	–	–	–	–	–	–	1	–	1	4	–	4
Logs and Other Forest Products	127	8	135	422	10	432	41	35	76	177	129	306
Other Agricultural	–	4	4	–	1	1	5	5	10	22	5	27
Processed Food	24	229	253	16	96	112	26	79	105	33	89	122
Sugar and Sugar Products	6	15	21	6	2	8	13	17	30	124	126	250
Animal Feeds	71	9	80	97	21	118	8	17	25	23	61	84
Beverage	14	118	132	49	548	597	223	35	258	1,288	115	1,403
Tobacco Products	–	31	31	–	41	41	4	13	17	1	16	17
Cement	7	41	48	10	235	245	5	30	35	43	183	226
Processed Timber	97	63	160	350	197	547	20	56	76	79	202	281
Chemical Products	35	57	92	15	134	149	22	46	68	99	75	174
Paper Products	–	15	15	–	6	6	1	8	9	–	8	8
Empty Containers	73	32	105	297	43	340	20	68	88	70	164	234
Washing nnd Cleansing Products	17	57	74	5	26	31	12	28	40	7	35	42
Fertilizer	1	19	21	15	80	95	2	15	17	2	71	73
Non-Metal Construction Materials	22	4	26	127	4	131	39	27	66	216	178	394
Minerals	238	–	238	2,520	–	2,520	–	1	1	–	1	1
Petroleum Products	32	86	118	26	298	324	13	72	85	64	326	390
Metal and Metal Products	2	48	50	11	52	63	1	29	30	–	24	24
Machinery and Transport Equipment	7	23	30	32	19	51	6	34	40	8	126	134
Electrical and Mechanical Appliances	25	19	44	5	4	9	4	13	17	2	3	5
Textile and Wearing Apparel	32	40	72	3	17	20	8	19	27	23	9	32
Other Industrial	34	71	105	1	17	18	7	29	36	1	4	5
Total	1,694	1,157	2,851	6,765	2,281	9,046	1,064	766	1,830	4,607	2,205	6,812

Source: Recompiled from NTSS Data