JAPAN INTERNATIONAL COOPERATION AGENCY

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
THE REPUBLIC OF THE PHILIPPINES

THE FEASIBILITY STUDY OF THE FLOOD CONTROL PROJECT FOR THE LOWER CAGAYAN RIVER IN THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

VOLUME III-1

SUPPORTING REPORT

ANNEX I	SOCIO-ECONOMY
ANNEX II	TOPOGRAPHY
ANNEX III	GEOLOGY
ANNEX IV	METEO-HYDROLOGY
ANNEX V	ENVIRONMENT
ANNEX VI	FLOOD CONTROL

FEBRUARY 2002

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List of Volumes

Volume I : Executive Summary

Volume II : Main Report

Volume III-1 : Supporting Report

Annex I : Socio-economy
Annex II : Topography
Annex III : Geology
Annex IV : Meteo-hydrology
Annex V : Environment
Annex VI : Flood Control

Volume III-2 : Supporting Report

Annex VII : Watershed Management
Annex VIII : Land Use
Annex IX : Cost Estimate
Annex X : Project Evaluation
Annex XI : Institution
Annex XII : Transfer of Technology

Volume III-3 : Supporting Report

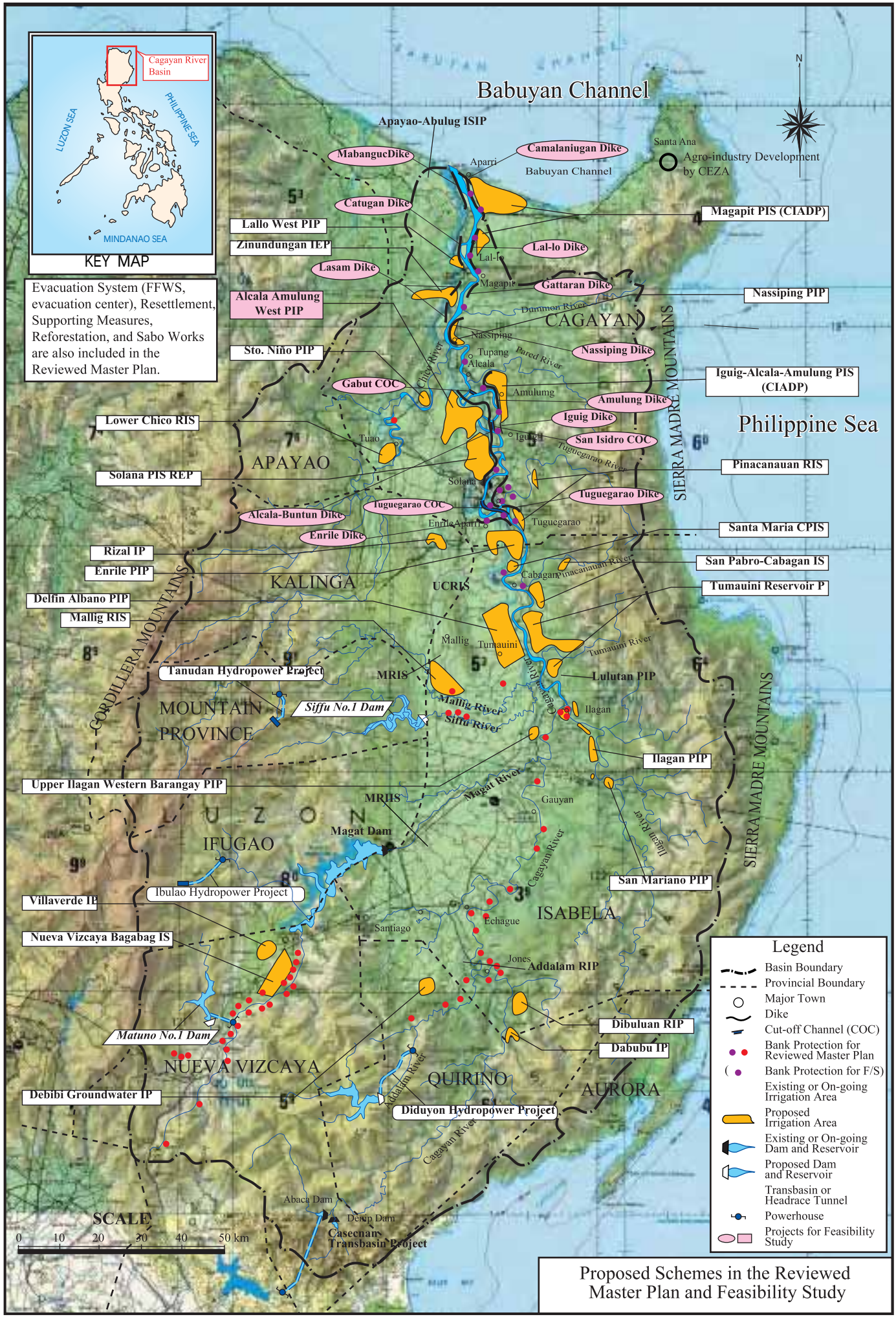
Drawings

Volume IV : Data Book

The cost estimate is based on the price level and exchange rate of June 2001.

The exchange rate is:

US$1.00 = PHP50.0 = ¥120.0


Cagayan River Basin
LUZON SEA
PHILIPPINE SEA
MINDANAO SEA
KEY MAP
Evacuation System (FFWS, evacuation center), Resettlement, Supporting Measures, Reforestation, and Sabo Works are also included in the Reviewed Master Plan.
Babuyan Channel
Apayao-Abulug ISIP
MabangucDike
Camalaniugan Dike
Aparri
Babuyan Channel
Santa Ana
Agro-industry Development by CEZA
N
Catugan Dike
Magapit PIS (CIADP)
Lallo West PIP
Zinundungan IEP
Lal-lo Dike
Lal-lo
Lasam Dike
Magapit
Gattaran Dike
Alcala Amulung West PIP
Nassiping PIP
Dummon River
CAGAYAN
SIERRA MADRE MOUNTAINS
Nassiping
Sto. Niño PIP
Tupang
Alcala
Pared River
Nassiping Dike
Chico River
Gabut COC
Amulung
Iguig-Alcala-Amulung PIS (CIADP)
Amulung Dike
Lower Chico RIS
Iguig Dike
Philippine Sea
Tuao
Iguig
San Isidro COC
Tuguegarao River
APAYAO
Pinacanauan RIS
Solana PIS REP
Solana
Tuguegarao Dike
Tuguegarao COC
Alcala-Buntun Dike
Enrile
Aparri
Tuguegarao
Santa Maria CPIS
Enrile Dike
Rizal IP
Enrile PIP
Cabagan
Pinacanauan River
San Pabro-Cabagan IS
KALINGA
UCRIS
Tumauini Reservoir P
Delfin Albano PIP
Mallig RIS
Mallig
Tumauini
Tumauini River
GORDILLERA MOUNTAINS
Tanudan Hydropower Project
MRIS
Lulutan PIP
Siffu No.1 Dam
Mallig River
Siffu River
Ilagan
MOUNTAIN PROVINCE
Ilagan PIP
Upper Ilagan Western Barangay PIP
Magat River
MRIIS
Gauyan
Tuguegarao River
LUZON
IFUGAO
Magat Dam
San Mariano PIP
Villaverde IP
Ibulao Hydropower Project
Cagayan River
ISABELA
Santiago
Echague
Nueva Vizcaya Bagabag IS
Jones
Addalam RIP
Dibuluan RIP
Matuno No.1 Dam
Dabubu IP
NUEVA VIZCAYA
QUIRINO
AURORA
Addalam River
Debibi Groundwater IP
Diduyon Hydropower Project
Cagayan River
Abaca Dam
Dekip Dam
Casecnan Transbasin Project
SCALE
0 10 20 30 40 50 km
Legend
Basin Boundary
Provincial Boundary
Major Town
Dike
Cut-off Channel (COC)
Bank Protection for Reviewed Master Plan
Bank Protection for F/S)
Existing or On-going Irrigation Area
Proposed Irrigation Area
Existing or On-going Dam and Reservoir
Proposed Dam and Reservoir
Transbasin or Headrace Tunnel
Powerhouse
Projects for Feasibility Study
Proposed Schemes in the Reviewed Master Plan and Feasibility Study

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THE FLOOD CONTROL PROJECT FOR THE LOWER CAGAYAN RIVER IN
THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

Volume III-1 SUPPORTING REPORT

List of Annex

List of Acronyms

A&D	Alienable and Disposable Land
ADB	Asian Development Bank
AFMA	Agro-fishery Modernization Act
AFP	Armed Forces of the Philippines
Agromet	Agro-meteorological Station, PAGASA
AIT	Asian Institute of Technology
ALECO	Albay Electric Cooperative
AO	Administrative Order
APDMC	Asia Pacific Disaster Management Centre
ARC(s)	Agrarian Reform Committee(s)
ASEAN	Association of Southeast Asian Nations
B/C	Benefit-Cost Ratio
BAS	Bureau of Agricultural Statistics
BDCC	Barangay Disaster Coordinating Council
BFP	Bureau of Fire Protection
BM	Bench Mark
BMG	Bureau of Mines and Geo-science
BOC	Bureau of Construction (DPWH)
BOD	Bureau of Design (DPWH)
BOD	Biochemical Oxygen Demand
BOI	Board of Investment
BOT	Bureau of Telecommunication
BRS	Bureau of Research and Standard, DPWH
BSWM	Bureau of Soils and Water Management
CAR	Cordillera Administrative Region
CARP	Comprehensive Agrarian Reform Program
CBIS	Community-Based Information System
CDA	Cooperative Development Authority
CDCC	City Disaster Coordinating Council
CENRO	Community Environment and Natural Resources Office
CEZA	Cagayan Economic Zone Authority
CIADP	Cagayan Integrated Agricultural Development Program
CLUP	Comprehensive Land Use Plan
CPDC	City Planning and Development Coordinator
CPDO	City Planning and Development Office
DA	Department of Agriculture
DA-BFAR	Department of Agriculture – Bureau of Fisheries and Aquatic Resources
DAR	Department of Agrarian Reform
DBM	Department of Budget and Management

DCC	Disaster Coordinating Council
DECS	Department of Education, Culture and Sports
DENR	Department of Environment and Natural Resources
DFA	Department of Foreign Affairs
DILG	Department of the Interior and Local Government
DO	Department Order
DO	Dissolved Oxygen
DOE	Department of Energy
DOH	Department of Health
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
DOT	Department of Tourism
DOTC	Department of Transportation and Communication
DPWH	Department of Public Works and Highways
DSWD	Department of Social Welfare and Development
DTI	Department of Trade and Industry
ECA	Environmental Critical Area
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EIAPO	Environmental Impact Assessment Project Office
EIS	Environmental Impact Statement
EIRR	Economic Internal Rate of Return
EMB	Environmental Management Bureau
ENRO	Environment and Natural Resources Office (Provincial Government)
EO	Executive Order
FIDA	Fiber Industry Development Authority, DA
FIRR	Financial Internal Rate of Return
GA	Government Agency
GDP	Gross Domestic Product
GIS	Geographical Information System
GOJ	Government of Japan
GOP	Government of the Philippines
GPS	Global Positioning System
GRDP	Gross Regional Domestic Product
GVA	Gross Value Added
HLURB	Housing and Land Use Regulatory Board
HUDCC	Housing and Urban Development Coordinating Council
IBRD	International Bank for Reconstruction and Development
IEE	Initial Environmental Examination
IRA	Internal Revenue Allotment
JAFTA	Japan Forest Technical Association

JBIC	Japan Bank for International Cooperation (Ex-OECF & EXIM)
JICA	Japan International Cooperation Agency
LARC	Local Amateur Radio Club
LBP	Land Bank of the Philippines
LGU(s)	Local Government Unit(s)
LTO	Land Transportation Office
LWD	Local Water District
LWUA	Local Water Utility Agency
M/D	Minutes of Discussion
MDCC	Municipal Disaster Coordinating Council
MLUC	Municipal Land Use Committee
MM	Minutes of Meeting
MMSL	Meters above Mean Sea Level
MPDC	Municipal Planning and Development Coordinator
MPDO	Municipal Planning and Development Office
MTPDP	Medium Term Provincial Development Plan
NAAD	Network of Areas for Agricultural Development
NAMRIA	National Mapping and Resource Information Authority
NAPHIRE	National Post Harvest Institute for Research and Extension
NCDPP	National Calamities and Disaster Preparedness Plan
NCIP	National Commission on Indigenous Peoples
NCR	National Capital Region
NDCC	National Disaster Coordinating Council
NEDA	National Economic and Development Authority
NEPC	National Environmental Protection Council
NFA	National Food Authority
NGA(s)	National Government Agency (Agencies)
NGO(s)	Non-Government Organization(s)
NHA	National Housing Authority
NIA	National Irrigation Administration
NIPAS	National Integrated Protected Areas System
NPC	National Power Corporation（or NAPOCOR）
NPAAD	Network of Protected Areas for Agricultural Development
NPV	Net Present Value
NSCB	National Statistical Coordination Board
NSO	National Statistics Office
NTC	National Telecommunication Commission
NWRB	National Water Resources Board (Ex-NWRC)
O&M or O/M	Operation and Maintenance
OCD	Office of Civil Defense

PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAMB	Protected Area Management Board
PAWB	Protected Area and Wildlife Bureau
PCA	Philippine Coconut Authority
PCM	Project Cycle Management
PCG	Philippine Coast Guard
PD	Presidential Decree
PDCC	Provincial Disaster Coordinating Council
PDMO	Provincial Disaster Management Office
PDZ	Permanent Danger Zone
PENRO	Provincial Environment and Natural Resources Office
PFDA	Philippine Fishery Development Authority
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PHO	Provincial Health Office
PIA	Philippine Information Agency
PMO	Project Management Office (DPWH)
PMO-MFCP	Project Management Office - Major Flood Control Project
PMS	Presidential Management Staff
PNP	Philippine National Police
PNR	Philippine National Railways
PNRC	Philippine National Red Cross
PPA	Philippine Port Authority
PPDC	Provincial Planning and Development Coordinator
PPDO	Provincial Planning and Development Office
PPFP	Provincial Physical Framework Plan
PRA	Participatory Rural Appraisal
PSWDO	Provincial Social Welfare and Development Office
PTA	Philippine Tourism Authority
RA	Republic Act
RDC	Regional Development Council
RDCC	Regional Disaster Coordinating Council
RPFD	Regional Physical Framework Plan
RRA	Rapid Rural Appraisal
SAFDZ	Strategic Agricultural and Fisheries Development Plan
SRA	Social Reform Agenda
SS	Suspended Solid
SW	Scope of Works
TESDA	Technical Education and Skills Development Authority
TOR	Terms of Reference

Measurements

Length

mm	=	millimeter
cm	=	centimeter
m	=	meter
km	=	kilometer
LM	=	linear meter

Area

m^2	=	square meter
ha	=	hectare
km^2	=	square kilometer

Volume

cm^3	=	cubic centimeter
l	=	liter
kl	=	kiloliter
m^3	=	cubic meter

Derived Measures

m/sec	=	meter per second
m^3/sec	=	cubic meter per second
kWh	=	kilowatt hour
MWh	=	megawatt hour
GWh	=	gigawatt hour
PPM	=	parts per million
kmph	=	kilometer per hour

Weight

g	=	gram
kg	=	kilogram
ton	=	metric ton

Currency

PHP	=	Philippine Peso
¥	=	Japanese Yen
US$	=	US Dollar

Time

sec	=	second
min	=	minute
hr	=	hour
d	=	day
y	=	year

Other Measure

%	=	percent
^{o}	=	degree
^oC	=	degree(s) Celsius
10^3	=	thousand
10^6	=	million
10^9	=	billion

Energy

W	=	watt
kW	=	kilowatt

Fiscal Year

January 1 to December 31

ANNEX I :
SOCIO-ECONOMY

THE FEASIBILITY STUDY OF
THE FLOOD CONTROL PROJECT FOR THE LOWER CAGAYAN RIVER IN
THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

Volume III-1 SUPPORTING REPORT

ANNEX I SOCIO-ECONOMY

Table of Contents

List of Tables

List of Figures

CHAPTER 1 INTRODUCTION

Socio-economic study aims at understanding present conditions and future socio-economic framework until the project target year 2020. The frame is essential for other sectoral studies related to this current study, as a function of the basic information for formulating the projects proposed. However, this socio-economic study covers neither all aspects of socio-economic conditions of the Philippines nor includes any proposal for socio-economic planning. It aims to provide the figures for the use of working out the other relevant sectoral studies. This study consists of eight chapters. The respective chapters include the following contents.

Chapter two presents administrative conditions in Cagayan River Basin. The basin extends to three regions Cagayan Valley Region (Region 2), Cordillera Administrative Region (CAR) and Southern Tagalog Region (Region 4).

Chapter three mentions present social conditions in the basin and Region 2 representing the basin's socio-economic characteristics. The chapter includes population, labor force and housing situation.

Chapter four presents economic situation in the region, comparing it to economic conditions in the country and other regions. It includes regional accounts, economic growth, foreign trade, official development assistance and external debt and outstanding.

Chapter five mentions sectoral economic profiles. It consists of major industrial conditions of agriculture, industry and services. It also mentions household economy in the basin and price transition.

Chapter six describes the present conditions of socio-economic infrastructures in the region. It includes social infrastructures such as educational and medical facilities, and physical infrastructures such as road, water supply, electric supply and communication.

Chapter seven states economic development plans of the country and the regions. The respective governments have hitherto addressed the economic development plans. This chapter summarizes these plans in terms of items concerned to the projects in this study.

Chapter eight presents a socio-economic framework until the target year 2020. It includes population and regional account with scenarios. It also presents a framework for water resources development during the planning period.

CHAPTER 2 ADMINISTRATION

The Philippines administratively consists of 16 Regions, namely: National Capital Region (NCR), Cordillera Administrative Region (CAR), Autonomous Region in Muslim Mindanao, and Region 1 to Region 12, although Region 13 was separated from Regions 10 and 11 recently. These regions are further divided into provinces, the provinces into cities/municipalities, and the cities/municipalities into barangays. The Cagayan River Basin is located in Region 2, CAR and a small part of Region 4, administratively. There are eight provinces in the basin, the territories of which are aggregated to 37,561 km^2, as shown in the table below.

Region	Province	Administrative Area		Cagayan River Basin	
		Land Area (km^2)	Number of Municipalities	Land Area (km^2)	Number of Municipalities
Region 2	Cagayan	9,003	29	4,251	18
	Isabela	10,665	37	8,237	37
	Nueva Vizcaya	3,904	15	3,301	15
	Quirino	3,057	6	3,057	6
CAR	Apayao	3,970	7	598	3
	Ifugao	2,518	11	2,518	11
	Kalinga	3,078	8	3,078	8
	Mt. Province	2,097	10	1,844	8
Region 4	Aurora	3,239	8	398	4
Total		37,561	131	27,281	110

The Cagayan River Basin area is estimated at 27,281 km^2 in total, accounting for 73% of the provincial territories (37,561 km2). The basin consists of 110 cities/municipalities in eight provinces, including two cities of Tuguegarao in Cagayan Province and Santiago in Isabela Province. Figure 2.1.1 illustrates the distribution of these cities and municipalities with administrative boundaries.

The administrative composition has changed from that in the master plan stage. In the master plan stage, there were six provinces in Region 2, one province (Mt. Province) in Region 1 and one province (Aurora) in Region 4 in the Cagayan River Basin. At present as mentioned above, there are four provinces in Region 2, four provinces in CAR and one province (Aurora) in Region 4. The reason why the number of provinces increased from eight to nine was that Kalinga-apayao Province in CAR was divided into two provinces, Kalinga and Apayao Provinces. In several provinces, furthermore, new municipalities were created. As a result, the total number of cities and municipalities increased from 105 to 110 in the basin.

CHAPTER 3 POPULATION

3.1 Population

According to the 1995 census, the Philippines has a population of 68.3 million. The population has increased by 8 million as compared with the 1990 census. During the 1980's, the average growth rate was 2.31% per annum. During the 1990's, however, it accelerated to 2.48% per annum.

In Cagayan River Basin, the census population was estimated at 2.55 million or 3.3% of the national population. The average growth rate during the 1980's was 2.25% per annum. During the 1990's, it further slowed down to 1.73%. The basin population by province was estimated as follows.

(Unit: 1000)

Region	Province	1980	1990	1995
Region 2	Cagayan	423	514	562
	Isabela	830	1,045	1,125
	Nueva Vizcaya	225	282	314
	Quirino	84	114	131
CAR	Apayao	12	13	15
	Ifugao	112	147	150
	Kalinga	115	137	154
	Mt. Province	67	79	89
Region 4	Aurora	5	8	9
Total		1,872	2,239	2,548

The census populations by municipality in the Cagayan River Basin are listed in Table 3.1.1. Among 110 municipalities, Tuguegarao City is the largest one in terms of population, and functions as the center of the basin. Its census population was 107,275 in 1995. The growth rate during the 1990 and 1995 was 2.61% per annum on average, which was higher than that of the province and also higher than that of Region 2. Among 110 municipalities, the highest growth rate of 8.12% during the same period was recorded in Dinapigue in Isabela Province. The lowest rate of –9.24% was in Mayoyao in Ifugao Province.

Urban population in the Cagayan River Basin was estimated at 21% of the total population in the 1990 census year, as shown in Table 3.1.2. Since 49% of the national population was estimated to live in urban area in the same year, the basin seems to stay behind urbanization. In urban areas, the ratio of male to female was estimated to be 1.00. In rural areas, however, the ratio was 1.05, so the male population was 5% larger than the female population.

A population density of the basin was 94 persons/km^2 in 1995, as shown in Table 3.1.1. The density of the respective municipalities ranged from the largest one of 741 persons/km^2 in Tuguegarao City to the smallest of 4 persons/km^2 in

Dinapigue in Isabela Province. The municipalities, which exceeded the density of 500 persons/km^2, were only four municipalities, i.e., Aurora and Reina Mercedes Municipality in Isabela Province and Bayombong in Nueva Vizcaya Province in addition to Tuguegarao City.

The average family size was 5.0 in the regions of the basin in the 1995 census, as shown in the table below. It was smaller than the national average of 6.0. The province, which recorded the largest family size, was Kalinga Province of 5.5. The smallest one was Nueva Vizcaya of 4.9.

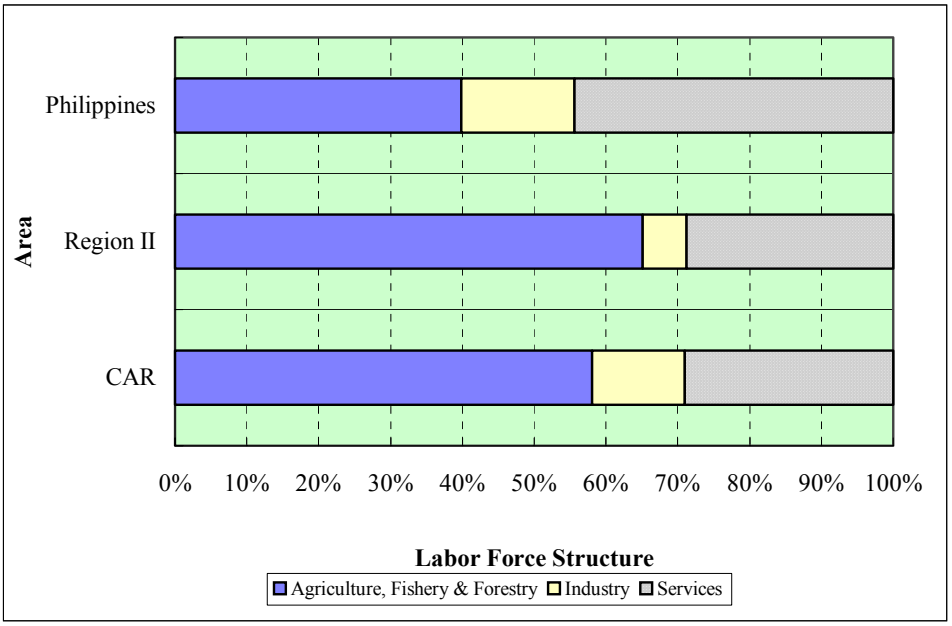
Region	Province	Household Population (1000)	Number of Household (1000)	Family Size (Persons per Household)
Region 2	Cagayan	893.7	179.1	5.0
	Isabela	1,157.6	233.2	5.0
	Nueva Vizcaya	333.5	67.7	4.9
	Quirino	131.0	26.4	5.0
CAR	Apayao	83.3	15.3	5.4
	Ifugao	149.5	29.2	5.1
	Kalinga	236.9	43.2	5.5
	Mt. Province	130.3	25.4	5.1
Total		3,115.8	619.5	5.0

3.2 Labor Force

In the Cagayan River Basin, a population was estimated at 2.548 million in the 1995 census year, distributing 2.132 million or 84% of the basin population in Region 2, 0.498 million or 16% in CAR and 9 thousand or 0% in Region 4. Thus, Region 2 is said to represent a basin's socio-economic character. In 1998, a population of 15 years old and over in Region 2 was estimated at 1.885 million, accounting for 70% of the total population (2.695 million), as shown in Table 3.2.1. Of this population, 69% or 1.293 million people participated in labor force markets as economically active people. Ninety-six percent (96%) of the labor force was employed, so only 4% was un-employed in the labor market. However, it was reported that 22% of employed labor force was in underemployed condition.

In the labor force market in Region 2, the agriculture sector absorbed 0.8 million or 65% of the total labor force, as shown in Table 3.2.1. 29% was employed in the services sector. The industrial sector absorbed 6% only. This labor structure is quite different from the national one, as shown in the figure below. Even in CAR, the agricultural sector has 58% of the total labor force. Thus, Region 2 is said to specialize in agricultural production.

In the 1990 census year, a population of 15 years old and over in Region 2 was estimated at 1.384 million, as shown in Table 3.2.2. Of this population, 54% or 0.75 million people participated in the labor force market as economically active people. Of the total labor force, 69% was male and 31% was female. 90% of the labor force was employed, so 10% was un-employed in the labor market.



In the labor force market in Region 2 in the 1990 census year, the agriculture sector absorbed 0.47 million or 60% of the total labor force, as shown in Table 3.2.3. 28% was employed in the services sector. The industrial sector absorbed 7%.

3.3 Housing Condition

Based on the 1990 census, there were 149,200 housing units in the municipalities in the Lower Cagayan River Basin, as shown in Table 3.3.1. Their building structures are classified into four types in general: (a) Type I, which is defined as a house made of strong materials such as concrete and iron; (b) Type II, which is defined as a house of semi-strong materials such as concrete bricks, stone and iron; (c) Type III, made of usual materials such as wood and asbestos; and (d) Type IV, made of light materials such as cogon, nipa and bamboo. With regard to the building structure, the above dwelling units in the basin were distributed as follows: (a) Type I and II accounted for 15,400 units or 10% of the total units; (b) Type III, 39,900 units or 27%; and (c) Type IV, 93,900 units or 63%.

The average age of dwelling units was 11 to 12 years old in the provinces concerned, as shown in Table 3.3.2. In the basin, it was the same average per year of 12 as in the provincial ones. In 24 municipalities of the basin, the average age ranged from 9 years in Allacapan in the Cagayan Province and San Mariano in Isabela Province to 15 years in Iguigu and Tuguegarao in the Cagayan Province. This means that the outskirts of Tuguegarao City are newly developed areas, and new dwelling units are constructed there.

Table 3.3.3 shows the distribution of the floor area of housing units in the 1990 census year. The average floor area was 29 m^2 in the basin. It is distributed as 21 m^2 of the smallest unit in Amulung in Cagayan Province to 39 m^2 of the largest unit in Tuguegarao City.

CHAPTER 4 NATIONAL AND REGIONAL ECONOMY

4.1 National and Regional Accounts

A regional account covering the Cagayan River Basin is not available. The regional account by the administrative region is estimated by NSCB. As mentioned before, the basin is mainly located in Region 2 and CAR. The main stream of the Cagayan River runs through the territory of Region 2. In fact, 70% of the basin area is located in the territory of Region 2. Although 29% of the basin area is located in CAR, the major economic activities supporting higher economic performance in CAR are carried out outside the basin such as in Baguio City and its surroundings. Thus, the economic condition in Region 2 would rather be considered as representing that of the basin.

Per capita gross regional domestic product (GRDP) of Region 2 is considerably lower than other regions in the country. In 1998, that was estimated at 20,200 Pesos per capita. It accounted for only 55% of the national average of 36,500 Pesos, and ranked as the 12th among 15 regions, as shown in the table below. The details of regional data are shown in Table 4.1.1. This economic status in the country has not changed since the master plan of the "Cagayan River Basin Water Resources Development" was reported in 1987.

Region/Area	GRDP in 1998 (Billion Pesos)	Per Capita GRDP in 1998 (1000 Pesos)	Ratio to National GDP per Capita (Per Cent)	Order of GRDP per Capita among 15 Regions
NCR	925	92.4	253	1
CAR	60	44.5	122	2
Region 2	55	20.2	55	12
Other Regions	1,627	27.5	76	-
Philippines	2,667	36.5	100	-
Country w/o NCR	1,742	27.6	76	-

Gross domestic product (GDP) in the Philippines was 2,667 billion Pesos in 1998. It was broken down into gross value added (GVA) of main economic sectors as shown in Table 4.1.2 and 4.1.3. They were summarized as follows: 450 billion Pesos in the agricultural sector or 16.9% of GDP, 841 billion Pesos in the industrial sector or 34.5%, and 1,376 billion Pesos in the services sector or 51.6%. Per capita GDP was 36,470 Pesos, equivalent to approximately US$890, as shown in Table 4.1.4.

The GRDP of Region 2 amounted to 55 billion Pesos in 1998, accounting for 2.0% of GDP in the Philippines. A structural proportion of major economic sectors was 43% of agriculture, 15% of industry and 42% of services in 1998. It is different from the national structure of 17%, 32% and 52%, respectively. Thus,

the economy of Region 2 is said to specialize in agricultural production, rice production in particular. Although the growth of GRDP in Region 2 was negative in 1998, the average growth for the past five years was 3.9% per annum, almost equal to the national average.

Table 4.1.4 shows GDP in the economic sector of 1985 as constant prices between 1993 and 1998. For six years, GDP increased from 734 billion Pesos to 888 billion Pesos in real terms, i.e., average growth rate of 3.88% per annum. GRDP in Region 2 grew at a rate of 3.74% per annum on average for the same period, which was smaller than the growth rate of the country. Thus the share of the region in the country diminished for this period. The real growth of the main economic sectors was calculated and is shown in Table 4.1.6.

4.2 Economic Growth and Investment

Gross regional domestic product (GRDP) of Region 2 in 1998 is enumerated in the table below, comparing it with the national GDP. In the same table, the gross regional domestic expenditure (GRDE) is shown, as well. The detail figures are tabulated in Table 4.2.1 to 4.2.4.

(Unit: Billion Pesos at 1998 Current Prices)

Item	Region 2		Philippines		Share of
	Value	%	Value	%	Region 2 (%)
1. Agriculture	23.9	43	449.9	17	5.3
2. Industry	8.0	15	841.1	31	1.0
3. Services	23.3	42	1,376.1	52	1.7
4. Total (GRDP/GDP)	55.2	100	2,667.1	100	2.1
5. Personal Consumption	62.3	113	1,980.1	74	3.1
6. Government Consumption	9.8	18	355.0	13	2.8
7. Capital Formation	16.1	29	541.2	20	3.0
Gross Fixed Capital Form.	17.7	30	561.7	21	3.2
Changes in Stock	-0.6	-1	-20.5	-1	2.9
8. Net Export	-33.1	-60	-99.7	-3	33.2
9. Statistical Discrepancy	-	-	-109.5	-4	-
10. Total (GRDE/GDE)	55.2	100	2,667.1	100	2.1

As shown in the table above, agricultural production attained the largest share (43%) among the major economic sectors. It accounted for 5.3% of the national agricultural production. It means that Region 2 still keeps the position of breadbasket in the country. In spite of that, Region 2 records excess of imports over export. It implies that Region 2 imports a huge amount of various consumer goods and capital materials from outside of the region, despite that the region exports agricultural products.

GRDP of Region 2 has grown at a rate of 3.74% annually on average between 1993 and 1998. Gross value added (GVA) of the major economic sectors are

enumerated in Table 4.1.5. GRDP per capita of Region 2 was 20,500 Pesos or equivalent to around US$500 in 1998, accounting for 56% only of the national average, as shown in Table 4.1.7. GRDP per capita has grown at a rate of 1.81% per annum on average.

In order to accelerate economic growth, the regional government has to increase production factors such as capital and labor, to increase productivity or to improve technology level. Since labor force is in excess in developing countries, the government has to increase capital stock through investment on condition that investment efficiency is constant. An economic growth is calculated as follows.

$$G(Y) = \frac{1}{ICOR} \times \frac{I}{Y}$$

Where, $G(Y)$: Economic Growth ($\Delta Y/Y$)

$ICOR$: Incremental capital-output ratio ($\Delta K/\Delta Y = I/\Delta Y$)

I : Investment ($=\Delta K$)

ΔY : Increment of GRDP

Y : GRDP

Thus, an increase of investment makes an economic growth in the region, since the ICOR is considered as constant during a certain period for the industrial structure to keep the same conditions. Incidentally, the smaller the ICOR, the higher is the economic efficiency of investment, as shown in the formula above. On basis of the GRDE records, the ICORs of Region 2 and the country were 5.9 and 5.5 respectively. The data for estimation of ICOR are tabulated in Table 4.2.5.

4.3 Foreign Trade

The Philippines' external trade balance has recorded widening in the deficit as shown in the below table. Although the major traditional commodity exports have contributed to the national trading performance for long time, its contribution has fallen well below that of manufactures. As shown in Table 4.3.1, the top five exports in 1998 comprised the following articles: (1) electronic equipment and parts, which accounted for US$17.4 billion; (2) machinery and transport equipment US$3.33 billion; (3) garments, US$2.36 billion; (4) coconut oil, US$0.71 billion; and (5) chemicals, US$0.34 billion. The total of these five articles accounted for US$24.14 billion or 82% of the total exports of US$29.50 billion in 1998.

(Unit: US$ billion)

Item	1994	1995	1996	1997	1998
Merchandise Export	21.33	26.54	32.43	33.93	29.66
Merchandise Import	13.48	17.45	20.54	25.23	29.50
Trade Balance	-7.85	-9.09	-11.88	-10.71	-0.16

Imports by major types of goods consist of capital goods and intermediate goods. The country's top five imports in 1998 comprised the following articles, which are shown in Table 4.3.2 in detail: (1) telecommunication and electrical machinery, which accounted for US$6.87 billion; (2) materials/accessories for manufacture, US$4.63 billion; (3) manufactured goods such as textile yarn, steel and metal products, US$2.81 billion; (4) power generating and specialized machines, US$2.57 billion; and (5) chemicals, US$2.21 billion. The total of these five articles accounted for US$19.09 billion or 64% of the total imports of US$29.66 billion in 1998. In addition, imports of petroleum and its products have kept the top ranking for a long time due to high demand in the domestic economy.

Major trading partners for export in 1998 were USA and Japan. Following them, Netherlands, Singapore, Taiwan, UK, Hong Kong, Malaysia and Germany recorded an annual export amount of more than US$1.0 billion, as shown in Table 4.3.3. Trade with these nine countries accounted for US$24.78 billion or 84% of the total export of US$29.50 billion in 1998. USA has been the most important trading partner for the Philippines, and it kept the largest share for the long time as shown in the table.

In terms of imports, Japan kept the top position until 1997, as shown in Table 4.3.3. USA had kept the second position till 1997. In 1998 USA has kept the top position, as shown in the table. Accordingly, a trade imbalance between the Philippines and Japan has reduced from US$3.16 billion in 1991 to US$1.80 in 1994.

4.4 Foreign Assistance

Gross receipts of official development assistance (ODA) from OECD, Arab countries and multilateral agencies aggregated to US$3.50 billion for the past five years and averaged US$0.88 billion per year between 1994 and 1998. The receipts fluctuate year by year, as shown in Table 4.4.1.

An average annual receipt of ODA accounted to approximately 6.1% of the annual expenditure of the central government on average in the same period. It ranged from a maximum 8.5% in 1994 and a minimum 4.3% in 1997 as shown in the table below.

(Unit: US$ billion)

Item	1994	1995	1996	1997	1998
Receipt of ODA	1.06	0.88	0.88	0.68	0.61
Expenditure of Central Government	12.43	15.21	15.24	15.91	12.79
Share of ODA (%)	8.5	5.8	5.8	4.3	4.7

4.5 External Debt and Outstanding

In 1998, the total external debt was US$48 billion as shown in Table 4.5.1, accounting for 73% of GDP (approximately US$65 billion equivalent). In 1998, the outstanding long-term debt was US$39 billion. The total debt-service was US$5.2 billion, comprising US$2.9 billion of principal repayment and US$2.3 billion of interest payment. Thus, the debt-service ratio decreased to 18.9% in 1994 from 11.8% in 1990.

CHAPTER 5 REGIONAL ECONOMIC PROFILES

As mentioned in the previous chapter, Region 2 represents the characteristics of the basin's distinctive features. Thus, the regional economic profiles of the basin are summarized by means of those of Region 2 in this chapter.

5.1 Agriculture Sector

In Region 2, the agricultural sector is a leading industry, of which GVA accounted for 51% of GRDP in 1997 and 43% in 1998, as shown in Table 4.1.3. In terms of labor force, 65% of gainful workers was absorbed in to the agricultural sector in the 1998. Since GVAs of fishery, livestock, and forestry sub-sectors accounted for only 3%, 19% and 1% of the total agricultural product respectively against 73% of crop production in 1998 as shown in Table 4.1.2, most of agricultural activity would rely on crop production.

In Region 2, paddy and corn production contributed 17.5% and 8.1% respectively to the GRDP of the region. They also accounted for 40.4% and 18.7% respectively of the gross value added (GVA) of the agriculture sector in the region. Thus, the agricultural production of the region is said to still specialize in these food grains, rice and corn.

The production of major crops in the Philippines and in the region is enumerated in Table 5.1.1. Based on the table, the major crops in the country are paddy (rice), corn, coconut, sugar cane and banana in the order of production value. Paddy production has been kept at the almost same annual production level of around 11 million tons in 1996 and 1997, and 8.6 million tons in 1998. On the other hand, the country needs 6.3 million tons of rice for nearly 70 million people. To maintain the self-sufficiency of rice, the paddy production is expected to be 10.8 million tons (6.3 million tons of rice equivalent) in 1996. Thus, the country has to import some amount of rice from the point of view of food balance. In fact, the country has recorded an excess of rice import of tens of thousand tons since 1994, as shown in the table below.

Year	Import		Export	
	Quantity (1000 Tons)	Value in CIF (US$ Million)	Quantity (1000 Tons)	Value in FOB (US$ Million)
1994	3	0.7	0	0.0
1995	263	75.7	0	0.0
1996	862	294.0	0	0.0
1997	722	211.3	0	0.0
1998	2,171	585.9	0	0.0

Source: Trade Statistics in 1994 to 1998, NSO

The major crops in the region are paddy (rice), corn, tobacco, sugar cane, coconut, mango, and banana in the order of production value. The paddy production has been kept at the top rank of crop production in the region, which accounted for 1.1 million tons in 1998 or 13.0% of the national production. In addition to rice, the corn production has also kept a high position among crops, which accounted for 0.6 million tons or 15% of the national production in the same year. Besides, the region produced 9,000 tons of tobacco in 1998, accounting for 13% of the national production. Thus, the province is specialized as a tobacco producing area.

Among four provinces in the region, Isabela and Cagayan Provinces are the major producer in terms of cereal production such as rice and corn. In 1998, they produced 0.930 million tons of paddy as shown in Table 5.1.2 against 1.109 million tons in the region, accounting for 84% of the region. They also accounted for 0.485 million tons as shown in Table 5.1.3 against 0.571 million tons in the region, accounting for 85% of the region.

In the capital city Tuguegarao of the region, annual average farm-gate prices in 1999 were reported as 8.62 Pesos per kg of paddy, 5.00 Pesos per kg of yellow corn and 5.30 Pesos per kg of white corn. Table 5.1.4 shows monthly averages of the farm-gate prices of cereals for the recent three years, 1997 to 1999.

In the fishing industry, fishpond is one of the most vulnerable facilities to flood disaster. In the region, however, inland fishery is under poor condition as compared with the entire national production. The regional production accounted for only 3% of the national one in 1998, as mentioned before. In the lower Cagayan River Basin, furthermore, there are no major fishponds. According to Table 5.1.5, the total fishpond area in the basin was reported as 383 ha in 2000. It accounted for 19% only of the total fishpond areas in the region.

The top species from freshwater fishpond is tilapia in Cagayan Province in 2000, as shown in Table 5.1.6. Next to tilapia, major fishes from fishponds are mudfish, catfish, carp, gourami, etc. The farm-gate price of tilapia was 60 to 35

Pesos per kg in August 2000, depending on size. The bigger, the more expensive in terms of unit prices.

The livestock and poultry industry has received a more important position than inland fishery in the basin. The GVA of this industry accounted for 19% of the GRDP in the region as mentioned before. Table 5.1.7 shows an inventory of livestock and poultry in the two provinces related to the Lower Cagayan River Basin for the recent three years from 1996 to 1998. In the provinces, there were 277,500 heads of carabao, 106,900 heads of cattle, 465,500 heads of swine, 51,900 heads of goat, 751,600 of duck and 7.64 million of chicken in 1998.

In these provinces, there are an estimated population of 2.18 million in 1998. Of this population, 65% or 1.42 million people were estimated to get their living on agriculture. The family size was reported as around 5.0 persons per household in 1995. Then, the number of agricultural households in the provinces was estimated at about 280,000, an average holding of livestock and poultry was calculated as 1.0 head of carabao per family, 0.4 heads of cattle, 1.6 heads of swine, 0.2 head of goat, 2.7 head of duck and 27.0 heads of chicken.

Table 5.1.7 shows annual average farm-gate prices of these livestock and poultry. In 1998, unit prices of swine, goat and chicken were 52 Pesos/kg, 66 Pesos/kg and 83 Pesos/kg, respectively.

5.2 Industry Sector

Within the industrial sector, the manufacturing sub-sector contributes the largest share to the national economy, accounting for 23.0% of GDP in 1995. In Region 2, however, its importance seems to be low in the regional economy, because its share was 3.7% only in GRDP as shown in Table 4.1.2. In spite of that, it would seem reasonable, that the manufacturing industry is expected to fulfill an important economic role in the region. In Lower Cagayan River Basin, incidentally, 94 manufacturing establishments were registered to Department of Trade and Industry (DTI) and to get licenses for their business in 1998, as shown in Table 5.2.1. Besides, many informal manufacturers exist in the region. The total number of manufacturing firms including unauthorized firms was estimated at around 1,500 establishments in the basin, according to a NSO staff. In addition to these medium and small-scale manufacturers, there are only five large-scale manufacturers in the region. They distribute as follows: 3 manufacturers in Cagayan, 1 in Isabela and 1 Nueva Vizcaya. In general, the

factories usually have a large property for production, which is damageable and vulnerable by flood disaster.

Table 5.2.2 shows the management conditions and internal asset holdings of manufacturing establishments in the country as well as in the region in 1995. Since the table includes both large scale and small scale manufacturing establishments, the data indicate management characteristics of respective scale establishments. The following table summarizes the management indices in the country and in the region:

Item	Philippines	Region 2
Large & Medium Scale Establishments		
Average Output (million Pesos)*1	98.7	18.1
Average VA (million Pesos)*1	30.4	7.2
VA Rate (%)	30.8	39.7
Ratio of Fixed Assets*3 to VA	0.96	0.79
Ratio of Inventory to VA	0.52	0.15
Small Scale Establishments		
Average Output (1000 Pesos)*1	371.7	271.2
Average VA (1000 Pesos)*1	146.3	85.9
VA Rate (%)	39.4	31.7
Ratio of Fixed Assets*3 to VA	0.78	1.54
Ratio of Inventory to VA	0.22	0.07

Remark: *1 An average value of an establishment
*2 VA stands for value added
*3 Excluding land value of the establishment

Since management characteristics of manufacturing establishments in the basin are not available, the above regional figures in Table 5.2.2 are applied to characterize the manufacturing establishments in the basin. Since there are few large-scale manufacturers in the basin, the manufacturing industry in the basin is characterized by small scale and cottage manufacturer figures.

5.3 Services Sector

Within the services sector, the trading and various service sub-sectors are considered the most popular and plentiful industry in the national economy. The trading industry accounted for 13.5% of GDP in 1998. In Region 2, the trading industry accounted for 9.4% of GRDP, as seen in Table 4.1.2. In the Lower Cagayan River Basin, 1,200 trading establishments and 383 servicing establishments were registered to DTI for business licenses as of 1998, as shown in Table 5.2.1. According to NSO, there were around 3,450 trading establishments including unauthorized firms in Lower Cagayan River Basin in 2000.

Table 5.3.1 shows the management conditions of trading establishments in the country and in the region in 1993. The management indices of trading establishments are summarized in the table below, divided into two categories of the number of employees. Table 5.3.2 shows the management conditions of servicing establishments. In the same manner, the management indices are summarized in the table below.

Item	Philippines	Region 2
Trading of Average Employment of 10 or More		
Average Annual Sales*1 (million Pesos)	46.47	19.28
Average VA (million Pesos)	7.25	3.04
VA Rate (%)	15.60	15.77
Ratio of Fixed Assets*3 to VA	0.41	0.63
Ratio of Inventory to VA	0.96	1.30
Trading of Average Employment of Less Than 10		
Average Annual Sales*1 (million Pesos)	0.96	1.09
Average VA (million Pesos)	0.17	0.17
VA Rate (%)	17.71	15.6
Ratio of Fixed Assets*3 to VA	0.56	1.21
Ratio of Inventory to VA	1.27	1.11
Services of Average Employment of 10 or More		
Average Annual Sales*1 (million Pesos)	9.24	3.38
Average VA (million Pesos)	5.02	2.45
VA Rate (%)	54.33	72.49
Ratio of Fixed Assets*3 to VA	0.90	0.16
Ratio of Inventory to VA	0.34	0.04
Services of Average Employment of Less Than 10		
Average Annual Sales*1 (million Pesos)	0.28	0.22
Average VA (million Pesos)	0.13	0.11
VA Rate (%)	46.43	50.00
Ratio of Fixed Assets*3 to VA	1.40	0.57
Ratio of Inventory to VA	0.10	0.08

Remark: *1 An average value of a establishment
*2 VA stands for value added
*3 Excluding land value of the establishment

5.4 Family Income and Expenditure

Living conditions may be derived sketchily from family income and expenditure. As regards average family income, the regional annual average of 86,822 Pesos in Region 2 was lower than the national average of 123,168 Pesos in 1997, accounting for 70% national family income. This disparity between national and regional figures was not so much as that found in the per capita GDP, as discussed in Chapter 4.1.

Engel coefficient, which is a rate of food expenditure to total income, is said to characterize destitute living condition. The lower income family shows the higher coefficient. The coefficient of the regional average was calculated at 51%, referring to Table 5.4.1. It was larger than that of the nation of 44%. Thus, the

living condition in the region and the province may be more serious than the national average.

In the region, people spend 3.6% of the total expenditure or 2,500 Pesos per year for cloths and wears. If they stocked these materials, value of which are equivalent to one-year expenditure, their value could be estimated at 2,500 Pesos. Besides, they also stock some food for daily use. If they had their food stock of a week, it could amount to 1,300 Pesos. Accordingly, an average family might stock 3,800 Pesos of foodstuff and cloths.

Housing expenses for the national average accounted for 24% of the total family expenditure, which are higher than those of the region (18%). This means that the regional level still stays at the same stage or goes into the diversified spending stage at a slack pace, although the national level goes into diversified spending stage and approaches the international level. Thus, the housing conditions might not proceed to a high standard level abruptly.

5.5 Poverty Incidence

In Region 2, the annual per capita poverty threshold was estimated at 9,880 Pesos in 1997 and 185,800 families were included under this threshold, according to "Cagayan Valley Statistical Yearbook 1999, NEDA Region 2". Then, the poverty family incidence was calculated at 31.6%. This was ranked at the fourth lowest percentage among the all regions in the country. The table below shows the regional situation of poverty incidence in the country. Incidentally, CAR was ranked as the eleventh among the regions.

Area	Annual per Capita Poverty Threshold (Pesos)	Magnitude of Poor Families	Incidence of Poor Families (%)	Order of Incidence
Philippines	11,388	4,533,387	32.1	-
NCR	14,360	140,793	7.1	1
CAR	12,744	109,646	42.3	11
Region 1	11,981	292,764	37.6	6
Region 2	9,873	185,768	31.6	4
Region 3	12,837	241,865	16.8	2
Region 4	12,507	498,536	25.7	3
Region 5	10,497	485,099	50.1	14
Region 6	10,558	520,200	41.6	10
Region 7	8,726	357,715	34.2	5
Region 8	8,755	305,750	40.7	9
Region 9	9,670	221,330	39.8	8
Region 10	10,455	385,337	46.8	12
Region 11	10,489	379,344	37.9	7
Region 12	11,155	220,526	49.1	13
ARMM	11,214	208,714	58.6	15

In the meantime, annual per capita poverty threshold means that an annual per capita income required of the amount to be spent to satisfy nutritional requirements and other basic needs. Furthermore, subsistence incidence indicates more serious conditions in terms of poverty level in the region. The subsistence threshold is only to satisfy nutritional requirements. In Region 2, the subsistence threshold was estimated at 6,985 Pesos in 1997. The subsistence incidence was calculated at 17.8% in Region 2.

Table 5.5.1 shows 24 indicators to clarify the poverty incidence in city and municipalities related to Cagayan River Basin. These indicators were derived from the Minimum Basic Community-Based Information System (MBN-CBIS). From these indicators, the poverty conditions of the respective municipalities could be inferred. The poverty alleviation in the basin is furthermore discussed in Section 8.5 of Chapter 8.

5.6 Price Indices

The price indices are prerequisite information to adjust values of costs and benefits in the past. The available data of price indices are consumer price index (CPI) and wholesale price index (WPI). Table 5.6.1 shows price indices in the Philippines, the Metro Manila and the regions from the year 1984 to 2000 covering not only retail prices but also wholesale prices.

Year	CPI (1994=100)		WPI (1985=100) in Metro Manila	
	Philippines	Region 2	General Index	Construction Materials
1985	46.1	45.9	100.0	100.0
1998	136.9	136.3	240.9	227.1
1999	146.0	148.9	254.8	229.0
2000, July	152.1	153.0	253.5	233.1
Ratio (85/2000)	3.30	3.33	2.54	2.33

A consumer price index (CPI) in Region 2 increased 3.3 times between the 1987 Master Plan and the reviewed master plan. For the same period, a wholesale price index also increased 2.54 times.

Inflation rates of the country average, in the Metro Manila and the regions are also shown in Table 5.6.1. In Region 2, the inflation rate was 9.2% in 1999 but only 0.70% between January and May in 2001. Thus, the rate has been calmed down in 2001.

The wholesale price index of construction materials in Metro Manila increased from 157.5 (base: 1985=100) in 1985 to 262.9 in May 2001, up by about 67% in the past 16 years. The details of these indices are shown in Table 5.6.2.

Table 5.6.3 shows the foreign exchange rate of Pesos per US$ from 1987 to 2001 at the end of each period and the annual average. The value of the peso dropped down from 20.48 Pesos per US$ at the beginning of 1987 to 50.54 Pesos in May 2001.

CHAPTER 6 INFRASTRUCTURE

6.1 Educational Facilities

As of school year 1997-98, educational facilities were enumerated as follows:

Level	Philippines	Region 2	Cagayan	Isabela
Pre-school	7,590	69	17	27
Elementary	37,665	2,075	674	917
Secondary	6,423	252	94	99
Tertiary	1,316	52	19	21

Table 6.1.1 shows the detailed distribution of these facilities. On the average, the rates of elementary schools was 5.2 schools per 10,000 population (37,665 elementary schools per 72.56 million population) in the country, but 7.7 schools per 10,000 (2,075 schools per 2.70 million) in the Region 2. Thus, the elementary school density in the region is larger than that in the national average. In the same manner, the national average of secondary and tertiary schools was 0.88 and 0.16 respectively. The basin average was 0.93 and 0.19. Accordingly, the school density in the region was larger of schools than that of the country.

In terms of public elementary schools, there were 488 schools in Cagayan Province and 643 schools in Isabela Province in the 1998-99 school year, according to DECS (Department of Education, Culture and Sports), Provincial Division. In the same year, there were 4,959 classrooms in Cagayan and 6,361 classrooms in Isabela, respectively. The average number of classrooms per elementary school was estimated at 10.2 rooms in Cagayan and 9.9 rooms in Isabela, respectively. Thus, the average number of classrooms per elementary school was considered as 10 classrooms per school.

6.2 Medical Facilities

Table 6.2.1 shows the distribution of medical facilities such as hospitals, barangay health stations and rural health units in 1997 in the Philippines, Region 2 and in the Provinces of Cagayan and Isabela. They are summarized below.

Facility	Philippines	Region 2	Cagayan	Isabela
Hospital	1,817	81	29	42
Barangay Health Station	13,096	717	204	322
Rural Health Unit	2,405	98	31	38

Although hospitals are managed by both public and private entities, other facilities such as barangay health station and rural health unit fall under the jurisdiction of LGUs in general. In the region, there are 38 public hospitals and 43 private hospitals. A rural health unit is usually located in a municipal center and a

barangay health station is located in a barangay center area or sometimes absorbed in a barangay hall. In terms of bed capacity of hospitals, the national average was estimated at 1.1 beds per 1000 population, as shown in Table 6.2.1. The regional average was estimated at 0.9 bed, taking account of the provincial averages of Cagayan and Isabela in the table. The regional condition of medical status appeared backward as compared with the national average of 1.1 beds.

6.3 Roads

As of 1999, the existing road was 14,530 km in total length in the region. In Cagayan and Isabela Provinces, there were 4,480 km and 5,870 km of roads respectively, as shown in Table 6.3.1. The road density in the provinces, i.e., the total length of road to the total land area, was 498 m/km^2, 551 m/km^2 respectively.

Concrete surface road is resistant to for flood disaster. In the region, the total length of this type was 1,295 km or 8.9% of the total length in 1999, as shown in Table 6.3.2. On the other hand, the length of asphalt surface road, vulnerable to flood, was 387 km or 2.7% only.

6.4 Water Supply

The system of waterworks is generally classified into three levels, namely; (a) Level 1, indicating a service level by a point source such as protected well and spring with an outlet and no distribution system; (b) Level 2, indicating a communal faucet system; and (c) Level 3, referring to a piped system connected to individual consumers.

The coverage of households served by potable water systems from the above three levels was 36% throughout the country in 1990. In the region, this rate was 71%, as shown in Table 6.4.1. The potable water system of Level 3 covered around 375,000 households in 1997, accounting for 21% of the total regional households. Taking into account of this situation, the coverage of water supply in the region might be fairly higher than the national average. The coverage in Cagayan Province is higher than the regional average, but that in Isabela Province was slightly lower than the regional average, as shown in the table.

6.5 Electrification

An electricity supply system is divided into two classes, i.e., (1) generation and primary power transmission, and (2) power distribution and connection services. The primary services are covered by National Power Corporation (NAPOCOR) and the secondary services are covered by the individual retailers. They are CAGELCO I and CAGELCO II in Cagayan Province. In the same manner, they are ISABELCO I and ISABELCO II in Isabela Province, VIZELCO in Nueva Vizcaya Province and QUIRELCO in Quirino Province in Region 2.

The electrification program for the country, the region and the province is shown in Table 6.5.1. In Region 2, the electrification coverage in the municipal level and barangay level was completely sufficient. However, barangay level and individual connection levels were considerably backward, 73% and 70% in 1998 respectively, as shown in the table. This electrification situation stands at almost the same position as the national average. Most of the houses in urban areas are covered by the electricity networks, but rather rural houses could not be covered by electricity distribution network. In the habitually inundated areas, and most houses in rural areas are not electrified by the systems.

6.6 Telecommunications

Telephone service penetration in the province was quite backward from expected levels. This is quite different from electrification. Telephone density, i.e., the number of connections per 100 persons, was 0.3, as shown in Table 6.6.1. This figure was much worse than the national average of 3.5. Incidentally, the regional density in NCR was 14.8. The telephone system is covered by the three corporations: Philippine Long-Distance Telephone (PLDT), Digitel and ETPI (covering Tuguegarao City only).

On the other hand, these days cellular phone systems are now becoming popular in the region. There are three cellular phone companies in Region 2. They are SMART, Globe and Mobiline. The systems are spreading through the region.

CHAPTER 7 DEVELOPMENT PLANS

7.1 Basic Policy of Socio-economic Development in Medium-Term Plans

7.1.1 National Development Policy

Under the new administration in 1999, the "Medium-Term Philippine Development Plan 1999-2004" proposes the following policies for sustainable development and growth with social equity:

(a) Acceleration of agricultural growth through modernization programs;
(b) Delivery of basic social development services such as health/nutrition, education/training, housing, social welfare and social safety net programs;
(c) Strengthening competitiveness of domestic markets by means of privatization, deregulation and liberalization;
(d) Supposition of infrastructure development mainly by private sector with government intervention as necessary in rural areas;
(e) Ensuring macroeconomic stability to bring the regional economy back to a positive growth; and
(f) Reforming political, economic and administrative governance for stability of political environment, reduction criminality, and protection for basic human rights.

Promoting the new policies above, the latest plan proposes that the government aims to attain the following economic growth in GDP and GRDP figures during the planning period.

Scenario/ Area	1998 (Actual) (Billion Pesos)	Projection (Billion Pesos at 1998 Prices) 1999	2004	Ave. Growth Rate (% Per Annum)
GDP Growth Scenarios in Country				
High Growth	2,667	2,752	3,628	5.3
Low Growth	2,667	2,736	3,505	4.7
Low Growth Scenario without El Nino occurrence in 2001 and 2004				
NCR	925	949	1,268	5.4
CAR	60	62	93	7.7
Region 2	55	57	77	6.0
Other Regions	1,628	1,671	2,175	5.0
Philippines	2,667	2,738	3,613	5.2

As shown in Table 7.1.1, GDP per capita in 2004 is estimated at 43,800 Pesos at 1998 constant prices under the low growth scenario without El Niño occurrence in 2001 and 2004. In the same manner, GRDP per capita of Region 2 was estimated at 25,600 Pesos in 2004, accounting for 58% of the national average.

7.1.2 Regional Development Policy

Corresponding to the "Medium-Term Philippine Development Plan 1999-2004", the "Cagayan Valley Strategic Development Plan 1999-2004" was published by NEDA in 1999 for Region 2, the principle region of the Cagayan River Basin. The plan declared its long-term development vision, as "Cagayan Valley is a region of world class, empowered and productive citizenry with competitive agri-industrial economy, modern infrastructure, responsive basic services and well-managed ecosystem in peaceful and orderly communities at one god, among themselves and with the rest world".

In the plan, the government proposed three development strategies for regional development. They are (1) balanced regional agro-industrial and natural resources (BRAIN) development strategy, (2) decisive people empowerment (DPE), which focuses on improving the quality of life of the people and on ensuring people participation in the overall decision-making for regional development, and (3) mid-rib peripheral/growth center development strategy, which provides a rational prioritization and direction of physical and socio-economic development in the region. The development strategies aim at the national twin goals of global competitiveness and people empowerment.

Promoting the strategies, the latest plan suggested that the government would attain the following economic growth figures in GRDP and gross value added (GVA) of the major economic sectors during the planning period.

Item	1999	2004	(% Per Annum)
GRDP at 1985 Constant Prices			
GRDP (Billion Pesos)	17.97	24.50	6.4
Agriculture	9.12	11.71	5.1
Industry	2.21	3.83	11.6
Services	6.64	8.96	6.4
GRDP per Capita (1000 Pesos)	6.53	8.09	4.4
GRDP at 1985 Constant Prices			
GRDP (Billion Pesos)	56.77	77.48	6.4
GRDP per Capita (1000 Pesos)	20.62	25.57	4.4

GRDP in Region 2 was estimated as 77.5 billion Pesos at 1998 constant prices, growing at 6.4% per annum on average during the planning period. GRDP per capita was estimated as 25,600 Pesos, growing at 4.4% per annum on the average. The agriculture sector was expected to grow at 5.1%, which was the lowest rate among the major three economic sectors, so its GVA decreased from 51% in 1999 to 48% in 2004 although it still was the leading economic sector in the region. On the other hand, since the industry sector expected to grow at 11.6%, its GVA increases from 12% in 1999 to 16% in 2004.

7.2 Development Plans

There are three types of development plans in the Philippines. They are (a) physical framework and comprehensive land use plan (PFCLUP), (b) socio-economic development plan (DP) and (c) investment program (IP). From the viewpoint of time series, the PFCLUP is released in the first place among the plans. The present PFCLUPs cover a planning period of 10 years from 1993 to 2002. Taking the plan into consideration, the DP is organized for developing socio-economic activities in the territory. The IP is drawn up to support the activities by means of budgetary appropriation from treasury. Table 7.2.1 shows a part of the IP. These plans are provided in the respective government levels in principle, i.e., national, regional, provincial/city and municipal levels. In principle, the plans are formulated under bottom-up policy from municipal level to national level.

7.3 Long-Term Development Plans

A long-term development plan (LTDP) was published by the previous administration during the former president Ramos era. Although it included long-term scenarios, it was originally announced to depict a medium-term picture of the country toward the next century. It was named as "the Philippine National Development Plan, directions for the 21st Century" in 1998. It covered a long-term planning period of 25 years from 1999 to 2025. The new administration under the new president Estrada seems to draw up a new long-term development plan.

The LTDP presented two long-term growth scenarios for the planning period of 20 years from 2005 to 2025. The annual growth rates of both 10% of high growth scenario and 8% of low growth scenario for the period seem to be high as compared with the past performance of the country. As an instance in the country, the actual average growth rate was 2.9% per annum during the latest 20 years between 1978 and 1998. The highest annual growth rate was 6.0% on the average for the 20 years from 1961 to 1981, as far as the rates were estimated from available data.

7.4 Long-Term GRDP Projected by NEDA Regional Office 2

The JICA study team made a request to NEDA Region 2 for economic growth projection in the region, since no information in terms of long-term economic development is available.

They drew up a long-term economic growth projection beyond 2004, answering our persistent request to them. The projection includes two scenarios, that is, high and low. The GRDP in Region 2 was projected as follows

Scenario	MTDP	NEDA Projection			Growth Rate (%)	
	2004	2005	2010	2020	2005/'10	2010/'20
Low Scenario						
GRDP (Billion Pesos)	77.5	83.1	100.6	143.0	3.9	3.6
GRDP per Capita (1000Pesos)	25.6	26.9	30.1	38.2	2.3	2.4
High Scenario						
GRDP (Billion Pesos)	77.5	83.1	126.6	268.3	8.8	7.8
GRDP per Capita (1000Pesos)	25.6	26.9	37.9	71.7	7.1	6.6

In order to draw up the growth projection, NEDA staff assumed the following conditions.

a) The agro-fishery modernization act (AFMA) is implemented on schedule. It has more direct impact on the agriculture sector in the region. The fishery sector is expected to undergo rapid development for better production.

b) The Cagayan economic zone authority (CEZA) is expected to develop the industry sector especially the manufacturing sectors. Its on-site developments have provided job opportunities in the area. Once in operation, its investment invites skilled local labor to attend to all the needs of industries and has an accordion effect to the services sector.

c) The dual effect of AFMA and CEZA supported by the increasing economic activities promises a health services sector.

CHAPTER 8 SOCIO-ECONOMIC FRAMEWORK

8.1 Target Year

In the inception report, the target year of this project was set as 2015. Taking into account of the past performance of economic activities and investment for flood control in the Cagayan River Basin since the master plan was proposed in 1987, the planning period of 15 years seems to be too short for the project to attain its objectives. On 22nd of March 2000, the first Steering Committee in Manila suggested to extend the planning target year to 2020 instead of 2015. In addition, several other long-term development plans in the Philippines set their target year at 2020. On 30th of June 2000, the second Advisory Committee in Tokyo agreed to extend the target year to 2020, taking consideration of the suggestion of the Steering Committee. This agreement of the Advisory Committee under the request of the Steering Committee was informed to the Technical Working Group (TWG) on 18th of August 2000. The TWG confirmed the extension of the target year, 2020.

8.2 Population Projection

In the master plan, the basin population at the target year 2005 was projected at 3.26 million. Since the basin population in the 1980 census year was estimated at 1.88 million, it was projected to increase 1.38 million more by the target year. Its growth rate was calculated at 2.2% per annum on average for 25 years. According to the subsequent censuses, this growth rate seems to be slightly slowing down.

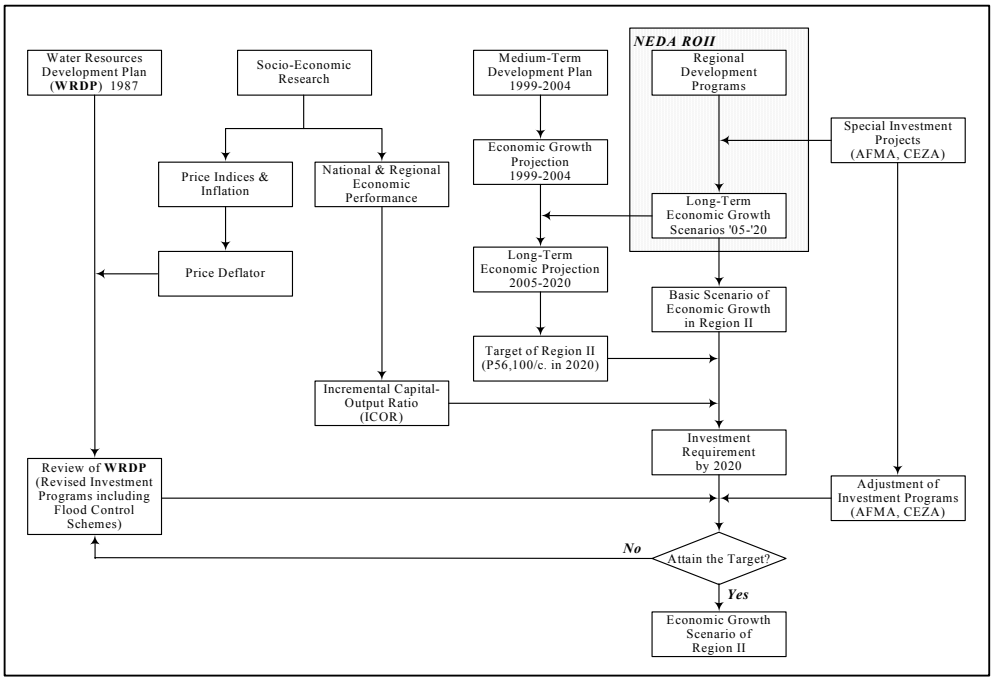
The National Statistics Office (NSO) presents population estimates for the country and for its subdivision down to provincial level for 25 years from 1996 to 2020 in the publication of "1995 Census-Based National, Regional and Provincial Population Projections" in May 1998. The national population is projected under the three scenarios, i.e., high, medium and low. The regional and provincial population projections are based on the medium growth scenario only. The following table in the next page shows the future basin population estimated on the basis of the medium projection.

The future basin populations projected in the years 2000, 2010 and 2025 are 2.84 million, 3.38 million, and 3.93 million, respectively. The respective annual growth rates are 2.22%, 1.75% and 1.13% on average.

Province	1995 Census Population (1000)	Projected Population (1000)		
		2000	2010	2025
Cagayan	562	617	715	790
Isabela	1,125	1,262	1,505	1,672
Nueva Vizcaya	314	352	425	483
Quirino	131	151	191	226
Apayao	15	16	19	21
Ifugao	150	168	202	232
Kalinga	154	171	201	222
Mt. Province	89	97	113	127
Aurora	9	10	12	14
Cagayan R. Basin	2,548	2,844	3,383	3,787

8.3 GRDP Projection

Referring to the economic development projection by NEDA Region 2 mentioned in Section 7.4, the JICA study team drew up a presumable growth scenario in Region 2. In its scenario, the goal is set for GRDP per capita in Region 2 to equal the national average excluding NCR by the target year 2020. The economic growth scenario was drawn up on the condition that the following economic events could be implemented during the planning period. The projection procedure is based on this scenario and illustrated in the figure below.



1) The national economy grows at the same rate of 5.2% as proposed under the low growth scenario without El Niño occurrence in 2001 and 2004 in "Medium-Term Philippine Development Plan 1999-2004".
2) As a result, the target of economic development in Region 2 is estimated at 56,100 Pesos in the target year 2020.

3) At least, Region 2 grows in pursuance of the low growth scenario, drawn by NEDA Region 2 on the basis of the past regional trend.
4) The central government already appropriated an initial fund of 447 million Pesos for AFMA for Region 2. The fund is expected to increase in proportion to the national economic growth of 5.2% annually until the target year.
5) CEZA estimates the total investment for the entire projects as around 120 billion Pesos, including private and public investment. Of the total amount, approximately 50% or 61 billion Pesos are invested by the public sector. In 2000, the government appropriates 108 million Pesos. By the target year, a half of the public investment will be implemented at least.
6) An incremental capital-output ratio (ICOR) of Region 2 will keep 5.9 till 2005, the same rate as the present one. It is assumed to be improved to the national level, 5.5, by the target year 2020. ICOR was already discussed in Section 4.2.

In addition to these projects, "Water Resources Development Projects" were proposed to push up the regional economy in the basin since the 1987 Master Plan was adopted by the government. However, its progress has been meager so far, although the existence of the plan was well known among the agencies concerned. The plan is an important component to encourage the regional economy. Thus, the plan should be implemented as soon as possible for the promotion of regional economy.

7) Once the government invests 30 billion Pesos by the target year 2020, it would produce the economic goal of 56,100 Pesos per capita in Region 2. To attain the economic goal of 56,100 Pesos in 2020, the government should invest its fund of approximately 30 billion Pesos in Water Resources Development Projects in addition to the projects above by the target year 2020. Incidentally, it corresponds to one-third of the total investment costs of 90.6 billion Pesos at 1998 constant prices.
8) In pursuance of these special projects, ripple effects and private capital formation will be taken in part in the region. For instance, many CEZA projects lead the investment from the private sector through the BOT system. The detailed CEZA projects are listed in Table 8.3.1. In addition, the private development activities related to the proposed projects will be induced by the major CEZA development works. In the water resources development projects, the same effects will be expected in accordance with their implementation. Thus, the total amount is estimated applying the past trend

of gross fixed capital formation, i.e., four points of private investment against one point of public investment. The total amount is expected at 327 billion Pesos in total by 2020.

The total amount of the required investment in the region during the planning period is summarized in the table below. The detailed figures are enumerated in Table 8.3.2.

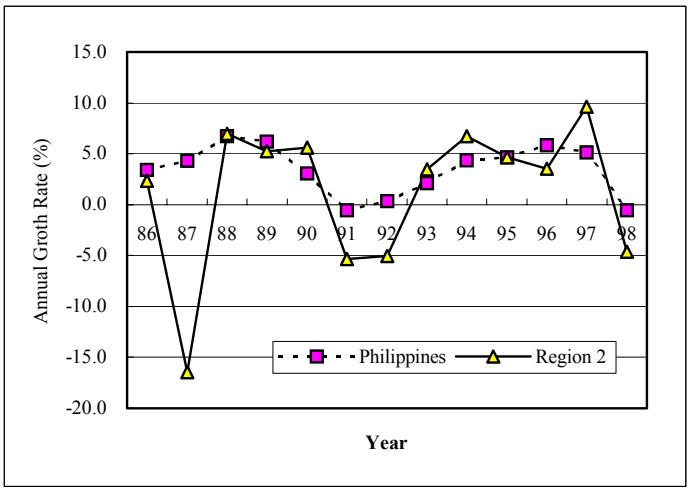
(Unit: Billion Pesos)

Item	Investment		Accumulated Investment		
	2010	2020	2000-'10	2011-'20	Total
1. Current Projects	15.2	32.4	258.8	250.1	508.9
2. Special Projects	20.0	33.3	141.7	267.6	409.3
• AFMA	0.7	1.2	6.4	9.9	16.3
• CEZA	1.6	2.7	13.3	21.9	35.2
• Water Resources	1.6	2.7	8.6	21.7	30.3
• Other Capital Formation	16.0	26.6	113.4	214.1	327.4
3. Total	35.2	65.7	400.6	517.7	918.2

The investment required to attain the target growth was projected on the basis of a simple model applying past growth trend data and ICOR in the region. This is one of simulation methods for projection. Once another simulation model is applied for the projection, the investment requirement would result in the different amount. As a reference, hence, a simulation trial is conducted and its report is attached in the APPENDIX. It provides a more exhaustive simulation mode for budget allocation in the country. From this point of view, budgets for capital investment in Region 2 are appropriated to major economic sectors through the simulation model.

8.4 Investment for Water Resources Development

As discussed in the previous section, the government should invest approximately 30 billion Pesos for water resources development including flood control projects by the target year 2020, in order that the economic level reach the target of GRDP per capita in 2020. The implementation projects among many



components of water resources development would rather be selected on the basis of urgency, equitability and economic priority in the region.

As a result, the regional economy is expected to grow at an average rate of 6.2% during the planning period. Region 2 has experienced this economic growth rate in 1987, 1994 and 1997 since 1985, as shown in the figure above. Although its opportunity was not so many times, it would be possible for the region to manage its regional economic development with prudence. In 2020, GRDP per capita is estimated to be at 56,100 Pesos.

8.5 Poverty Alleviation

8.5.1 Vicious Cycle of Farmer's Livelihood

A vicious cycle of farmer's livelihood was identified through interview survey of farmers engaging in the flood prone area. Farmers are suffering from ceaseless stress at all stage of farming. The factors affecting the farmer's livelihood are itemized below:

a) Natural calamity of flooding and drought;
b) Shortage of dryers and storage facilities;
c) Traditional way of tenant farming system; and
d) Landless/jobless farmers.

In addition to these factors, the social environment in their livelihood should be considered, that is, the custom of holding extravagant feast, or celebration, beyond their means. Most of farmers hold seasonal fiesta such as barangay feast, town fiesta, Christmas feast, New Year feast, and so on, inviting dozens of their relatives and friends. They usually spend more than 10,000 Pesos for one feast. They try to hold such a seasonal feast by borrowing money when they do not have enough money.

According to the farmers interviewed, in most cases, they are willing to hold such a feast even if they have to borrow money for them. In this respect, the habit might not be considered a problem mentally, but that this habit is oppressing their livelihood is an undeniable fact, and most of farmers are not recognizing it.

8.5.2 Development Expectation of Poverty Alleviation

The first step to poverty alleviation is to let the farmers recognize the vicious cycle where they have got into. The following actions would be possible solutions:

a) Construction of infrastructure to prevent crop damages by flooding and drought, such as irrigation and flood control facilities;
b) Promotions of land reform program with appropriate support to the small-scale beneficiary farmers, which enable them to continue sustainable farming;
c) Establishment of farmer's organization to promote cooperative activities for farming and for negotiating with landowners and traders; and
d) Strengthening of the formal financial assistance that enable farmers access to loans to solve shortage problem of drying and storage facilities by themselves;

As shown in these actions, the water resources development schemes could help the farmers get out of the vicious cycle. Thus, the water resource development projects take an important role in solving the poverty alleviation.

The second step to poverty alleviation is to strengthen information, education and communication providing farmers with opportunities recognizing the situation that they are in and with possible solutions at each stage of the vicious cycle. Improvement of economic situation in the region could be effective for them to recognize their poverty situation and to find out their solutions. By the year 2020, GRDP per capita in Region 2 is expected to reach to 56,100 Pesos at 1998 constant prices. This is almost 2.8 times of that in 1998, and equal to the national average except NCR. This condition could be effective finally to alleviate poverty conditions. In fact, their poverty conditions in the region are being improved in accordance with the regional economic growth, as mentioned in the "Cagayan Valley Strategic Development Plan 1999-2004".

Tables

Table 3.1.1 Population Growth by Municipality Related to Cagayan River Basin: 1970, 1980, 1990 and 1995 (1/4)

Nation, Region Province Municipality	Census Population 1970	1980	1990	1995	Municipal Area (km^2)	Percentage in Basin (%)		Area in Basin (km^2)	Basin Census Population 1970	1980	1990	1995	Average Annual Growth Rate of Basin Population (%) '70/80	'80/90	'90/95	Population Density in '95 (P./km^2)
Philippines	36,684,486	48,316,503	60,703,206	68,616,536	300,000	-		-	-	-	-	-	-	-	-	229
Region 2	1,462,723	1,919,091	2,340,545	2,536,035	26,838	-		18,845	1,171,706	1,565,475	1,958,906	2,136,402	2.94	2.27	1.75	94
CAR	730,906	914,432	1,146,191	1,254,838	18,294	-		8,037	246,650	307,639	377,986	408,928	2.23	2.08	1.59	69
Provinces Related	1,859,540	2,431,825	2,941,011	3,205,619	41,531	-		-	-	-	-	-	-	-	-	77
Cagayan River Basin	-	-	-	-	-	-		27,281	1,423,599	1,877,923	2,344,728	2,554,156	2.81	2.24	1.73	94
Cagayan	581,237	713,482	828,204	895,050	9,002.7	-		4,251	342,817	422,630	514,128	562,200	2.12	1.98	1.80	132
Abulug	19,206	23,984	24,034	23,548	162.6	0		0	0	0	0	0	-	-	-	-
Alcala	21,328	24,574	29,160	32,035	187.2	100	*	187	21,328	24,574	29,160	32,035	1.43	1.73	1.90	171
Allacapan	12,946	19,327	21,792	23,997	306.8	41	*	126	6,052	8,839	10,704	11,787	3.86	1.93	1.95	94
Amulung	24,283	29,161	35,116	37,744	242.2	100	*	242	24,283	29,161	35,116	37,744	1.85	1.88	1.45	156
Aparri	40,307	45,197	51,501	53,639	286.6	35	*	101	18,165	19,670	27,746	28,898	0.80	3.50	0.82	285
Baggao	36,471	44,205	55,252	60,060	920.6	56	*	516	21,367	26,766	34,538	37,544	2.28	2.58	1.68	73
Ballesteros	19,042	22,317	24,848	25,644	120.0	0		0	0	0	0	0	-	-	-	-
Buguey	17,571	21,297	22,876	25,058	138.2	0		0	0	0	0	0	-	-	-	-
Calayan	6,782	8,994	11,222	12,243	494.5	0		0	0	0	0	0	-	-	-	-
Camalaniugan	13,268	15,121	17,273	19,915	76.5	78	*	60	11,107	12,573	14,425	16,631	1.25	1.38	2.89	279
Claveria	22,614	24,578	24,135	25,363	194.8	0		0	0	0	0	0	-	-	-	-
Enrile	19,431	23,469	25,603	28,736	184.5	100	*	185	19,431	23,469	25,603	28,736	1.91	0.87	2.34	156
Gattaran	29,241	35,577	41,556	44,034	707.5	64	*	453	19,545	23,661	28,217	29,900	1.93	1.78	1.17	66
Gonzaga	17,686	22,530	26,498	27,997	486.2	0		0	0	0	0	0	-	-	-	-
Iguig	13,684	15,804	18,598	19,100	108.1	100	*	108	13,684	15,804	18,598	19,100	1.45	1.64	0.53	177
Lallo	21,400	27,023	31,276	32,156	702.8	18	*	127	5,028	5,879	8,460	8,698	1.58	3.71	0.56	69
Lasam	18,924	23,117	27,375	30,235	213.7	76	*	162	15,177	18,323	21,969	24,265	1.90	1.83	2.01	149
Pamplona	13,568	17,653	16,744	18,107	173.3	0		0	0	0	0	0	-	-	-	-
Penablanca	18,218	24,958	30,509	33,190	1,193.2	62	*	740	11,295	15,474	19,798	21,537	3.20	2.49	1.70	29
Piat	11,528	14,086	17,764	17,472	139.6	100	*	140	11,528	14,086	17,764	17,472	2.02	2.35	-0.33	125
Rizal	10,460	11,481	12,477	13,901	124.4	100	*	124	10,460	11,481	12,477	13,901	0.94	0.84	2.19	112
Sanchez-Mira	16,182	18,236	17,810	18,904	198.4	0		0	0	0	0	0	-	-	-	-
Santa Ana	9,799	12,586	17,567	18,640	441.3	0		0	0	0	0	0	-	-	-	-
Santa Praxedes	1,921	2,217	2,500	2,709	110.0	0		0	0	0	0	0	-	-	-	-
Santa Teresita	8,569	10,176	11,554	12,566	25.0	0		0	0	0	0	0	-	-	-	-
Santo Nino (Faire)	16,923	19,548	18,608	21,151	512.9	75	*	386	14,482	16,604	14,997	17,047	1.38	-1.01	2.60	44
Solana	34,172	46,194	56,347	60,346	234.6	100	*	235	34,172	46,194	56,347	60,346	3.06	2.01	1.38	257
Tuao	28,757	36,357	43,911	49,285	215.5	100	*	216	28,757	36,357	43,911	49,285	2.37	1.91	2.34	229
Tuguegarao City	56,956	73,715	94,298	107,275	144.8	100	*	145	56,956	73,715	94,298	107,275	2.61	2.49	2.61	741
Isabela	650,759	879,161	1,080,542	1,162,716	10,664.6	-		8,237	617,271	831,685	1,047,158	1,126,998	3.03	2.33	1.48	137
Alicia	24,220	36,911	47,659	52,666	138.2	100	*	138	24,220	36,911	47,659	52,666	4.30	2.59	2.02	381
Angadanan	22,820	27,915	32,492	33,145	204.4	100	*	204	22,820	27,915	32,492	33,145	2.04	1.53	0.40	162

Table 3.1.1 Population Growth by Municipality Related to Cagayan River Basin: 1970, 1980, 1990 and 1995 (2/4)

Nation, Region Province Municipality	Census Population 1970	1980	1990	1995	Municipal Area (km^2)	Percentage in Basin (%)		Area in Basin (km^2)	Basin Census Population 1970	1980	1990	1995	Average Annual Growth Rate of Basin Population (%) '70/80	'80/90	'90/95	Population Density in '95 (P./km^2)
Aurora	16,035	20,475	24,856	26,385	48.0	100	*	48	16,035	20,475	24,856	26,385	2.47	1.96	1.20	550
Benito Soliven	14,850	16,836	20,236	20,685	166.8	100	*	167	14,850	16,836	20,236	20,685	1.26	1.86	0.44	124
Burgos	10,704	15,252	17,485	19,052	57.7	100	*	58	10,704	15,252	17,485	19,052	3.60	1.38	1.73	330
Cabagan	23,370	29,126	34,983	35,054	430.4	100	*	430	23,370	29,126	34,983	35,054	2.23	1.85	0.04	81
Cabatuan	16,331	21,561	26,272	28,449	72.0	100	*	72	16,331	21,561	26,272	28,449	2.82	2.00	1.60	395
Cauayan	40,732	62,694	83,296	92,677	380.2	100	*	380	40,732	62,694	83,296	92,677	4.41	2.88	2.16	244
Cordon	12,972	21,153	27,280	30,461	144.0	100	*	144	12,972	21,153	27,280	30,461	5.01	2.58	2.23	212
Dinapigue	668	770	2,062	3,046	574.4	75		431	501	578	1,064	1,572	1.43	6.30	8.12	4
Divilican	563	1,873	2,479	2,593	197.8	70		138	394	1,311	1,735	1,815	12.77	2.84	0.90	13
Echague	36,180	41,703	51,897	56,119	258.4	100	*	258	36,180	41,703	51,897	56,119	1.43	2.21	1.58	217
Gamu	12,586	17,050	19,128	22,765	129.4	100	*	129	12,586	17,050	19,128	22,765	3.08	1.16	3.54	176
Ilagan	62,118	79,935	98,867	106,912	550.0	85	*	468	42,520	53,520	87,346	94,453	2.33	5.02	1.58	202
Jones	25,657	29,046	34,324	34,669	670.1	100	*	670	25,657	29,046	34,324	34,669	1.25	1.68	0.20	52
Luna	7,008	9,819	12,335	13,255	45.7	100	*	46	7,008	9,819	12,335	13,255	3.43	2.31	1.45	290
Maconacon	1,390	4,555	7,223	5,895	22.4	55		12	765	2,505	3,339	2,725	12.60	2.91	-3.98	221
Delfin Albano (Magsaysay)	13,905	17,859	20,409	21,811	145.7	100	*	146	13,905	17,859	20,409	21,811	2.53	1.34	1.34	150
Mallig	11,920	17,311	22,060	23,344	133.4	100	*	133	11,920	17,311	22,060	23,344	3.80	2.45	1.14	175
Naguilian	18,425	20,274	24,063	24,268	169.7	100	*	170	18,425	20,274	24,063	24,268	0.96	1.73	0.17	143
Palanan	7,518	10,373	11,373	13,220	880.2	37		326	2,782	3,838	3,396	3,948	3.27	-1.22	3.06	12
Quezon	7,271	9,894	16,280	17,617	189.9	100	*	190	7,271	9,894	16,280	17,617	3.13	5.11	1.59	93
Quirino	10,415	14,481	17,070	18,320	126.2	100	*	126	10,415	14,481	17,070	18,320	3.35	1.66	1.42	145
Ramon	15,211	31,048	33,443	35,885	75.0	100	*	75	15,211	31,048	33,443	35,885	7.40	0.75	1.42	478
Reina Mercedes	10,899	14,497	17,139	17,816	35.0	100	*	35	10,899	14,497	17,139	17,816	2.89	1.69	0.78	509
Roxas	22,997	33,295	40,186	45,187	184.8	100	*	185	22,997	33,295	40,186	45,187	3.77	1.90	2.37	245
San Agustin	13,294	14,992	16,577	17,861	278.4	100	*	278	13,294	14,992	16,577	17,861	1.21	1.01	1.50	64
San Guillermo	9,970	7,038	10,688	12,506	168.1	100	*	168	9,970	7,038	10,688	12,506	-3.42	4.27	3.19	74
San Isidro	8,384	11,614	14,444	16,043	71.9	100	*	72	8,384	11,614	14,444	16,043	3.31	2.20	2.12	223
San Manuel	11,307	18,104	24,593	25,527	76.4	100	*	76	11,307	18,104	24,593	25,527	4.82	3.11	0.75	334
San Mariano	20,227	32,079	36,295	37,861	1,469.5	90	*	1,323	14,919	23,824	33,405	34,846	4.79	3.44	0.85	26
San Mateo	29,604	41,463	48,461	48,861	100.2	100	*	100	29,604	41,463	48,461	48,861	3.43	1.57	0.16	488
San Pablo	11,539	13,868	16,565	17,122	155.2	75		116	8,654	10,401	11,196	11,572	1.86	0.74	0.66	99
Santa Maria	11,009	13,669	16,767	19,462	140.0	100	*	140	11,009	13,669	16,767	19,462	2.19	2.06	3.03	139
Santiago City	49,688	70,405	90,568	98,542	255.5	100	*	256	49,688	70,405	90,568	98,542	3.55	2.55	1.70	386
Santo Tomas	13,575	16,035	18,063	20,089	60.7	100	*	61	13,575	16,035	18,063	20,089	1.68	1.20	2.15	331
Tumauini	23,427	32,208	40,634	45,551	467.3	100	*	467	23,427	32,208	40,634	45,551	3.23	2.35	2.31	97
Nueva Vizcaya	174,168	244,925	302,556	336,960	3,903.9	-		3,301	161,852	227,142	283,565	316,085	3.45	2.24	2.20	96
Ambaguio	1,416	3,876	7,241	9,485	156.2	100	*	156	1,416	3,876	7,241	9,485	10.59	6.45	5.55	61
Aritao	18,098	22,118	25,933	29,151	402.7	100	*	403	18,098	22,118	25,933	29,151	2.03	1.60	2.37	72

Table 3.1.1 Population Growth by Municipality Related to Cagayan River Basin: 1970, 1980, 1990 and 1995 (3/4)

Nation, Region Province Municipality	Census Population 1970	1980	1990	1995	Municipal Area (km^2)	Percentage in Basin (%)		Area in Basin (km^2)	Basin Census Population 1970	1980	1990	1995	Average Annual Growth Rate of Basin Population (%) '70/80	'80/90	'90/95	Population Density in '95 (P./km^2)
Bagabag	16,327	20,963	26,024	28,279	118.0	100	*	118	16,327	20,963	26,024	28,279	2.53	2.19	1.68	240
Bambang	20,474	26,340	33,624	36,975	302.2	100	*	302	20,474	26,340	33,624	36,975	2.55	2.47	1.92	122
Bayombong	25,212	32,233	39,571	46,315	62.9	100	*	63	25,212	32,233	39,571	46,315	2.49	2.07	3.20	736
Diadi	4,407	8,650	11,335	12,469	104.1	100	*	104	4,407	8,650	11,335	12,469	6.98	2.74	1.93	120
Dupax del Norte	9,711	16,830	20,794	22,142	351.8	100	*	352	9,711	16,830	20,794	22,142	5.65	2.14	1.26	63
Dupax del Sur	7,047	9,682	12,294	13,900	590.0	90	*	531	6,342	8,714	11,388	12,875	3.23	2.71	2.49	24
Kasibu	7,952	15,107	21,399	26,252	358.5	100	*	359	7,952	15,107	21,399	26,252	6.63	3.54	4.17	73
Kayapa	14,920	20,597	18,678	19,376	481.4	40	*	191	5,908	8,156	7,795	8,086	3.28	-0.45	0.74	42
Quezon	5,156	9,766	12,202	13,944	186.2	100	*	186	5,156	9,766	12,202	13,944	6.60	2.25	2.70	75
Santa Fe	4,254	6,371	9,960	11,854	399.8	45	*	180	2,618	3,825	5,196	6,184	3.86	3.11	3.54	34
Solano	27,032	36,901	44,192	46,945	114.5	100	*	115	27,032	36,901	44,192	46,945	3.16	1.82	1.22	410
Villaverde	8,709	10,699	13,568	13,431	111.1	100	*	111	8,709	10,699	13,568	13,431	2.08	2.40	-0.20	121
Alfonso Castaneda	1,483	2,812	3,751	4,447	373.9	35	*	131	519	984	1,313	1,556	6.61	2.92	3.46	12
Quirino	49,767	84,018	114,055	131,119	3,057.2	-		3,057	49,767	84,018	114,055	131,119	5.38	3.10	2.83	43
Aglipay	7,854	12,452	16,419	20,205	391.2	100	*	391	7,854	12,452	16,419	20,205	4.72	2.80	4.24	52
Cabarroguis	7,838	17,615	21,766	22,812	240.1	100	*	240	7,838	17,615	21,766	22,812	8.43	2.14	0.94	95
Diffun	14,233	23,305	31,254	36,048	352.8	100	*	353	14,233	23,305	31,254	36,048	5.05	2.98	2.90	102
Maddela	14,976	23,910	25,244	28,645	296.1	100	*	296	14,976	23,910	25,244	28,645	4.79	0.54	2.56	97
Nagtipunan	-	-	9,460	12,509	1,711.4	100	*	1,711	-	-	9,460	12,509	-	-	5.75	7
Saguday	4,866	6,736	9,912	10,900	65.5	100	*	66	4,866	6,736	9,912	10,900	3.31	3.94	1.92	166
Ifugao	92,487	111,574	147,030	149,598	2,517.8	-		2,518	92,487	111,574	147,030	149,598	1.89	2.80	0.35	59
Aguinaldo	-	-	19,748	12,623	126.5	100	*	127	-	-	19,748	12,623	-	-	-8.56	100
Asipulo	-	-	-	9,964	70.7	100	*	71	-	-	-	9,964	-	-	-	141
Banaue	20,268	22,943	16,908	20,514	267.2	100	*	267	20,268	22,943	16,908	20,514	1.25	-3.01	3.94	77
Hingyon	-	-	8,373	9,724	137.4	100	*	137	-	-	8,373	9,724	-	-	3.04	71
Hungduan	8,958	9,875	7,254	9,491	213.1	100	*	213	8,958	9,875	7,254	9,491	0.98	-3.04	5.52	45
Kiangan	15,123	17,513	21,304	13,514	443.3	100	*	443	15,123	17,513	21,304	13,514	1.48	1.98	-8.70	30
Lagawe	14,085	15,103	12,348	14,898	209.4	100	*	209	14,085	15,103	12,348	14,898	0.70	-1.99	3.83	71
Lamut	8,068	11,037	14,096	17,081	104.6	100	*	105	8,068	11,037	14,096	17,081	3.18	2.48	3.92	163
Mayoyao	20,189	24,067	23,928	14,733	343.7	100	*	344	20,189	24,067	23,928	14,733	1.77	-0.06	-9.24	43
Alfonso Lista (Potia)	5,796	11,036	14,815	17,552	410.2	100	*	410	5,796	11,036	14,815	17,552	6.65	2.99	3.45	43
Tinoc	-	-	8,256	9,504	192.2	100	*	192	-	-	8,256	9,504	-	-	2.86	49
Kalinga	88,567	116,975	138,815	156,140	3,077.5	-		3,078	88,567	116,975	138,815	156,140	2.82	1.73	2.38	51
Balbalan	8,312	9,217	10,142	11,742	518.3	100	*	518	8,312	9,217	10,142	11,742	1.04	0.96	2.97	23
Lubuagan	7,236	8,591	9,184	9,897	329.5	100	*	330	7,236	8,591	9,184	9,897	1.73	0.67	1.51	30
Pasil	5,557	6,909	7,572	8,935	188.0	100	*	188	5,557	6,909	7,572	8,935	2.20	0.92	3.37	48
Pinukpuk	13,429	17,455	20,095	23,057	726.1	100	*	726	13,429	17,455	20,095	23,057	2.66	1.42	2.79	32
Rizal (Liwan)	8,034	11,699	10,885	12,173	177.5	100	*	178	8,034	11,699	10,885	12,173	3.83	-0.72	2.26	69

Table 3.1.1 Population Growth by Municipality Related to Cagayan River Basin: 1970, 1980, 1990 and 1995 (4/4)

Nation, Region Province Municipality	Census Population 1970	1980	1990	1995	Municipal Area (km^2)	Percentage in Basin (%)		Area in Basin (km^2)	Basin Census Population 1970	1980	1990	1995	Average Annual Growth Rate of Basin Population (%) '70/80	'80/90	'90/95	Population Density in '95 (P./km^2)
Tabuk	28,016	42,997	56,987	63,507	641.7	100	*	642	28,016	42,997	56,987	63,507	4.38	2.86	2.19	99
Tanudan	5,696	6,361	9,323	11,243	306.9	100	*	307	5,696	6,361	9,323	11,243	1.11	3.90	3.82	37
Tinglayan	10,317	11,766	12,637	13,591	189.5	100	*	190	10,317	11,766	12,637	13,591	1.32	0.72	1.47	72
Apayao	49,652	71,060	74,566	83,660	3,970.1	-		598	8,076	12,337	13,426	14,549	4.33	0.85	1.62	24
Calanasan (Bayag)	5,214	5,586	10,669	11,679	1,293.2	0		0	0	0	0	0	-	-	-	-
Conner	9,419	14,272	16,179	17,461	694.3	77	*	535	7,253	10,989	12,458	13,445	4.24	1.26	1.54	25
Flora	6,510	12,361	10,759	12,310	324.4	7		23	456	865	495	566	6.62	-5.43	2.73	25
Kabugao	7,358	9,651	11,186	12,710	806.4	5		40	368	483	474	538	2.75	-0.19	2.59	13
Luna	9,980	13,741	10,537	12,126	655.4	0		0	0	0	0	0	-	-	-	-
Pudtol	5,735	7,639	7,618	8,656	238.9	0		0	0	0	0	0	-	-	-	-
Santa Marcela	5,436	7,810	7,618	8,718	70.4	0		0	0	0	0	0	-	-	-	-
Mt. Province	93,112	103,151	116,171	130,755	2,097.3	-		1,844	57,520	66,753	78,714	88,641	1.50	1.66	2.40	48
Barlig	4,053	5,246	6,267	7,477	85.4	100	*	85	4,053	5,246	6,267	7,477	2.61	1.79	3.59	88
Bauko	14,104	16,704	21,073	24,242	153.0	60	*	92	8,462	10,022	12,836	14,766	1.71	2.51	2.84	161
Besao	9,286	9,102	8,412	9,147	107.8	0		0	0	0	0	0	-	-	-	-
Bontoc	16,901	17,108	17,641	21,192	396.1	96	*	378	16,140	16,338	16,980	20,398	0.12	0.39	3.74	54
Natonin	5,690	7,332	9,808	8,997	490.5	100	*	491	5,690	7,332	9,808	8,997	2.57	2.95	-1.71	18
Paracelis	5,666	9,738	12,927	15,882	567.7	100	*	568	5,666	9,738	12,927	15,882	5.56	2.87	4.20	28
Sabangan	6,517	8,202	8,078	8,609	127.5	100	*	128	6,517	8,202	8,078	8,609	2.33	-0.15	1.28	68
Sadanga	5,115	6,656	7,302	8,373	83.3	63	*	52	3,222	4,193	4,600	5,275	2.67	0.93	2.78	101
Sagada	12,947	9,469	10,328	10,354	83.3	60	*	50	7,768	5,681	7,218	7,237	-3.08	2.42	0.05	145
Tadian	12,833	13,594	14,335	16,482	145.2	0		0	0	0	0	0	-	-	-	-
Aurora	79,791	107,479	139,072	159,621	3,239.5	-		398	5,243	4,808	7,836	8,826	-0.86	5.01	2.41	22
Baler	14,632	18,406	24,611	26,919	92.6	0		0	0	0	0	0	-	-	-	-
Casiguran	12,128	13,968	18,255	19,578	715.4	19		136	1,815	1,746	2,161	2,318	-0.39	2.16	1.41	17
Dilasag	5,327	6,737	11,162	12,825	306.3	36		110	1,544	1,034	3,120	3,585	-3.93	11.68	2.82	33
Danalungan	4,577	5,258	6,759	8,187	316.9	24		76	725	589	831	1,007	-2.06	3.50	3.91	13
Dingalan	6,616	8,729	14,342	19,325	304.6	0		0	0	0	0	0	-	-	-	-
Dipaculao	10,228	15,610	18,928	21,044	507.3	15		76	1,159	1,439	1,723	1,916	2.19	1.82	2.14	25
Maria Aurora	18,193	26,906	28,337	30,796	426.2	0		0	0	0	0	0	-	-	-	-
San Luis	8,090	11,865	16,678	20,947	605.9	0		0	0	0	0	0	-	-	-	-

Sources: (1) 1970, 1980 and 1990 Census Population and Housing, NSO
(2) 1995 Census of Population, 1997, NSO
(3) 1995 Census Maps, NSO

Note: *1 "*" mark means that an urban area of the municipality is included in the basin.
*2 Since urban populations were not identified in the 1995 census, the population ratio in the river basin was applied that in the 1990 census to estimate the basin population in 1995.
*3 According to NSO, the provincial total area is not equal to individual figures due to unfinished cadastral survey.
*4 A percentage of basin area to the total municipal territory was estimated on the basis of the administrative boundary map delineated applying the census maps of NSO by the JICA study team.

Table 3.1.2 Urban/Rural and Male/Female Population: 1990 Census Year

Area	Total Population			Urban Popualtion			Rural Population		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Population Distribution									
I. Philippines	60,559,116	30,443,187	30,115,929	29,440,153	14,546,463	14,893,690	31,118,963	15,896,724	15,222,239
II. Provinces Related to Cagayan River Basin	2,795,969	1,424,282	1,371,687	600,496	300,312	300,184	2,195,473	1,123,970	1,071,503
1. Region 2	2,321,377	1,183,831	1,137,546	543,490	271,896	271,594	1,777,887	911,935	865,952
Cagayan	828,204	420,247	407,957	195,434	97,335	98,099	632,770	322,912	309,858
Isabela	1,078,552	551,655	526,897	247,051	123,936	123,115	831,501	427,719	403,782
Nueva Vizcaya	300,566	153,026	147,540	71,919	35,835	36,084	228,647	117,191	111,456
Quirino	114,055	58,903	55,152	29,086	14,790	14,296	84,969	44,113	40,856
2. CAR	474,592	240,451	234,141	57,006	28,416	28,590	417,586	212,035	205,551
Ifugao	147,030	73,152	73,878	15,871	7,928	7,943	131,159	65,224	65,935
Kalinga-Apayao	116,171	58,971	57,200	10,506	5,122	5,384	105,665	53,849	51,816
Mt. Province	211,391	108,328	103,063	30,629	15,366	15,263	180,762	92,962	87,800
Percentage Share									
I. Philippines	100	50	50	49	24	25	51	26	25
II. Provinces Related to Cagayan River Basin	100	51	49	21	11	11	79	40	38
1. Region 2	100	51	49	23	12	12	77	39	37
Cagayan	100	51	49	24	12	12	76	39	37
Isabela	100	51	49	23	11	11	77	40	37
Nueva Vizcaya	100	51	49	24	12	12	76	39	37
Quirino	100	52	48	26	13	13	74	39	36
2. CAR	100	51	49	12	6	6	88	45	43
Ifugao	100	50	50	11	5	5	89	44	45
Kalinga-Apayao	100	51	49	9	4	5	91	46	45
Mt. Province	100	51	49	14	7	7	86	44	42

Source: 1990 Census of Population and Housing 1993, NSO

Table 3.2.1 Labor Force and Employment Status: 1990, 1995 and 1998

Item	Philippines	Region 2	CAR
Employment Status			
Projected Household Population, 15 Years Old & Over (in 1000)			
1990	37,999	1,498	714
1995	42,770	1,741	815
1998	47,415	1,885	876
Participation Rate to Labor Force			
1990	64.5	66.7	73.9
1995	65.6	71.3	71.2
1998	66.0	68.6	67.0
Percentage of Labor Force			
Employment Rate (%)			
1990	91.9	95.4	96.2
1995	91.6	97.3	93.8
1998	90.4	95.8	91.1
Unemployment Rate (%)			
1990	8.1	4.6	3.8
1995	8.4	2.7	6.2
1998	9.6	4.2	8.9
Underemployment Rate in Percent of Employed (%)			
1990	22.1	21.4	17.8
1995	19.8	17.5	17.1
1998	23.7	22.1	21.3
Employed Persons by Major Industry Group in October 1998 (in 1000)			
Agriculture	11,272	808	310
Agriculture, Fishery & Forestry	11,272	808	310
Industry	4,442	76	69
Mining & Quarrying	104	0	16
Manufacturing	2,687	34	24
Electricity, Gas & Water	140	3	2
Construction	1,511	39	27
Services	12,547	357	155
Wholesale & Retail Trade	4,328	126	40
Transportation, Storage & Communication	1,885	54	20
Financing, Real Estate & Business Service	695	12	7
Community, Social & Personal Services	5,631	165	88
Industry Not Adequately Defined or Repor	8	-	-
Total	28,261	1,241	534

Source: 1999 Philippine Statistical Yearbook, October 1999, NSCB

Table 3.2.2 Labor Force and Employment: 1990 Census Year

(Unit: 1000)

Area	Household Population 15 Years Old & Over	Labor Force			Not in Labor Force
		Total	Employed	Un-employed	
Population Distribution					
I. Philippines	36,572.4	21,106.6	19,318.2	1,788.5	15,465.8
Male	18,173.1	13,902.0	13,026.4	875.6	4,271.1
Female	18,399.3	7,204.7	6,291.8	912.9	11,194.7
II. Provinces Related to					
Cagayan River Basin	1,661.1	955.9	867.9	88.0	705.2
Male	843.4	634.4	594.0	40.4	209.0
Female	817.6	321.5	273.9	47.5	496.2
1. Region 2	1,384.0	749.8	671.6	78.2	634.2
Male	703.7	520.4	485.0	35.4	183.3
Female	680.2	229.4	186.6	42.8	450.8
Cagayan	497.0	275.0	247.7	27.4	222.0
Male	250.9	195.1	183.3	11.7	55.9
Female	246.1	80.0	64.3	15.6	166.1
Isabela	640.4	324.5	284.4	40.1	316.0
Male	327.3	225.2	205.4	19.8	102.2
Female	313.1	99.3	78.9	20.4	213.8
Nueva Vizcaya	179.7	114.2	106.6	7.5	65.6
Male	90.9	75.9	73.0	2.9	15.1
Female	88.8	38.3	33.7	4.6	50.5
Quirino	66.8	36.1	32.9	3.2	30.7
Male	34.6	24.3	23.3	1.0	10.2
Female	32.2	11.8	9.6	2.2	20.4
2. CAR	277.1	206.1	196.3	9.7	71.0
Male	139.7	114.0	109.0	5.1	25.7
Female	137.4	92.1	87.4	4.7	45.3
Ifugao	83.3	64.6	61.6	3.0	18.8
Male	41.4	34.9	33.7	1.3	6.5
Female	41.9	29.6	27.9	1.7	12.3
Kalinga-Apayao	70.6	54.9	52.8	2.1	15.7
Male	35.6	29.5	28.4	1.1	6.0
Female	35.1	25.4	24.5	0.9	9.7
Mt. Province	123.1	86.6	81.9	4.7	36.5
Male	62.7	49.6	46.9	2.6	13.2
Female	60.4	37.1	35.0	2.0	23.4

Source: 1990 Census of Population and Housing, Socio-economic and Demographic Characteristics, NSO

Table 3.2.3 Gainful Workers 15 Years Old and Over by Major Industry Group: 1990 Census Year

Major Industry Group	Region 2					CAR*1				Total of Region 2 & CAR
	Region	Cagayan	Isabela	N. Vizcaya	Quirino	Region *3	Ifugao	Kalinga-Apayao*2	Mt. Prov.	
I. Agriculture	**465,399**	**156,844**	**222,889**	**62,495**	**23,171**	**139,523**	**47,474**	**56,516**	**35,533**	**604,922**
Agriculture, Fishery & Forestry	465,399	156,844	222,889	62,495	23,171	139,523	47,474	56,516	35,533	604,922
II. Industry	**53,060**	**18,533**	**23,637**	**8,365**	**2,525**	**8,275**	**3,856**	**1,868**	**2,551**	**61,335**
1. Mining & Quarrying	610	90	126	349	45	1,880	579	410	891	2,490
2. Manufacturing	28,247	8,926	13,248	4,492	1,581	4,022	2,676	669	677	32,269
3. Electricity, Gas & Water	2,411	605	1,372	275	159	231	88	97	46	2,642
4. Construction	21,792	8,912	8,891	3,249	740	2,142	513	692	937	23,934
III. Services	**220,926**	**81,227**	**97,129**	**33,660**	**8,910**	**30,006**	**8,699**	**12,800**	**8,507**	**250,932**
1. Wholesale & Retail Trade	53,784	19,563	24,211	8,021	1,989	4,915	1,308	2,524	1,083	58,699
2. Transportation & Communication	28,735	12,499	11,055	4,289	892	2,301	810	733	758	31,036
3. Financing, Real Estate & Business Services	5,927	2,645	2,395	703	184	334	78	145	111	6,261
4. Community, Social & Personal Services	101,259	36,447	43,816	16,628	4,368	19,165	6,001	7,278	5,886	120,424
5. Activities not Adequately Defined	31,221	10,073	15,652	4,019	1,477	3,291	502	2,120	669	34,512
IV. Not Stated	41,280	21,026	11,197	1,011	8,046	13,095	635	8,141	4,319	54,375
Total	**780,665**	**277,630**	**354,852**	**105,531**	**42,652**	**190,899**	**60,664**	**79,325**	**50,910**	**971,564**
Percentage Distribution										
I. Agriculture	**59.6**	**56.5**	**62.8**	**59.2**	**54.3**	**73.1**	**78.3**	**71.2**	**69.8**	**62.3**
Agriculture, Fishery & Forestry	59.6	56.5	62.8	59.2	54.3	73.1	78.3	71.2	69.8	62.3
II. Industry	**6.8**	**6.7**	**6.7**	**7.9**	**5.9**	**4.3**	**6.4**	**2.4**	**5.0**	**6.3**
1. Mining & Quarrying	0.1	0.0	0.0	0.3	0.1	1.0	1.0	0.5	1.8	0.3
2. Manufacturing	3.6	3.2	3.7	4.3	3.7	2.1	4.4	0.8	1.3	3.3
3. Electricity, Gas & Water	0.3	0.2	0.4	0.3	0.4	0.1	0.1	0.1	0.1	0.3
4. Construction	2.8	3.2	2.5	3.1	1.7	1.1	0.8	0.9	1.8	2.5
III. Services	**28.3**	**29.3**	**27.4**	**31.9**	**20.9**	**15.7**	**14.3**	**16.1**	**16.7**	**25.8**
1. Wholesale & Retail Trade	6.9	7.0	6.8	7.6	4.7	2.6	2.2	3.2	2.1	6.0
2. Transportation & Communication	3.7	4.5	3.1	4.1	2.1	1.2	1.3	0.9	1.5	3.2
3. Financing, Real Estate & Business Services	0.8	1.0	0.7	0.7	0.4	0.2	0.1	0.2	0.2	0.6
4. Community, Social & Personal Services	13.0	13.1	12.3	15.8	10.2	10.0	9.9	9.2	11.6	12.4
5. Activities not Adequately Defined	4.0	3.6	4.4	3.8	3.5	1.7	0.8	2.7	1.3	3.6
IV. Not Stated	5.3	7.6	3.2	1.0	18.9	6.9	1.0	10.3	8.5	5.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: 1990 Census of Population and Housing, Socio-economic and Demographic Characteristics, NSO

Note: *1 In CAR which was created in 1989, Abra and Benguet Provinces are included in addition to the following three Provinces.

*2 In the 1990 census year, both Kalinga and Apayao Provinces were put together. They were seperated in two provinces in 1995

*3 Including the Provinces related to Cagayan River Basin.

Table 3.3.1 Inventory of Housing Units by Type and by Municipality in Floor Prone Area: 1990 Census Year

Province / City/Municipality	Housing Type*2 I / II	III	IV	Not Reported	Total
1. Cagayan Province	16,403	40,516	98,089	12	155,020
Isabala Province	26,403	52,342	119,127	13	197,885
Kalinga-apayao Province	2,543	14,404	20,876	1	37,824
2. **Lower Cagayan River Basin*1**	**15,393**	**39,931**	**93,904**	**9**	**149,237**
1) Cagayan Province	12,446	30,994	73,841	7	117,288
1 Alcala	285	1,364	4,086	1	5,736
2 Allacapan	232	1,808	2,049	1	4,090
3 Amulung	235	1,213	5,267	-	6,715
4 Aparri	941	2,875	5,655	1	9,472
5 Baggao	181	1,982	8,150	-	10,313
6 Ballesteros	839	1,189	2,776	-	4,804
7 Camalaniugan	465	1,432	1,375	-	3,272
8 Enrile	368	1,191	2,995	-	4,554
9 Gattaran	841	2,082	4,979	-	7,902
10 Iguig	379	748	2,442	-	3,569
11 Lallo	623	2,583	2,684	1	5,891
12 Lasam	362	1,666	3,105	1	5,134
13 Piat	256	803	2,504	-	3,563
14 Rizal	90	695	1,642	-	2,427
15 Santo Nino (Faire)	155	796	2,897	-	3,848
16 Solana	792	1,814	8,194	2	10,802
17 Tuao	695	1,345	6,466	-	8,506
18 Tuguegarao City	4,707	5,408	6,575	-	16,690
2) Isabela Province	1,355	4,921	11,938	1	18,215
19 Cabagan	731	1,715	3,332	-	5,778
20 San Mariano	226	1,479	4,745	-	6,450
21 San Pablo	272	761	1,738	1	2,772
22 Santo Tomas	126	966	2,123	-	3,215
3) Kalinga-apayao Province	1,592	4,016	8,125	1	13,734
23 Pinukpuk	108	1,023	2,465	0	3,596
24 Tabuk	1,484	2,993	5,660	1	10,138

Source: 1990 Census of Population and Housing, Housing Statistics, 1992, NSO

Note: *1 A total figure of a city and 23 municipalities only involved in the Lower Cagayan River Basin.

*2 Housing type is classified as follows, in imitation of a definition of Provincial/City Assessor's Office.

Type I/II (Reinforced concrete and semi-concrete): concrete/ brick/ stone walls and galvanized iron/ aluminum/ tile/ clay tile/ semi-concrete roofing

Type III (Strong material): Wood/ semi-concrete/ brick/ stone walls and wood roofing

Type IV (Temporary and Makeshift structure): Other structures

Table 3.3.2 Inventory of Housing Units by Year Built and by Municipality in Floor Prone Area: 1990 Census Year

Province/Municipality \ Year Built	1986 - 1990	1981 - 1985	1971 - 1980	1961 - 1970	1951 - 1960	1950 or Earlier	Total	Not Reported	Weighted Average of Year Built	Average Year Passed
1. Cagayan Province	56,637	31,142	30,814	16,880	8,904	6,539	150,916	4,241	1978	12
Isabala Province	76,657	42,355	42,379	19,211	9,035	4,872	194,509	3,491	1979	11
Kalinga Province	13,771	8,741	7,952	4,033	1,790	1,016	37,303	521	1979	11
2. **Lower Cagayan River Basin*1**	**53,216**	**31,825**	**31,091**	**15,994**	**8,146**	**5,163**	**145,435**	**3,934**	**1978**	**12**
1) Cagayan Province	41,545	24,605	23,959	12,564	6,559	4,547	113,779	3,623	1978	12
1 Alcala	2,163	1,083	944	632	410	295	5,527	216	1977	13
2 Allacapan	1,872	880	770	317	143	79	4,061	33	1981	9
3 Amulung	2,617	1,344	1,211	656	325	387	6,540	180	1978	12
4 Aparri	3,584	1,529	1,813	1,046	559	361	8,892	584	1978	12
5 Baggao	4,442	2,300	1,979	872	386	185	10,164	197	1980	10
6 Ballesteros	1,736	781	997	659	308	238	4,719	87	1977	13
7 Camalaniugan	1,144	586	632	415	250	215	3,242	32	1976	14
8 Enrile	1,137	1,013	1,245	643	319	159	4,516	38	1976	14
9 Gattaran	3,389	1,698	1,397	777	364	207	7,832	85	1980	10
10 Iguig	907	749	768	578	338	220	3,560	9	1975	15
11 Lallo	2,644	1,273	1,082	472	236	149	5,856	39	1980	10
12 Lasam	2,016	1,174	964	497	225	203	5,079	60	1979	11
13 Piat	1,232	845	860	349	169	87	3,542	22	1979	11
14 Rizal	712	599	480	247	168	97	2,303	124	1977	13
15 Santo Nino (Faire)	1,484	692	610	302	177	101	3,366	487	1980	10
16 Solana	3,854	2,389	2,385	977	508	281	10,394	410	1979	11
17 Tuao	2,856	2,086	1,759	901	423	361	8,386	125	1978	12
18 Tuguegarao City	3,756	3,584	4,063	2,224	1,251	922	15,800	895	1975	15
2) Isabela Province	6,547	3,700	4,066	2,155	1,122	462	18,052	181	1978	12
19 Cabagan	1,611	1,249	1,379	845	442	151	5,677	110	1977	13
20 San Mariano	3,330	1,178	1,146	447	228	96	6,425	31	1981	9
21 San Pablo	713	578	738	417	217	96	2,759	15	1976	14
22 Santo Tomas	893	695	803	446	235	119	3,191	25	1976	14
3) Kalinga Province	5,124	3,520	3,066	1,275	465	154	13,604	130	1980	10
23 Pinukpuk	1,397	950	684	383	109	31	3,554	42	1980	10
24 Tabuk	3,727	2,570	2,382	892	356	123	10,050	88	1980	10

Source: 1990 Census of Population and Housing, Housing Statistics, 1992, NSO

Note: *1 A total figure of a city and 23 municipalities only involved in the Lower Cagayan River Basin.

Table 3.3.3 Inventory of Housing Units by Floor Area and by Municipality in Floor Prone Area: 1990 Census Year

Province/Municipality \ Floor Area (m2)	Less than 10	10 - 19	20 - 29	30 - 49	50 - 69	70 - 89	90 - 119	120 & Over	Total	Not Reported	Weighted Average
1. Cagayan Province	24,874	44,722	36,604	27,256	10,016	5,181	2,996	3,471	155,120	37	29
Isabala Province	30,998	53,944	45,985	37,114	13,028	7,058	3,903	5,916	197,946	54	30
Kalinga Province	8,236	12,989	8,117	4,572	1,694	806	499	905	37,818	6	25
2. **Lower Cagayan River Basin*1**	**25,373**	**43,657**	**34,835**	**25,245**	**9,002**	**4,531**	**2,700**	**3,992**	**149,335**	**34**	**29**
1) Cagayan Province	19,046	34,341	28,157	20,283	7,093	3,619	2,126	2,707	117,372	30	29
1 Alcala	860	1,721	1,425	1,068	359	148	70	91	5,742	1	27
2 Allacapan	353	961	1,048	1,085	366	130	81	70	4,094	-	32
3 Amulung	1,699	2,249	1,494	864	242	95	46	28	6,717	3	21
4 Aparri	2,037	2,648	2,246	1,419	438	203	143	341	9,475	1	28
5 Baggao	1,037	3,604	2,805	1,945	469	281	112	105	10,358	3	27
6 Ballesteros	846	1,547	990	834	287	138	68	95	4,805	1	27
7 Camalaniugan	511	923	917	583	164	70	53	51	3,272	2	27
8 Enrile	128	1,116	1,226	1,082	474	260	137	131	4,554	-	37
9 Gattaran	1,661	2,007	1,781	1,300	532	285	189	162	7,917	-	29
10 Iguig	664	1,106	1,006	561	146	53	19	14	3,569	-	23
11 Lallo	957	1,571	1,341	1,205	462	180	93	86	5,895	-	29
12 Lasam	503	1,355	1,633	1,149	281	121	41	56	5,139	-	28
13 Piat	709	1,069	811	604	189	86	46	50	3,564	-	26
14 Rizal	208	831	674	434	130	74	35	41	2,427	-	28
15 Santo Nino (Faire)	560	1,102	923	748	283	132	76	27	3,851	2	28
16 Solana	2,438	3,855	2,556	1,154	370	213	99	115	10,800	4	22
17 Tuao	1,100	3,218	2,023	1,222	455	218	141	124	8,501	10	26
18 Tuguegarao City	2,775	3,458	3,258	3,026	1,446	932	677	1,120	16,692	3	39
2) Isabela Province	3,169	4,733	4,268	3,521	1,193	490	274	583	18,231	2	30
19 Cabagan	391	1,504	1,468	1,183	500	230	120	389	5,785	2	38
20 San Mariano	1,825	1,883	1,195	973	323	119	80	58	6,456	-	23
21 San Pablo	490	511	822	745	118	36	24	28	2,774	-	26
22 Santo Tomas	463	835	783	620	252	105	50	108	3,216	-	31
3) Kalinga Province	3,158	4,583	2,410	1,441	716	422	300	702	13,732	2	30
23 Pinukpuk	682	1,341	874	338	174	85	53	47	3,594	2	24
24 Tabuk	2,476	3,242	1,536	1,103	542	337	247	655	10,138	-	32

Source: 1990 Census of Population and Housing, Housing Statistics, 1992, NSO

Note: *1 A total figure of a city and 23 municipalities only involved in the Lower Cagayan River Basin.

Table 4.1.1 GRDP and Per Capita GDP Information in Philippines: 1998

	Area	GDP/GRDP at Current Prices (Million Pesos)	Population	Per Capita GRDP (Pesos)	Ratio to National GDP (%)	Order of GRDP in Regions
	Philippines	2,667,109	73,130,998	36,470	100	-
1.	NCR	925,412	10,011,636	92,434	253	1
2.	CAR	59,661	1,340,011	44,523	122	2
3.	Region 1	86,011	4,000,953	21,498	59	11
4.	Region 2	54,529	2,697,849	20,212	55	12
5.	Region 3	206,221	7,374,751	27,963	77	8
6.	Region 4	372,365	10,742,197	34,664	95	3
7.	Region 5	77,651	4,577,240	16,965	47	14
8.	Region 6	180,019	6,097,048	29,526	81	7
9.	Region 7	176,656	5,322,648	33,189	91	4
10.	Region 8	68,787	3,589,035	19,166	53	13
11.	Region 9	66,428	3,004,109	22,112	61	10
12.	Region 10	127,215	4,240,288	30,001	82	6
13.	Region 11	172,381	5,470,907	31,509	86	5
14.	Region 12	69,289	2,535,416	27,328	75	9
15.	ARMM	24,484	2,126,910	11,512	32	15
	Country w/o NCR	1,741,697	63,119,362	27,594	76	-
	Regions w/o NCR, CAR, and Region 2	1,627,507	59,081,502	27,547	76	-

Source: (1) 1999 Philippine Statistical Yearbook, 1999, NSCB
(2) 1995 Census-Based National and Regional Population Projections, 1997, NSO

Table 4.1.2 Gross Regional Domestic Product at Current Prices: 1993-1998

(Unit: Million Pesos)

Economic Sector	1993	1994	1995	1996	1997	1998
Gross Domestic Product in Philippines						
1. Agriculture	**318,546**	**372,507**	**412,197**	**447,803**	**452,546**	**449,888**
1) Crop Production	174,278	209,198	243,396	268,134	263,560	251,240
Palay	42,167	51,079	63,894	78,046	73,826	59,672
Corn	18,484	18,757	21,750	22,128	22,189	19,399
Coconut	18,489	23,400	27,330	25,126	23,473	28,860
Sugarcane	9,538	12,036	11,971	14,090	12,580	13,018
Others	85,600	103,926	118,451	128,744	131,492	130,291
2) Fishery	57,533	65,860	70,206	65,394	67,776	74,081
3) Livestock & Poultry	66,662	75,784	76,606	88,611	97,562	101,692
4) Agricultural Activities	14,503	16,895	19,243	20,999	20,907	20,660
5) Forestry	5,570	4,770	2,746	4,665	2,741	2,215
2. Industry	**481,900**	**550,709**	**611,097**	**696,881**	**779,786**	**841,145**
1) Mining & Quarrying	16,621	16,509	16,801	17,175	17,311	20,093
2) Manufacturing	349,595	393,810	438,247	495,389	540,305	582,894
3) Construction	79,267	95,495	106,639	127,592	156,116	160,185
4) Electricity, Gas & Water	36,417	44,895	49,410	56,725	66,054	77,973
3. Services	**674,010**	**769,716**	**880,926**	**1,027,238**	**1,188,974**	**1,376,075**
1) Transport & Communication	78,385	82,813	88,929	101,002	118,877	139,662
2) Trade	207,563	230,799	261,862	295,092	317,170	361,159
3) Others	388,062	456,104	530,135	631,144	752,927	875,254
4. Total	**1,474,457**	**1,692,932**	**1,904,220**	**2,171,922**	**2,421,306**	**2,667,108**
Gross Regional Domestic Product in Region 2						
1. Agriculture	**15,156**	**18,082**	**21,836**	**23,660**	**26,791**	**23,933**
1) Crop Production	-	-	-	17,992	20,314	17,430
Palay	-	-	-	11,725	12,329	9,667
Corn	-	-	-	3,330	4,547	4,467
Coconut	-	-	-	299	262	305
Sugarcane	-	-	-	365	608	493
Others	-	-	-	2,274	2,567	2,499
2) Fishery	-	-	-	572	690	700
3) Livestock & Poultry	-	-	-	3,837	4,570	4,627
4) Agricultural Activities	-	-	-	950	1,019	989
5) Forestry	976	831	574	309	199	187
2. Industry	**3,630**	**4,290**	**4,120**	**5,048**	**5,878**	**8,025**
1) Mining & Quarrying	136	86	177	270	285	264
2) Manufacturing	1,867	2,118	1,512	1,723	1,878	2,026
3) Construction	1,191	1,547	1,829	2,352	2,900	4,787
4) Electricity, Gas & Water	436	539	601	703	815	949
3. Services	**11,061**	**12,629**	**14,418**	**16,825**	**19,904**	**23,253**
1) Transport & Communication	1,205	1,278	1,436	1,628	2,007	2,211
2) Trade	2,971	3,201	3,583	4,006	4,312	5,192
3) Others	6,885	8,151	9,400	11,190	13,585	15,850
4. Total	**29,847**	**35,002**	**40,374**	**45,533**	**52,574**	**55,211**
Gross Regional Domestic Product in CAR						
1. Agriculture	**5,580**	**6,564**	**8,642**	**8,800**	**8,978**	**8,878**
1) Crop Production	-	-	-	6,744	6,652	6,672
Palay	-	-	-	1,699	1,730	1,425
Corn	-	-	-	409	327	355
Coconut	-	-	-	14	14	16
Sugarcane	-	-	-	0	0	0
Others	-	-	-	4,622	4,582	4,876
2) Fishery	-	-	-	19	21	22
3) Livestock & Poultry	-	-	-	1,671	1,950	1,813
4) Agricultural Activities	-	-	-	347	344	362
5) Forestry	2	1	748	19	12	9
2. Industry	**13,524**	**17,110**	**18,526**	**20,902**	**26,963**	**32,432**
1) Mining & Quarring	3,886	4,252	3,337	3,229	3,781	4,856
2) Manufacturing	6,813	9,282	11,210	13,030	17,697	19,573
3) Construction	959	1,416	1,708	2,102	2,656	4,729
4) Elec. Gas & Water	1,867	2,159	2,270	2,541	2,830	3,275
3. Services	**8,493**	**9,823**	**11,284**	**13,560**	**15,915**	**18,351**
1) Transport & Communication	487	515	552	655	779	850
2) Trade	1,475	1,663	1,874	2,119	2,302	2,671
3) Others	6,532	7,645	8,858	10,786	12,834	14,830
4. Total	**27,597**	**33,497**	**38,453**	**43,262**	**51,857**	**59,661**

Source: 1999 Philippine Statistical Year book, NSCB

Table 4.1.3 Percentage Distribution of GRDP by Economic Sector: 1993-1998

Economic Sector	1993	1994	1995	1996	1997	1998
Philippines						
1. Agriculture	21.6	22.0	21.6	20.6	18.7	16.9
2. Industry	32.7	32.5	32.1	32.1	32.2	31.5
- Manufacturing	23.7	23.3	23.0	22.8	22.3	21.9
3. Services	45.7	45.5	46.3	47.3	49.1	51.6
- Trade	14.1	13.6	13.8	13.6	13.1	13.5
4. Total	100.0	100.0	100.0	100.0	100.0	100.0
Region 2						
1. Agriculture	50.8	51.7	54.1	52.0	51.0	43.3
2. Industry	12.2	12.3	10.2	11.1	11.2	14.5
- Manufacturing	6.3	6.0	3.7	3.8	3.6	3.7
3. Services	37.1	36.1	35.7	37.0	37.9	42.1
- Trade	10.0	9.1	8.9	8.8	8.2	9.4
4. Total	100.0	100.0	100.0	100.0	100.0	100.0
CAR						
1. Agriculture	20.2	19.6	22.5	20.3	17.3	14.9
2. Industry	49.0	51.1	48.2	48.3	52.0	54.4
- Manufacturing	24.7	27.7	29.2	30.1	34.1	32.8
3. Services	30.8	29.3	29.3	31.3	30.7	30.8
- Trade	5.3	5.0	4.9	4.9	4.4	4.5
4. Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: (1) 1999 Philippine Statistical Year book, NSCB
(2) Data presented by NSCB and Central Bank

Table 4.1.4 GRDP per Capita: 1993-1998

Item	1993	1994	1995	1996	1997	1998
In Pesos						
Philippines	22,568	25,285	27,752	31,051	33,846	36,470
Region 2	12,153	14,025	15,920	17,626	19,910	20,465
Percentage (%)	54	55	57	57	59	56
CAR	22,804	27,182	30,644	33,712	39,515	44,454
Percentage (%)	101	108	110	109	117	122
In US$ Equivalent						
Philippines	832	957	1,079	1,184	1,148	892
Region 2	448	531	619	672	676	500
CAR	841	1,029	1,192	1,286	1,341	1,087

Source: (1) 1999 Philippine Statistical Year book, NSCB
(2) Data presented by NSCB and Central Bank

Table 4.1.5 Gross Regional Domestic Product at 1985 Constant Prices: 1993-1998

(Unit: Million Pesos)

Economic Sector	1993	1994	1995	1996	1997	1998
Gross Domestic Product in Philippines						
1. Agriculture	**167,053**	**171,390**	**172,848**	**179,451**	**184,713**	**172,445**
1) Crop Production	89,660	92,775	92,940	96,418	99,973	87,118
Palay	25,228	28,182	28,189	30,175	30,135	22,877
Corn	11,435	10,769	9,837	9,893	10,324	9,111
Coconut	6,827	6,831	7,380	6,890	7,280	6,325
Sugarcane	5,257	5,326	3,964	4,810	4,828	4,164
Others	40,913	41,667	43,570	44,650	47,406	44,641
2) Fishery	32,820	33,195	33,853	34,288	34,275	34,690
3) Livestock & Poultry	32,862	34,113	35,895	39,008	41,361	42,219
4) Agricultural Activities	8,214	8,336	8,632	7,838	7,992	7,521
5) Forestry	3,497	2,971	1,527	1,898	1,112	897
2. Industry	**251,460**	**265,972**	**283,858**	**302,126**	**320,689**	**314,554**
1) Mining & Quarrying	11,571	10,763	10,035	10,166	10,338	10,624
2) Manufacturing	181,289	190,374	203,271	214,613	223,672	221,151
3) Construction	38,344	41,774	44,492	49,339	57,322	52,464
4) Electricity, Gas & Water	20,255	23,061	26,060	28,008	29,357	30,315
3. Services	**315,643**	**329,006**	**345,518**	**367,544**	**387,458**	**401,076**
1) Transport & Communication	42,941	44,764	47,366	50,878	55,067	58,640
2) Commerce	112,479	116,923	123,430	130,247	135,326	138,641
3) Others	160,223	167,319	174,722	186,419	197,065	203,795
4. Total	**734,156**	**766,368**	**802,224**	**849,121**	**892,860**	**888,075**
Gross Regional Domestic Product in Region 2						
1. Agriculture	**7,583**	**8,159**	**8,782**	**8,810**	**10,026**	**8,175**
1) Crop Production	-	-	-	6,571	7,680	5,858
Palay	-	-	-	4,313	4,675	3,302
Corn	-	-	-	1,384	1,998	1,670
Coconut	-	-	-	82	84	67
Sugarcane	-	-	-	136	228	198
Others	-	-	-	657	695	620
2) Fishery	-	-	-	348	377	344
3) Livestock & Poultry	-	-	-	1,437	1,549	1,591
4) Agricultural Activities	-	-	-	328	337	303
5) Forestry	577	553	253	127	83	80
2. Industry	**1,799**	**1,990**	**1,854**	**2,067**	**2,273**	**2,767**
1) Mining & Quarrying	49	45	116	133	134	119
2) Manufacturing	916	961	631	676	704	691
3) Construction	595	713	795	928	1,094	1,609
4) Electricity, Gas & Water	239	272	312	330	340	348
3. Services	**5,078**	**5,279**	**5,506**	**5,835**	**6,151**	**6,435**
1) Transport & Communication	675	707	775	851	930	941
2) Commerce	1,544	1,610	1,700	1,763	1,860	2,023
3) Others	2,859	2,962	3,031	3,220	3,360	3,470
4. Total	**14,460**	**15,428**	**16,142**	**16,712**	**18,450**	**17,377**
Gross Regional Domestic Product in CAR						
1. Agriculture	**2,908**	**3,035**	**3,388**	**3,194**	**3,323**	**3,190**
1) Crop Production	-	-	-	2,388	2,427	2,325
Palay	-	-	-	662	690	539
Corn	-	-	-	145	150	144
Coconut	-	-	-	4	4	4
Sugarcane	-	-	-	0	0	0
Others	-	-	-	1,577	1,583	1,638
2) Fishery	-	-	-	7	10	11
3) Livestock & Poultry	-	-	-	662	749	717
4) Agricultural Activities	-	-	-	129	131	132
5) Forestry	1	1	314	8	5	4
2. Industry	**7,968**	**8,992**	**8,645**	**9,314**	**11,638**	**12,527**
1) Mining & Quarrying	2,621	2,683	1,656	1,667	2,122	2,314
2) Manufacturing	3,791	4,569	5,069	5,532	7,191	7,300
3) Construction	476	634	721	831	1,003	1,565
4) Electricity, Gas & Water	1,080	1,105	1,199	1,284	1,322	1,348
3. Services	**3,782**	**3,902**	**4,042**	**4,365**	**4,626**	**4,836**
1) Transport & Communication	272	285	301	322	353	368
2) Commerce	789	817	857	913	989	1,053
3) Others	2,721	2,799	2,884	3,130	3,285	3,415
4. Total	**14,657**	**15,928**	**16,075**	**16,873**	**19,587**	**20,552**

Source: (1) 1999 Philippine Statistical Year book, NSCB
(2) Data presented by NSCB and Central Bank

Table 4.1.6 Real Growth of GRDP by Economic Sector: 1993-1998

Economic Sector	1994	1995	1996	1997	1998	'93-'98
Philippines						
1. Agriculture	2.60	0.85	3.82	2.93	-6.64	0.64
2. Industry	5.77	6.72	6.44	6.14	-1.91	4.58
- Manufacturing	5.01	6.77	5.58	4.22	-1.13	4.06
3. Services	4.23	5.02	6.37	5.42	3.51	4.91
- Commerce	3.95	5.56	5.52	3.90	2.45	4.27
4. Total	4.39	4.68	5.85	5.15	-0.54	3.88
Region 2						
1. Agriculture	7.60	7.63	0.32	13.81	-18.47	1.51
2. Industry	10.63	-6.83	11.48	9.96	21.75	9.00
- Manufacturing	4.92	-34.31	7.19	4.05	-1.85	-5.48
3. Services	3.97	4.29	5.98	5.41	4.62	4.85
- Commerce	4.29	5.58	3.72	5.49	8.77	5.55
4. Total	6.70	4.62	3.53	10.40	-5.82	3.74
CAR						
1. Agriculture	4.38	11.64	-5.74	4.04	-4.00	1.87
2. Industry	12.85	-3.86	7.74	24.95	7.64	9.47
- Manufacturing	20.55	10.93	9.13	29.99	1.52	14.00
3. Services	3.17	3.61	7.98	5.98	4.53	5.04
- Commerce	3.64	4.89	6.51	8.29	6.46	5.95
4. Total	8.67	0.92	4.96	16.08	4.93	7.00

Source: (1) 1999 Philippine Statistical Year book, NSCB
(2) Data presented by NSCB and Central Bank

Table 4.1.7 Real Growth of GRDP per Capita: 1993-1998

Economic Sector	1993	1994	1995	1996	1997	1998
GRDP per Capita at 1985 Constant Prices (Pesos)						
Philippines	11,237	11,446	11,691	12,140	12,481	12,144
Region 2	5,888	6,182	6,365	6,469	6,987	6,441
CAR	12,111	12,925	12,811	13,149	14,925	15,314

	1994	1995	1996	1997	1998	'93-'98
Annual Growth Rate (%)						
Philippines	1.86	2.14	3.83	2.81	-2.70	1.56
Region 2	5.00	2.96	1.64	8.00	-7.82	1.81
CAR	6.72	-0.89	2.64	13.51	2.60	4.80

Source: (1) 1999 Philippine Statistical Year book, NSCB
(2) Data presented by NSCB and Central Bank

Table 4.1.8 Gross Regional Domestic Expenditure at Current Prices: 1993-1998

(Unit: Million Pesos)

Economic Sector	1993	1994	1995	1996	1997	1998
Gross Domestic Product in Philippines						
1. Personal Consumption	1,122,528	1,258,750	1,411,904	1,595,346	1,762,008	1,980,088
2. Government Consumption	149,057	182,776	217,045	259,501	319,935	354,981
3. Capital Formation	353,595	407,367	427,896	521,605	601,953	541,233
1) Fixed Capital	350,543	400,139	423,197	508,745	593,284	561,714
a. Construction	148,860	165,202	183,740	230,508	270,446	269,535
b. Durable Equipment	176,889	207,562	209,772	245,170	284,894	253,349
c. Breeding Stock & Orchard Dev.	24,794	27,375	29,685	33,067	37,944	38,830
2) Changes in Stock	3,052	7,228	4,699	12,860	8,669	-20,481
4. Net Export	-124,551	-106,793	-149,121	-190,839	-250,861	-99,711
1) Export	462,384	572,646	692,952	879,773	1,188,048	1,478,016
2) Import	586,935	679,439	842,073	1,070,612	1,438,909	1,577,727
5. Statistical Discrepancy	-26,172	-49,168	-1,773	-13,691	-11,729	-109,483
6. Total	**1,474,457**	**1,692,932**	**1,905,951**	**2,171,922**	**2,421,306**	**2,667,108**
Gross Regional Domestic Product in Region 2						
1. Personal Consumption	35,255	40,784	45,747	51,690	56,471	62,363
2. Government Consumption	3,998	4,788	5,555	6,870	8,674	9,816
3. Capital Formation	5,516	13,266	11,866	16,104	16,413	16,148
1) Fixed Capital	5,499	13,144	11,676	15,415	16,054	16,731
a. Construction	2,448	4,876	3,167	7,272	7,414	8,169
b. Durable Equipment	1,253	6,334	6,281	5,494	5,610	5,242
c. Breeding Stock & Orchard Dev.	1,798	1,934	2,228	2,649	3,030	3,320
2) Changes in Stock	17	122	190	689	358	-582
4. Net Export	-14,923	-23,837	-22,794	-29,132	-28,985	-33,117
5. Total	**29,847**	**35,002**	**40,374**	**45,533**	**52,574**	**55,211**
Gross Regional Domestic Product in CAR						
1. Personal Consumption	18,085	21,212	23,862	26,962	29,261	32,290
2. Government Consumption	2,311	3,154	3,716	4,683	5,884	6,958
3. Capital Formation	5,740	6,221	5,875	7,132	9,478	11,499
1) Fixed Capital	5,715	5,894	5,734	7,140	9,430	11,510
a. Construction	2,472	2,809	2,593	3,669	5,651	7,906
b. Durable Equipment	2,538	2,305	2,322	2,563	2,852	2,663
c. Breeding Stock & Orchard Dev.	704	780	818	908	927	941
2) Changes in Stock	26	327	141	-8	49	-12
4. Net Export	1,461	2,910	5,000	4,484	7,587	9,302
5. Total	**27,597**	**33,497**	**38,453**	**43,262**	**52,210**	**60,048**

Source: 1999 Philippine Statistical Year book, NSCB
Gross Regional Domestic Expenditure 1996-1998, July 2000, NSCB

Table 4.1.9 Percentage Distribution of GRDE by Type of Expenditure: 1993-1998

Economic Sector	1993	1994	1995	1996	1997	1998
Philippines						
1. Personal Consumption	76.1	74.4	74.1	73.5	72.8	74.2
2. Government Consumption	10.1	10.8	11.4	11.9	13.2	13.3
3. Capital Formation	24.0	24.1	22.5	24.0	24.9	20.3
1) Fixed Capital	23.8	23.6	22.2	23.4	24.5	21.1
2) Changes in Stock	0.2	0.4	0.2	0.6	0.4	-0.8
4. Net Export	-8.4	-6.3	-7.8	-8.8	-10.4	-3.7
5. Statistical Discrepancy	-1.8	-2.9	-0.1	-0.6	-0.5	-4.1
6. Total	100.0	100.0	100.0	100.0	100.0	100.0
Region 2						
1. Personal Consumption	118.1	116.5	113.3	113.5	107.4	113.0
2. Government Consumption	13.4	13.7	13.8	15.1	16.5	17.8
3. Capital Formation	18.5	37.9	29.4	35.4	31.2	29.2
1) Fixed Capital	18.4	37.6	28.9	33.9	30.5	30.3
2) Changes in Stock	0.1	0.3	0.5	1.5	0.7	-1.1
4. Net Export	-50.0	-68.1	-56.5	-64.0	-55.1	-60.0
5. Total	100.0	100.0	100.0	100.0	100.0	100.0
CAR						
1. Personal Consumption	65.5	63.3	62.1	62.3	56.0	53.8
2. Government Consumption	8.4	9.4	9.7	10.8	11.3	11.6
3. Capital Formation	20.8	18.6	15.3	16.5	18.2	19.1
1) Fixed Capital	20.7	17.6	14.9	16.5	18.1	19.2
2) Changes in Stock	0.1	1.0	0.4	0.0	0.1	0.0
4. Net Export	5.3	8.7	13.0	10.4	14.5	15.5
5. Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 4.1.10 Gross Regional Domestic Expenditure at 1985 Constant Prices: 1993-1998

(Unit: Million Pesos)

Economic Sector	1993	1994	1995	1996	1997	1998
Gross Domestic Product in Philippines						
1. Personal Consumption	578,589	600,106	622,985	651,790	684,316	707,904
2. Government Consumption	58,746	62,343	65,810	68,527	71,703	70,180
3. Capital Formation	166,397	180,797	187,131	210,440	235,125	196,480
1) Fixed Capital	164,125	176,388	184,667	206,854	230,662	204,279
a. Construction	70,258	72,858	78,627	91,115	104,404	98,219
b. Durable Equipment	82,292	91,658	93,701	102,654	112,065	91,837
c. Breeding Stock & Orchard Dev.	11,575	11,872	12,339	13,085	14,193	14,223
2) Changes in Stock	2,272	4,409	2,464	3,586	4,463	-7,799
4. Net Export	-66,097	-62,120	-84,294	-102,993	-102,360	-87,573
1) Export	256,451	307,205	344,181	397,201	465,322	398,657
2) Import	322,548	369,325	428,475	500,194	567,682	486,230
5. Statistical Discrepancy	-3,479	-14,758	10,592	21,357	4,076	1,084
6. Total	**734,156**	**766,368**	**802,224**	**849,121**	**892,860**	**888,075**
Gross Regional Domestic Product in Region 2						
1. Personal Consumption	18,844	20,761	21,918	22,515	23,386	23,863
2. Government Consumption	1,576	1,633	1,684	1,814	1,944	1,947
3. Capital Formation	2,591	5,917	5,197	6,457	6,460	5,918
1) Fixed Capital	2,593	5,880	5,131	6,265	6,276	6,136
a. Construction	1,193	2,244	1,422	2,983	2,987	3,104
b. Durable Equipment	583	2,797	2,806	2,300	2,207	1,900
c. Breeding Stock & Orchard Dev.	817	839	903	982	1,082	1,131
2) Changes in Stock	-3	36	65	192	185	-217
4. Net Export	-8,551	-12,882	-12,657	-14,074	-13,341	-14,352
5. Total	**14,460**	**15,428**	**16,142**	**16,712**	**18,450**	**17,377**
Gross Regional Domestic Product in CAR						
1. Personal Consumption	9,938	10,503	11,018	11,499	12,064	12,498
2. Government Consumption	911	1,076	1,127	1,237	1,319	1,380
3. Capital Formation	2,733	2,840	2,568	2,914	3,766	4,295
1) Fixed Capital	2,716	2,636	2,517	2,916	3,741	4,299
a. Construction	1,196	1,268	1,120	1,470	2,257	2,986
b. Durable Equipment	1,181	1,018	1,037	1,073	1,122	965
c. Breeding Stock & Orchard Dev.	339	350	360	372	362	348
2) Changes in Stock	17	204	50	-2	25	-4
4. Net Export	1,055	1,510	1,363	1,224	2,494	2,323
5. Total	**14,637**	**15,928**	**16,075**	**16,873**	**19,643**	**20,496**

Source: 1999 Philippine Statistical Year book, NSCB
Gross Regional Domestic Expenditure 1996-1998, July 2000, NSCB

Table 4.1.11 Real Growth of GRDE by Type of Expenditure: 1993-1998

Economic Sector	1994	1995	1996	1997	1998	'93-'98
Philippines						
1. Personal Consumption	3.7	3.8	4.6	5.0	3.4	4.1
2. Government Consumption	6.1	5.6	4.1	4.6	-2.1	3.6
3. Capital Formation	8.7	3.5	12.5	11.7	-16.4	3.4
1) Fixed Capital	7.5	4.7	12.0	11.5	-11.4	4.5
2) Changes in Stock	94.1	-44.1	45.5	24.5	-274.7	-228.0
4. Net Export	-6.0	35.7	22.2	-0.6	-14.4	5.8
5. Statistical Discrepancy	324.2	-171.8	101.6	-80.9	-73.4	-179.2
6. Total	4.4	4.7	5.8	5.2	-0.5	3.9
Region 2						
1. Personal Consumption	10.2	5.6	2.7	3.9	2.0	9.2
2. Government Consumption	3.6	3.1	7.7	7.2	0.2	8.6
3. Capital Formation	128.4	-12.2	24.2	0.0	-8.4	-179.2
1) Fixed Capital	126.8	-12.7	22.1	0.2	-2.2	3.9
2) Changes in Stock	-1,470.4	80.3	193.5	-4.0	-217.7	141.4
4. Net Export	50.7	-1.7	11.2	-5.2	7.6	10.9
5. Total	6.7	4.6	3.5	10.4	-5.8	3.7
CAR						
1. Personal Consumption	5.7	4.9	4.4	4.9	3.6	4.7
2. Government Consumption	18.1	4.8	9.8	6.6	4.7	8.7
3. Capital Formation	3.9	-9.6	13.5	29.3	14.0	9.5
1) Fixed Capital	-3.0	-4.5	15.8	28.3	14.9	9.6
2) Changes in Stock	1,133.1	-75.3	-104.3	-1,259.1	-117.5	-176.7
4. Net Export	43.2	-9.7	-10.2	103.7	-6.8	17.1
5. Total	8.8	0.9	5.0	16.4	4.3	7.0

Table 4.1.12 Incremental Capital Output Ratio of Nation, Region 2 and CAR: 1993-1998

Item	1993	1994	1995	1996	1997	1998	Average*2
Philippines							
1. Capital Formation	164,125	176,388	184,667	206,854	230,662	204,279	192,539
2. Incremental Output	15,215	32,212	35,856	46,897	43,739	-4,785	34,784
3. Incremental Capital Output Ratio	10.79	5.48	5.15	4.41	5.27	-42.69	5.54
Average of ICOR*1							**5.5**
Region 2							
1. Capital Formation	2,593	5,880	5,131	6,265	6,276	6,136	5,229
2. Incremental Output	460	969	714	570	1,738	-1,073	890
3. Incremental Capital Output Ratio	5.64	6.07	7.19	10.99	3.61	-5.72	5.88
Average of ICOR							**5.9**
CAR							
1. Capital Formation	2,716	2,636	2,517	2,916	3,741	4,299	2,905
2. Incremental Output	1,137	1,291	147	798	2,769	854	1,229
3. Incremental Capital Output Ratio	2.39	2.04	17.09	3.65	1.35	5.04	2.36
Average of ICOR							**2.4**

Source: 1999 Philippine Statistical Year book, NSCB
Gross Regional Domestic Expenditure 1996-1998, July 2000, NSCB

Note: *1 ICOR stands for Incremental Capital Output Ratio.
*2 An average of ICOR was estimated excluding 1998 values because the national economy suffered from the Asian crisis seriously.

Table 4.2.1 Gross Regional Domestic Expenditure at Current Prices: 1993-1998

(Unit: Million Pesos)

Economic Sector	1993	1994	1995	1996	1997	1998
Gross Domestic Product in Philippines						
1. Personal Consumption	1,122,528	1,258,750	1,411,904	1,595,346	1,762,008	1,980,088
2. Government Consumption	149,057	182,776	217,045	259,501	319,935	354,981
3. Capital Formation	353,595	407,367	427,896	521,605	601,953	541,233
1) Fixed Capital	350,543	400,139	423,197	508,745	593,284	561,714
a. Construction	148,860	165,202	183,740	230,508	270,446	269,535
b. Durable Equipment	176,889	207,562	209,772	245,170	284,894	253,349
c. Breeding Stock & Orchard Dev.	24,794	27,375	29,685	33,067	37,944	38,830
2) Changes in Stock	3,052	7,228	4,699	12,860	8,669	-20,481
4. Net Export	-124,551	-106,793	-149,121	-190,839	-250,861	-99,711
1) Export	462,384	572,646	692,952	879,773	1,188,048	1,478,016
2) Import	586,935	679,439	842,073	1,070,612	1,438,909	1,577,727
5. Statistical Discrepancy	-26,172	-49,168	-1,773	-13,691	-11,729	-109,483
6. Total	**1,474,457**	**1,692,932**	**1,905,951**	**2,171,922**	**2,421,306**	**2,667,108**
Gross Regional Domestic Product in Region 2						
1. Personal Consumption	35,255	40,784	45,747	51,690	56,471	62,363
2. Government Consumption	3,998	4,788	5,555	6,870	8,674	9,816
3. Capital Formation	5,516	13,266	11,866	16,104	16,413	16,148
1) Fixed Capital	5,499	13,144	11,676	15,415	16,054	16,731
a. Construction	2,448	4,876	3,167	7,272	7,414	8,169
b. Durable Equipment	1,253	6,334	6,281	5,494	5,610	5,242
c. Breeding Stock & Orchard Dev.	1,798	1,934	2,228	2,649	3,030	3,320
2) Changes in Stock	17	122	190	689	358	-582
4. Net Export	-14,923	-23,837	-22,794	-29,132	-28,985	-33,117
5. Total	**29,847**	**35,002**	**40,374**	**45,533**	**52,574**	**55,211**
Gross Regional Domestic Product in CAR						
1. Personal Consumption	18,085	21,212	23,862	26,962	29,261	32,290
2. Government Consumption	2,311	3,154	3,716	4,683	5,884	6,958
3. Capital Formation	5,740	6,221	5,875	7,132	9,478	11,499
1) Fixed Capital	5,715	5,894	5,734	7,140	9,430	11,510
a. Construction	2,472	2,809	2,593	3,669	5,651	7,906
b. Durable Equipment	2,538	2,305	2,322	2,563	2,852	2,663
c. Breeding Stock & Orchard Dev.	704	780	818	908	927	941
2) Changes in Stock	26	327	141	-8	49	-12
4. Net Export	1,461	2,910	5,000	4,484	7,587	9,302
5. Total	**27,597**	**33,497**	**38,453**	**43,262**	**52,210**	**60,048**

Source: 1999 Philippine Statistical Year book, NSCB
Gross Regional Domestic Expenditure 1996-1998, July 2000, NSCB

Table 4.2.2 Percentage Distribution of GRDE by Type of Expenditure: 1993-1998

Economic Sector	1993	1994	1995	1996	1997	1998
Philippines						
1. Personal Consumption	76.1	74.4	74.1	73.5	72.8	74.2
2. Government Consumption	10.1	10.8	11.4	11.9	13.2	13.3
3. Capital Formation	24.0	24.1	22.5	24.0	24.9	20.3
1) Fixed Capital	23.8	23.6	22.2	23.4	24.5	21.1
2) Changes in Stock	0.2	0.4	0.2	0.6	0.4	-0.8
4. Net Export	-8.4	-6.3	-7.8	-8.8	-10.4	-3.7
5. Statistical Discrepancy	-1.8	-2.9	-0.1	-0.6	-0.5	-4.1
6. Total	100.0	100.0	100.0	100.0	100.0	100.0
Region 2						
1. Personal Consumption	118.1	116.5	113.3	113.5	107.4	113.0
2. Government Consumption	13.4	13.7	13.8	15.1	16.5	17.8
3. Capital Formation	18.5	37.9	29.4	35.4	31.2	29.2
1) Fixed Capital	18.4	37.6	28.9	33.9	30.5	30.3
2) Changes in Stock	0.1	0.3	0.5	1.5	0.7	-1.1
4. Net Export	-50.0	-68.1	-56.5	-64.0	-55.1	-60.0
5. Total	100.0	100.0	100.0	100.0	100.0	100.0
CAR						
1. Personal Consumption	65.5	63.3	62.1	62.3	56.0	53.8
2. Government Consumption	8.4	9.4	9.7	10.8	11.3	11.6
3. Capital Formation	20.8	18.6	15.3	16.5	18.2	19.1
1) Fixed Capital	20.7	17.6	14.9	16.5	18.1	19.2
2) Changes in Stock	0.1	1.0	0.4	0.0	0.1	0.0
4. Net Export	5.3	8.7	13.0	10.4	14.5	15.5
5. Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 4.2.3 Gross Regional Domestic Expenditure at 1985 Constant Prices: 1993-1998

(Unit: Million Pesos)

Economic Sector	1993	1994	1995	1996	1997	1998
Gross Domestic Product in Philippines						
1. Personal Consumption	578,589	600,106	622,985	651,790	684,316	707,904
2. Government Consumption	58,746	62,343	65,810	68,527	71,703	70,180
3. Capital Formation	166,397	180,797	187,131	210,440	235,125	196,480
1) Fixed Capital	164,125	176,388	184,667	206,854	230,662	204,279
a. Construction	70,258	72,858	78,627	91,115	104,404	98,219
b. Durable Equipment	82,292	91,658	93,701	102,654	112,065	91,837
c. Breeding Stock & Orchard Dev.	11,575	11,872	12,339	13,085	14,193	14,223
2) Changes in Stock	2,272	4,409	2,464	3,586	4,463	-7,799
4. Net Export	-66,097	-62,120	-84,294	-102,993	-102,360	-87,573
1) Export	256,451	307,205	344,181	397,201	465,322	398,657
2) Import	322,548	369,325	428,475	500,194	567,682	486,230
5. Statistical Discrepancy	-3,479	-14,758	10,592	21,357	4,076	1,084
6. Total	**734,156**	**766,368**	**802,224**	**849,121**	**892,860**	**888,075**
Gross Regional Domestic Product in Region 2						
1. Personal Consumption	18,844	20,761	21,918	22,515	23,386	23,863
2. Government Consumption	1,576	1,633	1,684	1,814	1,944	1,947
3. Capital Formation	2,591	5,917	5,197	6,457	6,460	5,918
1) Fixed Capital	2,593	5,880	5,131	6,265	6,276	6,136
a. Construction	1,193	2,244	1,422	2,983	2,987	3,104
b. Durable Equipment	583	2,797	2,806	2,300	2,207	1,900
c. Breeding Stock & Orchard Dev.	817	839	903	982	1,082	1,131
2) Changes in Stock	-3	36	65	192	185	-217
4. Net Export	-8,551	-12,882	-12,657	-14,074	-13,341	-14,352
5. Total	**14,460**	**15,428**	**16,142**	**16,712**	**18,450**	**17,377**
Gross Regional Domestic Product in CAR						
1. Personal Consumption	9,938	10,503	11,018	11,499	12,064	12,498
2. Government Consumption	911	1,076	1,127	1,237	1,319	1,380
3. Capital Formation	2,733	2,840	2,568	2,914	3,766	4,295
1) Fixed Capital	2,716	2,636	2,517	2,916	3,741	4,299
a. Construction	1,196	1,268	1,120	1,470	2,257	2,986
b. Durable Equipment	1,181	1,018	1,037	1,073	1,122	965
c. Breeding Stock & Orchard Dev.	339	350	360	372	362	348
2) Changes in Stock	17	204	50	-2	25	-4
4. Net Export	1,055	1,510	1,363	1,224	2,494	2,323
5. Total	**14,637**	**15,928**	**16,075**	**16,873**	**19,643**	**20,496**

Source: 1999 Philippine Statistical Year book, NSCB
Gross Regional Domestic Expenditure 1996-1998, July 2000, NSCB

Table 4.2.4 Real Growth of GRDE by Type of Expenditure: 1993-1998

Economic Sector	1994	1995	1996	1997	1998	'93-'98
Philippines						
1. Personal Consumption	3.7	3.8	4.6	5.0	3.4	4.1
2. Government Consumption	6.1	5.6	4.1	4.6	-2.1	3.6
3. Capital Formation	8.7	3.5	12.5	11.7	-16.4	3.4
1) Fixed Capital	7.5	4.7	12.0	11.5	-11.4	4.5
2) Changes in Stock	94.1	-44.1	45.5	24.5	-274.7	-228.0
4. Net Export	-6.0	35.7	22.2	-0.6	-14.4	5.8
5. Statistical Discrepancy	324.2	-171.8	101.6	-80.9	-73.4	-179.2
6. Total	4.4	4.7	5.8	5.2	-0.5	3.9
Region 2						
1. Personal Consumption	10.2	5.6	2.7	3.9	2.0	9.2
2. Government Consumption	3.6	3.1	7.7	7.2	0.2	8.6
3. Capital Formation	128.4	-12.2	24.2	0.0	-8.4	-179.2
1) Fixed Capital	126.8	-12.7	22.1	0.2	-2.2	3.9
2) Changes in Stock	-1,470.4	80.3	193.5	-4.0	-217.7	141.4
4. Net Export	50.7	-1.7	11.2	-5.2	7.6	10.9
5. Total	6.7	4.6	3.5	10.4	-5.8	3.7
CAR						
1. Personal Consumption	5.7	4.9	4.4	4.9	3.6	4.7
2. Government Consumption	18.1	4.8	9.8	6.6	4.7	8.7
3. Capital Formation	3.9	-9.6	13.5	29.3	14.0	9.5
1) Fixed Capital	-3.0	-4.5	15.8	28.3	14.9	9.6
2) Changes in Stock	1,133.1	-75.3	-104.3	-1,259.1	-117.5	-176.7
4. Net Export	43.2	-9.7	-10.2	103.7	-6.8	17.1
5. Total	8.8	0.9	5.0	16.4	4.3	7.0

Table 4.2.5 Incremental Capital Output Ratio of Nation, Region 2 and CAR: 1993-1998

Item	1993	1994	1995	1996	1997	1998	Average*2
Philippines							
1. Capital Formation	164,125	176,388	184,667	206,854	230,662	204,279	192,539
2. Incremental Output	15,215	32,212	35,856	46,897	43,739	-4,785	34,784
3. Incremental Capital Output Ratio	10.79	5.48	5.15	4.41	5.27	-42.69	5.54
Average of ICOR*1							**5.5**
Region 2							
1. Capital Formation	2,593	5,880	5,131	6,265	6,276	6,136	5,229
2. Incremental Output	460	969	714	570	1,738	-1,073	890
3. Incremental Capital Output Ratio	5.64	6.07	7.19	10.99	3.61	-5.72	5.88
Average of ICOR							**5.9**
CAR							
1. Capital Formation	2,716	2,636	2,517	2,916	3,741	4,299	2,905
2. Incremental Output	1,137	1,291	147	798	2,769	854	1,229
3. Incremental Capital Output Ratio	2.39	2.04	17.09	3.65	1.35	5.04	2.36
Average of ICOR							**2.4**

Source: 1999 Philippine Statistical Year book, NSCB
Gross Regional Domestic Expenditure 1996-1998, July 2000, NSCB

Note: *1 ICOR stands for Incremental Capital Output Ratio.
*2 An average of ICOR was estimated excluding 1998 values because the national economy suffered from the Asian crisis seriously.

Table 4.3.1 Exports by Major Commodity Group: 1995-1998

(Unit: FOB Value in US$ Million)

Commodities	1995	1996	1997	1998
TOTAL EXPORTS	**17,447**	**20,543**	**25,228**	**29,496**
Agro-based Products	**1,522**	**1,356**	**1,392**	**1,378**
Coconut Products	989	731	835	832
Coconut Oil	826	571	673	706
Dessicated Coconut	68	85	88	73
Copra & Copra Meal/Cake	80	58	55	37
Others	15	17	18	16
Sugar & Products	75	140	99	100
Centrigual & Refined	66	136	83	80
Molasses	7	3	15	19
Others	1	1	1	0
Fruits and Vegetables	458	485	458	446
Canned Pineapple	81	93	86	79
Pineapple Juice	10	11	9	7
Pineapple Concentrates	24	27	28	33
Bananas	224	236	217	217
Mangoes	43	40	40	42
Others	76	78	79	68
Other Agro-based Products	**575**	**507**	**507**	**466**
Fish, Fresh or Preserved (Shrimps & Prawns)	378	295	291	306
Coffee, Raw, not Roasted	7	1	1	1
Abaca Fibers	23	21	22	17
Tobacco Unmanufactured	21	29	29	22
Natural Rubber	28	34	25	14
Ramie Fibers, Raw or Roasted	0	0	0	0
Seaweeds, Dried	39	42	33	31
Rice	0	0	0	0
Others	79	84	104	75
Forest Products	**38**	**42**	**46**	**24**
Logs	0	0	0	0
Lumber	18	25	26	10
Plywood	6	5	5	2
Veneer Sheets/Corestocks	14	12	12	11
Others	0	1	3	1
Mineral Products	**893**	**771**	**763**	**592**
Copper Concentrates	134	52	44	25
Copper Metal	341	297	232	178
Gold	62	55	49	34
Iron Ore Agglomerates	74	70	90	61
Chromium Ore	13	8	6	6
Nickel	0	0	0	0
Others	270	289	343	288
Petroleum Products	**171**	**272**	**257**	**129**
Manufactures	**13,940**	**17,191**	**21,643**	**26,114**
Electronic Equipment & Parts	7,473	10,071	13,202	17,388
Gaments	2,570	2,423	2,348	2,356
Textile Yams/Fabrics	208	255	300	244
Footwear	208	170	194	147
Travel Goods & Handbags	110	120	173	183
Wood Manufactures	134	151	134	118
Furnitures and Fixtures	276	293	322	323
Chemicals	343	353	383	340
Non-Metallic Mineral Manufactures	108	95	105	106
Machinery & Transport Equipment	751	1,302	2,691	3,329
Processed Food & Beverages	291	334	346	306
Iron & Steel	56	80	47	28
Baby Carriage, Toys, Games & Sporting Goods	231	224	203	169
Basketwork, Wickenwork & Other Articles	125	101	94	85
Miscellaneous Manufactured Articles	201	221	209	207
Others	854	997	892	786
Special Transactions	**309**	**403**	**620**	**794**
RE-EXPORTS	**273**	**382**	**551**	**733**

Source: Foreign Trade Statistics of the Philippines, 1995-1998, NSO

Table 4.3.2 Imports by Major Type of Goods: 1994-1998

(Unit: FOB Value in US$ Million)

Commodities	1994	1995	1996	1997	1998
TOTAL IMPORTS	**21,333**	**26,538**	**32,427**	**35,934**	**29,660**
Capital Goods	**6,867**	**8,176**	**11,015**	**13,949**	**12,187**
Power Generating & Specialized Machines	2,494	2,874	3,647	3,802	2,568
Office & EDP Machines	333	525	867	1,423	1,582
Telecommunication & Electrical Machinery	2,526	3,211	4,211	6,431	6,870
Land Transport Equipment excluding Passenger Cars	399	602	822	804	445
Air Craft, Ships & Boats	799	606	1,001	1,020	332
Professional, Scientific, Photographic & Optical Goods	316	358	466	468	390
Raw Materials & Intermediate Goods	**9,653**	**12,174**	**14,059**	**14,632**	**11,586**
Unprocessed Raw Materials	1,278	1,562	1,720	1,644	1,170
Wheat	324	349	375	423	249
Corn	0	33	86	54	78
Unmilled Cereals excluding Rice & Corn	2	2	3	2	1
Crude Materials, Inedible	862	1,090	1,194	1,044	767
Pulp &Waste Paper	63	114	87	75	67
Cotton	107	110	126	107	60
Synthetic Fibers	115	118	117	110	82
Metalliferous Ores	299	395	384	350	230
Others	278	353	480	403	327
Tobacco, Unmanufactured	90	88	62	121	74
Semi-Processed Raw Materials	8,375	10,612	12,339	12,988	10,415
Feeding Stuffs for Animals	195	263	197	311	283
Animal & Vegetable Oils & Fats	38	38	57	57	59
Chemical	2,012	2,406	2,575	2,791	2,206
Chemical Compounds	522	651	655	684	559
Medicinal & Pharmaceutical Chem.	261	293	318	331	311
Urea	90	109	107	89	68
Fertilizer Excluding Urea	80	85	87	125	94
Artificial Resins	580	707	801	867	568
Others	479	560	606	695	606
Manufactured Goods	2,944	3,572	3,949	3,981	2,807
Paper & Paper Products	268	310	309	337	266
Textile Yarn, Fabrics & Made-up Articles	782	872	825	918	789
Non-metallic Mineral Manufactures	121	186	276	284	144
Iron & Steel	877	1,312	1,436	1,260	764
Non-ferrous Metals	260	335	347	374	284
Metal Products	394	297	405	510	371
Others	242	260	350	297	189
Embroideries	411	471	349	357	346
Materials/Accessories for Manufacture	2,711	3,772	5,130	5,411	4,634
Iron Ore, not Agglomerated	64	89	83	80	81
Mineral Fuels & Lubricant	**2,046**	**2,461**	**3,008**	**3,073**	**2,020**
Coal, Coke	33	59	81	109	110
Petroleum Crude	1,308	1,931	2,458	2,458	1,433
Others	705	471	469	506	477
Consumer Goods	**2,052**	**2,785**	**3,330**	**3,092**	**2,623**
Durable	1,067	1,459	1,654	1,514	902
Passenger Cars & Motorized Cycle	633	801	932	642	235
Home Appliances	90	152	123	142	89
Miscellaneous Manufactures	344	506	598	730	577
Non-durable	985	1,325	1,676	1,577	1,721
Food & Live Animals Chiefly for Food	816	1,203	1,577	1,437	1,603
Daily Products	354	410	388	406	300
Fish & Fish Preparations	53	59	69	70	57
Rice	0	76	294	211	586
Fruits & Vegetables	99	97	123	137	108
Others	310	563	702	613	552
Beverages & Tobacco Manufactures	138	72	46	75	64
Articles of Apparel, Accessories	32	49	54	65	54
Special Transactions	**715**	**942**	**1,016**	**1,188**	**1,245**
Articles Temporarily Imported & Exported	434	530	705	870	879
Others	281	412	311	318	367

Source: Foreign Trade Statistics of the Philippines, 1995-1998, NSO

Table 4.3.3 Export and Import by Country: 1990-1994

(Unit: FOB US$ Million)

Country	1994		1995		1996		1997		1998	
	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
South-East Asian Countries										
1. Japan	5,190	2,035	5,957	2,747	7,129	3,671	7,414	4,194	6,030	4,234
2. Singapore	1,441	710	1,553	996	1,740	1,224	2,171	1,621	1,740	1,832
3. Hong Kong	1,113	651	1,275	824	1,360	868	1,549	1,172	1,300	1,326
4. Taiwan	1,226	453	1,437	568	1,598	661	1,808	1,169	1,415	1,757
5. Thailand	197	364	396	799	602	780	791	856	794	634
6. Korea Republic	1,107	292	1,366	444	1,673	371	2,182	474	2,189	509
7. Malaysia	431	224	573	315	801	667	947	640	924	1,142
8. China	294	164	579	214	677	328	872	244	1,199	344
9. Indonesia	367	71	575	129	645	142	695	214	592	111
10. Brunei	35	3	8	3	0	3	1	4	0	4
Middle Eastern Countries										
1. Saudi Arabia	945	59	1,634	65	1,671	55	1,058	30	607	33
2. Kuwait	80	9	33	10	16	18	4	17	22	10
3. Bahrain	7	7	17	6	16	4	9	7	13	5
American Continents										
1. USA	3,941	5,143	5,014	6,160	6,361	6,966	7,154	8,815	6,557	9,374
2. Canada	139	196	240	202	259	206	308	234	209	234
European Countries										
1. Germany F. R.*1	761	665	929	699	1,209	847	1,180	1,060	822	1,035
2. UK	389	639	549	923	479	936	545	1,086	327	1,757
3. Netherlands	279	516	318	805	331	1,115	545	1,663	219	2,319
4. France	235	185	306	203	400	226	781	231	492	251
5. Italy	165	90	225	111	297	94	304	91	219	111
6. Romania	12	1	6	1	16	3	15	2	6	1
Oceanian Countries										
1. Australia	587	140	731	143	808	161	955	204	683	170
Total *2	21,333	13,553	26,538	17,447	32,427	20,543	35,934	25,228	29,660	29,496

Source: 1999 Philippine Statistical Yearbook, NSCB

Note : *1 The total figures include other countries not listed in the above.

Table 4.4.1 Official Development Assistance*1: 1993-1998

(Unit: US$ Million)

Item	1993	1994	1995	1996	1997	1998
Bilateral	1,330.1	942.6	748.8	748.2	567.3	528.0
Japan	758.4	591.6	416.1	414.5	319.0	297.6
USA	262.0	116.0	112.0	46.0	15.0	27.3
Germany	88.4	56.4	67.6	106.6	56.6	45.4
Italy	71.8	4.5	3.0	8.7	2.1	2.1
Spain	31.2	16.8	11.8	4.4	22.7	15.4
Australia	28.5	33.8	56.0	55.9	42.9	45.0
Canada	24.4	24.1	19.5	16.4	16.5	14.5
Others	65.4	99.4	62.8	95.7	92.5	80.7
Multilateral	154.1	110.8	132.6	131.7	115.0	79.6
ADB	100.2	55.0	54.8	47.2	49.0	21.3
Others	53.9	55.8	77.8	84.5	66.0	58.3
Arab Countries	2.7	3.8	1.6	-0.8	-0.9	-0.9
Total	1,486.9	1,057.2	883.0	879.1	681.4	606.7

Source: Geographical Distribution of Financial Flows to Aid Recipients, Disbursements Commitments Country Indicators 1994-1998, OECD Development Assistance Committee

Note: *1 Official development assistance is defined as grants and loans, with at least a 25% grant element, administered with the aim of promoting economic of social development. Figures indicate amounts.

Table 4.5.1 External Debt: 1993-1998

(Unit: US$ Billion)

Item	1993	1994	1995	1996	1997	1998
Total Debt Stocks	35.9	39.4	37.8	40.1	45.7	47.8
1. Long Term Debt	29.7	32.6	31.8	31.8	33.0	39.1
2. Use of IMF Credit	1.2	1.1	0.7	0.4	0.9	1.6
3. Short Term Debt	5.0	5.7	5.3	8.0	11.8	7.2
Debt Outstanding of Long Term Debt	29.7	32.6	31.8	31.8	33.0	39.1
1. Public and Publicly Guaranteed	27.5	29.7	28.3	26.9	26.2	28.2
a. Official Creditors	21.1	23.2	22.2	20.2	18.5	20.2
- Multilateral	7.6	8.3	8.5	7.9	7.3	8.0
- Bilateral	13.5	14.9	13.7	12.3	11.2	12.2
b. Private Creditors	6.3	6.5	6.1	6.7	7.7	8.0
- Bonds	4.7	4.9	4.7	5.5	6.2	6.4
- Commercial Banks	0.6	0.6	0.7	0.6	0.9	1.2
- Others	1.1	1.0	0.8	0.6	0.5	0.4
2. Private Nonguranteed	2.2	2.9	3.5	4.9	6.8	10.9
Total Debt Service	4.9	4.6	5.4	5.4	4.5	5.2
1. Principal Repayment	2.8	2.5	3.1	3.2	2.3	2.9
a. Long Term Debt	2.7	2.3	2.7	2.9	2.1	2.8
b. IMF Repurchases	0.1	0.3	0.4	0.3	0.2	0.1
2. Interest Payments	2.1	2.1	2.3	2.2	2.2	2.3
a. Long Term Debt	1.8	1.6	1.8	1.7	1.7	2.0
b. IMF Charges	0.1	0.1	0.1	0.0	0.0	0.0
c. Short Term Debt	0.3	0.4	0.4	0.5	0.5	0.3
Ratios (%)						
1. Total Debt Stocks/GNP	65.0	60.0	49.7	46.5	53.3	70.1
2. Debt Service Ratio *1	25.6	18.9	16.1	13.4	9.3	11.8

Source: World Debt Tables, 1999, World Bank

Note: Long term debt is defined as having original maturity of more than one year.

*1 Debt service as a percentage of earnings from exports of goods and service (including workers' remittances).

Table 5.1.1 Production of Major Crops: 1996-1998

Crop	1996					1997					1998				
	Area (1000ha)	Quantity (1000ton)	Yield (ton/ha)	Value Mil. Pesos)	% Share	Area (1000ha)	Quantity (1000ton)	Yield (ton/ha)	Value Mil. Pesos)	% Share	Area (1000ha)	Quantity (1000ton)	Yield (ton/ha)	Value Mil. Pesos)	% Share
Philippines															
1 Cereals	6,686.8	15,434.9	2.3	118,392.3	-	6,568.1	15,601.5	2.4	116,301.8	-	5,524.2	12,378.0	2.2	91,947.4	-
- Paddy	3,951.1	11,283.6	2.9	91,284.1	-	3,842.3	11,269.1	2.9	89,137.5	-	3,170.0	8,554.8	2.7	69,123.0	-
- Corn	2,735.7	4,151.3	1.5	27,108.2	-	2,725.8	4,332.4	1.6	27,164.3	-	2,354.2	3,823.2	1.6	22,824.4	-
2 Major Crops															
- Coconut	3,149.0	11,368.1	3.6	27,397.2	-	3,314.2	12,118.5	3.7	29,690.3	-	3,115.8	10,905.3	3.5	36,532.8	-
- Banana	326.9	3,304.1	10.1	13,811.0	-	338.3	3,773.8	11.2	16,642.5	-	337.1	3,560.8	10.6	15,881.2	-
- Mango	87.7	624.8	7.1	11,196.8	-	92.9	987.1	10.6	15,092.8	-	93.9	931.5	9.9	16,496.9	-
- Sugar Cane	395.6	23,142.2	58.5	6,479.8	-	375.2	22,273.1	59.4	15,368.4	-	330.5	17,347.9	52.5	13,531.4	-
- Pineapple	45.0	1,542.2	34.3	7,418.2	-	40.4	1,638.0	40.5	11,285.8	-	40.2	1,495.1	37.2	10,361.2	-
- Cassava	228.3	1,911.8	8.4	6,767.9	-	230.5	1,958.0	8.5	6,402.7	-	216.5	1,786.7	8.3	6,735.9	-
- Tobacco	54.2	64.9	1.2	1,668.2	-	51.1	65.3	1.3	3,379.4	-	47.6	71.1	1.5	3,339.8	-
- Onion	9.8	83.3	8.5	1,443.1	-	11.9	85.4	7.2	1,145.0	-	12.8	87.7	6.9	1,951.5	-
Region 2 (Cagayan Valley Region)				Reference*1	% Share				Reference*	% Share				Reference*	% Share
1 Cereals	641.2	1,907.6	3.0	14,704.9	12.4	689.2	2,214.5	3.2	16,418.5	14.1	595.2	1,680.6	2.8	12,373.8	13.5
- Paddy	414.3	1,441.3	3.5	11,660.4	12.8	428.0	1,544.7	3.6	12,218.7	13.7	357.6	1,109.4	3.1	8,963.8	13.0
- Corn	226.9	466.2	2.1	3,044.5	11.2	261.3	669.8	2.6	4,199.8	15.5	237.5	571.2	2.4	3,410.1	14.9
2 Major Crops															
- Coconut	-	41.7	-	100.5	0.4	-	66.0	-	161.6	0.5	-	54.7	-	183.3	0.5
- Banana	-	17.0	-	71.1	0.5	-	34.3	-	151.4	0.9	-	31.4	-	140.0	0.9
- Mango	-	4.2	-	75.9	0.7	-	-	-	-	0.0	-	-	-	-	0.0
- Sugar Cane	-	156.5	-	43.8	0.7	-	354.0	-	244.2	1.6	-	166.1	-	129.6	1.0
- Pineapple	-	7.3	-	35.1	0.5	-	12.7	-	87.7	0.8	-	12.7	-	87.9	0.8
- Cassava	-	13.0	-	46.0	0.7	-	20.0	-	65.5	1.0	-	16.4	-	61.9	0.9
- Tobacco	-	9.6	-	247.6	14.8	-	11.9	-	614.7	18.2	-	9.0	-	424.6	12.7
- Onion	-	0.6	-	10.3	0.7	-	1.3	-	17.5	1.5	-	0.8	-	17.9	0.9

Source: (1) 1999 Philippine Statistical Yearbook, NSCB
(2) Cagayan Valley Statistical Yearbook 1999, NEDA Region 2
(3) Data presented by BAS in Manila and Region 2

Note: *1 Estimated on the basis of production applying unit prices calculated from the national average shown above.

Table 5.1.2 Production, Harvested Field and Yield of Paddy Cultivation: 1996-1998

Item	Jan.-June			July-Dec.			Annual Total		
	Production (1000ton)	Area Harvested (1000ha)	Yield (ton/ha)	Production (1000ton)	Area Harvested (1000ha)	Yield (ton/ha)	Production (1000ton)	Area Harvested (1000ha)	Yield (ton/ha)
1996									
Cagayan Province	238.9	81.9	2.9	136.5	52.8	2.6	375.5	134.7	2.8
Irrigated	179.7	50.5	3.6	119.4	41.8	2.9	299.1	92.3	3.2
Rainfed	59.2	31.4	1.9	17.1	11.0	1.6	76.3	42.4	1.8
Isabela Province	446.1	109.4	4.1	424.5	109.8	3.9	870.5	219.2	4.0
Irrigated	416.4	96.8	4.3	403.5	102.0	4.0	819.9	198.7	4.1
Rainfed	29.6	12.7	2.3	21.0	7.8	2.7	50.6	20.5	2.5
Two Provinces	685.0	191.4	3.6	561.0	162.6	3.5	1,246.0	353.9	3.5
Irrigated	596.1	147.2	4.0	522.9	143.7	3.6	1,119.0	291.0	3.8
Rainfed	88.8	44.1	2.0	38.1	18.8	2.0	127.0	63.0	2.0
1997									
Cagayan Province	262.2	85.7	3.1	177.4	60.3	2.9	439.6	146.0	3.0
Irrigated	207.5	58.6	3.5	165.6	52.8	3.1	373.1	111.4	3.3
Rainfed	54.6	27.1	2.0	11.8	7.4	1.6	66.4	34.5	1.9
Isabela Province	465.2	112.3	4.1	442.2	109.3	4.0	907.5	221.5	4.1
Irrigated	436.4	99.1	4.4	432.6	104.8	4.1	869.0	203.8	4.3
Rainfed	28.8	13.2	2.2	9.6	4.5	2.1	38.5	17.7	2.2
Two Provinces	727.4	198.0	3.7	619.6	169.5	3.7	1,347.0	367.5	3.7
Irrigated	643.9	157.7	4.1	598.2	157.6	3.8	1,242.1	315.3	3.9
Rainfed	83.5	40.3	2.1	21.4	11.9	1.8	104.9	52.2	2.0
1998									
Cagayan Province	194.3	72.3	2.7	151.9	54.6	2.8	346.2	126.9	2.7
Irrigated	179.6	59.8	3.0	142.8	48.3	3.0	322.5	108.0	3.0
Rainfed	14.7	12.6	1.2	9.1	6.4	1.4	23.8	18.9	1.3
Isabela Province	368.0	95.9	3.8	215.7	78.1	2.8	583.6	174.0	3.4
Irrigated	366.7	95.3	3.8	215.0	77.6	2.8	581.8	172.9	3.4
Rainfed	1.2	0.6	1.9	0.6	0.5	1.4	1.9	1.1	1.7
Two Provinces	562.3	168.2	3.3	367.6	132.7	2.8	929.9	300.9	3.1
Irrigated	546.4	155.0	3.5	357.8	125.9	2.8	904.2	280.9	3.2
Rainfed	15.9	13.2	1.2	9.7	6.8	1.4	25.6	20.0	1.3

Source: Statistical Yearbook 1999, NEDA Region 2

Table 5.1.3 Production, Harvested Field and Yield of Corn Cultivation: 1996-1998

Item	Jan.-June			July-Dec.			Annual Total		
	Production (1000ton)	Area Harvested (1000ha)	Yield (ton/ha)	Production (1000ton)	Area Harvested (1000ha)	Yield (ton/ha)	Production (1000ton)	Area Harvested (1000ha)	Yield (ton/ha)
1996									
Cagayan Province	55.9	27.9	2.0	40.6	30.9	1.3	96.4	58.8	1.6
White	3.2	3.3	1.0	5.6	8.9	0.6	8.9	12.2	0.7
Yellow	52.6	24.7	2.1	34.9	22.0	1.6	87.5	46.7	1.9
Isabela Province	145.3	61.2	2.4	171.6	81.4	2.1	316.9	142.6	2.2
White	10.5	5.7	1.9	6.8	4.8	1.4	17.3	10.4	1.7
Yellow	134.7	55.5	2.4	164.8	76.6	2.2	299.5	132.1	2.3
Two Provinces	201.1	89.1	2.3	212.2	112.3	1.9	413.3	201.4	2.1
White	13.8	8.9	1.5	12.4	13.7	0.9	26.2	22.6	1.2
Yellow	187.3	80.2	2.3	199.7	98.6	2.0	387.0	178.8	2.2
1997									
Cagayan Province	86.3	36.0	2.4	57.2	33.8	1.7	143.5	69.8	2.1
White	6.4	5.7	1.1	8.9	10.9	0.8	15.4	16.6	0.9
Yellow	79.9	30.3	2.6	48.2	22.9	2.1	128.1	53.1	2.4
Isabela Province	220.6	80.9	2.7	212.3	79.2	2.7	432.9	160.1	2.7
White	7.8	4.9	1.6	9.5	5.6	1.7	17.3	10.5	1.7
Yellow	212.9	76.0	2.8	202.7	73.6	2.8	415.6	149.6	2.8
Two Provinces	307.0	116.9	2.6	269.5	113.0	2.4	576.4	229.8	2.5
White	14.2	10.6	1.3	18.5	16.5	1.1	32.7	27.1	1.2
Yellow	292.7	106.3	2.8	251.0	96.5	2.6	543.7	202.7	2.7
1998									
Cagayan Province	62.6	29.1	2.2	57.4	34.6	1.7	120.0	63.7	1.9
White	5.5	5.7	1.0	5.3	7.2	0.7	10.9	12.9	0.8
Yellow	57.1	23.4	2.4	52.1	27.4	1.9	109.2	50.8	2.1
Isabela Province	150.9	62.0	2.4	213.8	83.6	2.6	364.7	145.7	2.5
White	4.0	2.6	1.5	5.3	5.0	1.1	9.3	7.6	1.2
Yellow	147.0	59.4	2.5	208.4	78.7	2.6	355.4	138.0	2.6
Two Provinces	213.6	91.1	2.3	271.2	118.2	2.3	484.7	209.4	2.3
White	9.5	8.4	1.1	10.7	12.2	0.9	20.2	20.5	1.0
Yellow	204.0	82.8	2.5	260.5	106.1	2.5	464.5	188.8	2.5

Source: Statistical Yearbook 1999, NEDA Region 2

Table 5.1.4 Farm-gate Price of Paddy and Corn: 1997-1999

(Unit: Pesos/kg)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Average
Paddy													
1997	7.58	8.26	8.51	8.83	9.19	9.10	9.19	9.50	8.16	8.00	7.62	7.69	8.47
1998	8.07	7.82	8.59	9.13	9.20	9.24	10.50	9.46	8.20	8.27	8.86	8.03	8.78
1999	8.84	10.22	9.52	9.52	9.11	9.06	9.76	8.08	7.27	7.40	6.96	7.66	8.62
Corn, Yellow													
1997	7.28	7.28	6.36	6.21	5.96	-	6.35	6.00	5.91	6.00	6.01	6.17	6.32
1998	6.30	5.83	5.64	5.40	5.50	-	-	7.08	5.70	5.36	-	-	5.85
1999	5.33	5.24	5.34	5.01	5.23	-	5.10	4.57	3.97	5.25	-	-	5.00
Corn, White													
1997	6.77	-	-	-	-	-	-	5.49	-	-	-	5.75	6.00
1998	-	-	-	-	-	-	-	-	8.16	-	-	-	8.16
1999	-	6.93	-	6.73	-	-	4.74	3.96	4.15	-	-	-	5.30

Source: Data were presented by BAS, Region 2

Table 5.1.5 Inventory of Freshwater Fishpond by Municipality in Lower Cagayan River Basin: 2000

Type of Industry / Province/Municipality	Freshwater Fishpond (ha)			
	Total	Backyard	Medium	Commercial
1. **Region II**	**1,972.5**	-	-	-
Cagayan Province	1,035.3	157.6	839.7	38.0
Isabala Province	748.3	173.7	564.3	10.3
Nueva Vizcaya & Quirino	188.9	-	-	-
2. **Lower Cagayan River Basin*1**	**383.6**	**146.4**	**231.0**	**6.2**
1) Cagayan Province	343.4	135.8	201.3	6.2
1 Alcala	6.0	2.0	4.1	0.0
2 Allacapan	44.4	0.0	41.5	3.0
3 Amulung	17.5	4.9	12.6	0.0
4 Aparri	85.5	30.3	54.0	1.3
5 Baggao	46.6	46.6	0.0	0.0
6 Ballesteros	29.8	6.0	23.8	0.0
7 Camalaniugan	6.7	5.0	1.7	0.0
8 Enrile	9.7	0.0	9.7	0.0
9 Gattaran	20.1	11.5	8.5	0.0
10 Iguig	0.9	0.0	0.9	0.0
11 Lallo	27.1	19.2	7.8	0.0
12 Lasam	3.7	2.8	0.9	0.0
13 Piat	5.7	1.0	4.7	0.0
14 Rizal	0.8	0.0	0.8	0.0
15 Santo Nino (Faire)	3.3	2.4	1.0	0.0
16 Solana	19.5	0.0	17.5	1.9
17 Tuao	3.2	2.3	0.9	0.0
18 Tuguegarao City	13.0	2.0	11.0	0.0
2) Isabela Province	40.3	10.5	29.7	0.0
19 Cabagan	18.6	7.1	11.5	0.0
20 San Mariano	14.3	0.8	13.6	0.0
21 San Pablo	1.3	0.0	1.3	0.0
22 Santo Tomas	6.1	2.6	3.4	0.0

Source: CY2000 Updated Fisheries Profile/Municipality, BFAR Region 2
Note: Fishpond scale is classified as follows:

Backyard	500m2 & below
Medium scale	500m2 to 10ha
Commercial scale	10ha & above

Table 5.1.6 Production and Farm-gate Price of by Fish Species in Freshwater Fishpond: 1997-1999

Year	Tilapia	Carp	Catfish	Mudfish	Gourami	Others
Production (tons)						
Cagayna Province						
1995	230	15	15	21	10	11
1996	235	14	15	20	11	10
1997	241	15	12	20	12	10
1998	255	14	16	22	10	12
1999	261	19	29	37	16	10
Isabela Province*1						
Farmgate, Wholesale and Retail Price in Aug. 2000 (Pesos/kg)						
1) Farmgate*2	60~35	-	-	-	-	-
2) Wholesale	52.42	-	-	-	-	-
3) Retail	72.58	-	-	-	-	-

Source: BFAR Region 2

Note: *1 Fishpond production data in Isabela Province were not available.

*2 Farmgate price (pesos/kg) depends on size of tilapia. The bigger, the more expensive.

Table 5.1.7 Inventory and Farm-gate Price of Livestock and Poultry: 1996-1998

Item	Cattle	Carabao	Swine	Goat	Duck	Chicken
Inventory (Unit: Heads)						
Cagayan Province						
1996	30,645	125,931	198,110	19,858	159,570	1,669,853
1997	30,880	128,836	209,090	25,731	168,094	1,771,625
1998	31,713	132,204	273,670	27,995	181,377	2,523,065
Isabela Province						
1996	61,155	127,576	144,770	19,910	727,010	2,877,889
1997	69,965	141,347	193,050	25,786	743,103	3,981,028
1998	75,230	145,331	191,840	23,857	570,217	5,120,195
Total of Two Provinces						
1996	91,800	253,507	342,880	39,768	886,580	4,547,742
1997	100,845	270,183	402,140	51,517	911,197	5,752,653
1998	106,943	277,535	465,510	51,852	751,594	7,643,260
Farm-gate Price*1						
Unit	Pesos/Head	Pesos/Head	Pesos/Kg	Pesos/Kg	Pesos/Kg	Pesos/Kg
Annual Average Price						
1997	-	-	50.71	71.84	-	74.40
1998	-	-	54.99	68.65	-	86.81
1999	-	-	51.64	66.36	-	82.63

Source: Statistical Yearbook 1999, NEDA Region 2
BAS Region II
Note: *1 Prices shows a unit price of live animal.

Table 5.2.1 Inventory of Establishments Registered to DTI by Municipality in Flood Prone Area of Lower Cagayan River Basin: 1998

Type of Industry / Province/Municipality	Manufacturing	Wholesale & Retail Trading	Services	Total
1. Cagayan Province	136	1,320	409	1,865
Isabala Province	137	774	410	1,321
Kalinga Province	-	-	-	-
2. **Lower Cagayan River Basin*1**	94	1,200	383	1,677
1) Cagayan Province	82	1,156	365	1,603
1 Alcala	2	23	5	30
2 Allacapan	0	7	9	16
3 Amulung	0	4	2	6
4 Aparri	0	84	0	84
5 Baggao	14	131	22	167
6 Ballesteros	8	18	9	35
7 Camalaniugan	15	16	0	31
8 Enrile	1	4	2	7
9 Gattaran	3	26	8	37
10 Iguig	0	73	0	73
11 Lallo	1	9	6	16
12 Lasam	0	0	0	0
13 Piat	2	11	3	16
14 Rizal	0	4	3	7
15 Santo Nino (Faire)	0	0	0	0
16 Solana	0	319	0	319
17 Tuao	0	20	0	20
18 Tuguegarao City	36	407	296	739
2) Isabela Province	12	44	18	74
19 Cabagan	7	28	14	49
20 San Pablo	2	0	1	3
21 Santa Maria	3	16	3	22
22 Santo Tomas	0	0	0	0
3) Kalinga Province	-	-	-	-
23 Pinukpuk	-	-	-	-
24 Tabuk	-	-	-	-

Source: Directory of Registered Business Names 1998, 1999, DTI Region 2
Note: *1 A total figure of a city and 23 municipalities involved in the Lower Cagayan River Basin.

Table 5.2.2 Assets Holdings of Manufacturing Industry: 1993

(Unit: Million Pesos)

	Item	Philippines	Region II	CAR
I.	**Large & Medium Scale Manufacturer with Average Total Employment of 10 and More**			
1.	Number of Establishments (nos)	11,005	144	52
2.	Employment (Average for the year)			
1)	Total (persons)	908,686	3,756	4,083
2)	Paid Employees (persons)	900,645	3,540	4,035
3)	Compensation (Million Pesos)	63,338.2	159.9	572.9
3.	Production and Value Added			
1)	Value of Output *1	793,282.0	1,342.0	13,442.0
2)	Production Cost *2	500,610.1	738.8	11,223.0
3)	Value Added	256,176.4	584.3	2,138.0
4.	Fixed Assets			
1)	Land	1,022.9	-	-
2)	Building	6,832.1	3.3	91.9
3)	Transport Equipment	2,124.9	12.9	1.1
4)	Machinery	36,995.9	450.6	1,060.8
5)	Other Fixed Assets	2,805.1	1.3	4.2
	Total	49,781.0	468.1	1,158.0
5.	Inventory			
1)	Finished Products	44,173.2	74.8	32.0
2)	Works-in-Process	19,391.5	41.6	416.4
3)	Material, Fuel & Supplies	73,739.8	68.2	1,176.6
4)	Goods for Resale	2,694.1	29.5	0.6
	Total	139,998.6	214,177.0	1,625,598.0
II.	**Smale Scale and Cottage Manufacturer with Average Total Employment of Less Than 10**			
1.	Number of Establishments (nos)	80,131	3,703	1,626
2.	Employment (Average for the year)			
1)	Total (persons)	317,896	11,813	4,102
2)	Paid Employees (persons)	190,131	5,722	1,266
3)	Compensation (Million Pesos)	4,392.8	92.5	37.2
3.	Production and Value Added			
1)	Value of Output *1	24,689.1	737.7	215.1
2)	Production Cost *2	13,909.2	442.8	87.5
3)	Value Added	9,916.6	269.1	100.1
4.	Fixed Assets			
1)	Land	68.2	11.1	-
2)	Building	76.8	0.1	0.1
3)	Transport Equipment	101.5	13.6	-
4)	Machinery	180.8	2.8	2.3
5)	Other Fixed Assets	5.8	0.0	-
	Total	433.0	27.6	2.5
5.	Inventory			
1)	Finished Products	1,452.6	19.9	5.8
2)	Works-in-Process	322.6	2.1	8.9
3)	Material, Fuel & Supplies	732.8	9.5	2.1
4)	Goods for Resale	126.0	3.8	-
	Total	2,634.0	35.3	16.8

Source: 1993 Annual Survey of Establishments, Vol. III Manufacturing, NSO

Note : *1 In producers' prices

*2 Detail figures may not add up to total due to rounding.

*3 Following selected costs only: (1) Materials and supplies purchased, (2) Fuels purchased, (3) Electricity purchased, (4) Contract work and industrial services done by others, (5) Merchandise purchased for resale and (6) Indirect tax. Indirect taxes and Subsidies received are not included in the total cost.

Table 5.2.3 Assets Holdings of Manufacturing Industry: 1995

(Unit: Million Pesos)

	Item	Philippines	Region 2	CAR
I.	**Large & Medium Scale Manufacturer with Average Total Employment of 10 and More**			
1.	Number of Establishments (nos)	10,219	97	51
2.	Employment (Average for the year)			
1)	Total (persons)	911,319	2,335	4,239
2)	Paid Employees (persons)	902,994	2,167	4,174
3)	Compensation (Million Pesos)	75,705.7	183.5	489.7
3.	Production and Value Added			
1)	Value of Output *1	1,008,157.3	1,753.0	21,639.8
2)	Production Cost *2*3	614,138.4	994.0	17,942.4
3)	Census Value Added	394,018.9	759.0	3,697.1
4)	Value Added*4	310,729.5	696.4	3,457.1
4.	Fixed Assets			
1)	Land	17,634.0	30.0	2.2
2)	Building	64,665.0	75.0	1,031.4
3)	Transport Equipment	12,585.7	86.6	13.3
4)	Machinery	208,521.5	381.0	4,896.8
5)	Other Fixed Assets	13,333.9	8.8	4.1
	Total	316,740.1	581.4	5,947.8
5.	Inventory			
1)	Finished Products	50,234.9	24.2	40.7
2)	Works-in-Process	23,642.2	21.2	872.5
3)	Material, Fuel & Supplies	83,532.7	85.5	2,233.0
4)	Goods for Resale	2,717.0	5.1	0.5
	Total	160,126.8	136.0	3,146.6
II.	**Smale Scale and Cottage Manufacturer with Average Total Employment of Less Than 10**			
1.	Number of Establishments (nos)	86,484	3,817	1,550
2.	Employment (Average for the year)			
1)	Total (persons)	313,019	11,883	4,096
2)	Paid Employees (persons)	172,881	5,889	1,603
3)	Compensation (Million Pesos)	4,621.8	148.9	47.8
3.	Production and Value Added			
1)	Value of Output *1	32,147.8	1,035.3	701.0
2)	Production Cost *2*3	18,158.2	633.0	563.5
3)	Census Value Added	14,659.2	402.3	137.4
4)	Value Added*4	12,655.0	327.9	119.0
4.	Fixed Assets			
1)	Land	-	-	-
2)	Building	-	-	-
3)	Transport Equipment	-	-	-
4)	Machinery	-	-	-
5)	Other Fixed Assets	-	-	-
	Total	9,846.4	504.6	73.9
5.	Inventory			
1)	Finished Products & Work-in Pro	2,453.4	33.4	216.4
2)	Material, Fuel & Supplies	1,539.6	10.7	7.4
3)	Goods for Resale	112.2	1.2	0.1
4)	Others	5.0	0.0	3.1
	Total	4,110.2	45.3	227.0

Source: 1995 Annual Survey of Establishments, Vol. III Manufacturing, NSO

Note : *1 In producers' prices

*2 Detail figures may not add up to total due to rounding.

*3 Following selected costs only: (1) Materials and supplies purchased, (2) Fuels purchased, (3) Electricity purchased, (4) Contract work and industrial services done by others, (5) Merchandise purchased for resale and (6) Indirect tax.
Indirect taxes and Subsidies received are not included in the total cost.

*4 Census Value Added minus cost of non-industrial services and indirect taxes.

Table 5.3.1 Assets Holdings of Wholesale and Retail Trade: 1993

(Value in Million Pesos)

Item	Philippines	Region 2	CAR
I. Average Total Employment of 10 or More			
1. Number of Establishments (nos)	9,752	128	86
2. Employment (nos)			
1) Total	299,303	3,472	1,733
2) Employees	292,211	3,282	1,681
3) Compensation	20,989	137	81
3. Sale Amount and Value Added			
1) Annual Sales	453,154	2,468	1,569
Costs	403,690	1,964	1,640
2) Gross Margin	94,556	496	112
3) Value Added	70,661	389	8
4. Fixed Assets			
1) Land	5,339	70	10
2) Building	13,716	111	73
3) Transport Equipment	4,886	92	26
4) Machinery	8,990	36	18
5) Other Fixed Assets	1,651	6	0
Total	34,581	315	128
5. Inventory			
1) Goods for Resale	65,749	464	183
2) Materials & Supplies	1,962	25	4
3) Fuels, Lubricants Oils & Greases	214	18	28
4) Other Inventories	-	-	-
Total	67,925	507	214
II. Average Total Employment of Less Than 10			
1. Number of Establishments (nos)	182,198	5,858	3,559
2. Employment (nos)			
1) Total	687,145	23,381	11,718
2) Employees	402,030	13,713	6,139
3) Compensation	12,342	300	131
3. Sale Amount and Value Added			
1) Annual Sales	175,921	6,395	2,260
	161,562	5,678	1,875
2) Gross Margin	42,566	1,173	348
3) Value Added	31,815	1,017	501
4. Fixed Assets			
1) Land	7,838	205	335
2) Building	6,932	381	293
3) Transport Equipment	7,314	624	100
4) Machinery	2,628	90	174
5) Other Fixed Assets	1,131	141	22
Total	25,842	1,442	924
5. Inventory			
1) Goods for Resale	39,404	1,125	240
2) Materials & Supplies	1,033	5	2
3) Fuels, Lubricants Oils & Greases	78	1	3
4) Other Inventories	40,514	1,131	245
Total			

Source: 1993 Annual Survey of Establishments, Vol. VII Wholesale and Retail Trade, NSO

Table 5.3.2 Assets Holdings of Service Industry: 1995

(Unit: 1000 Pesos)

Item	Philippines	Region 2	CAR
I. Medium-Size Enterprise with Average Total Employment of 10 and More			
1. Number of Establishments (nos)	11,589	177	263
2. Employment (nos)			
1) Total	450,008	5,378	8,918
2) Employees	440,310	5,278	8,616
3) Compensation	30,576,028	291,155	460,232
3. Sale Amount and Value Added			
1) Annual Sales	107,188,659	598,614	1,166,144
2) Gross Margin	-	-	-
3) Value Added	58,266,984	433,171	670,916
4. Fixed Assets			
1) Land	899,214	21,301	3,428
2) Building	4,991,328	39,960	59,524
3) Transport Equipment	378,400	3,250	1,730
4) Machinery	4,782,884	21,916	27,851
5) Other Fixed Assets	312,092	5,310	3,528
Total	11,363,918	91,737	96,061
5. Inventory			
1) Goods for Resale	405,089	291	7,533
2) Materials & Supplies	2,762,896	16,800	25,840
3) Fuels, Lubricants Oils & Greases	32,787	3	44
4) Other Inventories	786,160	-	-
Total	3,986,932	17,094	33,417
II. Small Sceli Enterprise with Average Total Employment of Less Than 10			
1. Number of Establishments (nos)	137,249	3,707	2,369
2. Employment (nos)			
1) Total	513,023	11,938	9,178
2) Employees	312,459	5,992	5,478
3) Compensation	8,006,120	137,702	149,291
3. Sale Amount and Value Added			
1) Annual Sales	38,615,799	831,052	692,313
2) Gross Margin	-	-	-
3) Value Added	18,447,821	423,757	383,037
4. Fixed Assets			
1) Land	-	-	-
2) Building	-	-	-
3) Transport Equipment	-	-	-
4) Machinery	-	-	-
5) Other Fixed Assets	-	-	-
Total	25,836,685	241,094	421,566
5. Inventory			
1) Goods for Resale	84,188	1,982	205
2) Materials & Supplies	1,766,568	32,255	15,474
3) Fuels, Lubricants Oils & Greases	-	-	-
4) Other Inventories	6,367	0	0
Total	1,857,123	34,237	15,679

Source: 1995 Annual Survey of Establishments, Vol. VII Wholesale and Retail Trade, NSO

Table 5.4.1 Family Annual Income and Expenditure: 1997

Item	Philippines	Region 2				
		Region	Cagayan	Isabela	N. Vizcaya	Quirino
I. Average Annual Income (Pesos)	123,168	86,822	78,067	89,706	97,334	84,042
II. Average Annual Expenditure (Pesos)	99,537	68,556	65,070	66,413	83,876	68,752
III. Details of Expenditure (%)	100.0	100.0	100.0	100.0	100.0	100.0
1 Food	44.2	51.2	54.2	49.1	51.9	50.2
- Consumed at Home	39.5	48.8	52.2	47.1	47.3	48.3
- Consumed Outside the Home	4.7	2.4	2.0	2.0	4.6	1.9
2 Tobacco and Alcoholic	2.2	3.2	3.4	3.0	3.3	3.3
3 Clothing, Other Wear	3.3	3.6	3.5	3.2	5.0	4.0
4 Housing Expenses	23.9	18.2	16.1	20.4	16.1	17.0
- Fuel, Light & Water	5.3	5.2	5.4	5.3	4.3	5.5
- Non-Durable Furnishing	0.3	0.4	0.4	0.3	0.5	0.4
- Furniture and Equipment	3.0	2.8	2.0	3.3	2.4	3.2
- Rental Value of Dwelling Unit	14.2	8.7	7.4	10.6	7.1	6.1
- Maintenance & Repairs	1.1	1.1	0.9	0.9	1.8	1.8
5 Taxes Paid	2.5	1.4	1.1	1.7	0.9	1.3
6 Other Expenses	23.9	22.4	21.7	22.6	22.8	24.2
- Education	3.7	4.4	3.6	5.0	3.8	5.5
- Medical Care	2.2	2.0	1.6	2.2	2.2	2.0
- Others	18.0	16.0	16.5	15.4	16.8	16.7
IV. Annual Savings (Balance)	23,631	18,266	12,997	23,293	13,458	15,290

Item	CAR					Aurora Province
	Region	Apayao	Ifugao	Kalinga	Mt. Prov.	
I. Average Annual Income (Pesos)	193,432	89,976	87,687	100,746	68,000	97,915
II. Average Annual Expenditure (Pesos)	142,457	60,780	70,000	80,605	54,655	85,425
III. Details of Expenditure (%)	100.0	100.0	100.0	100.0	100.0	100.0
1 Food	47.6	52.2	43.4	47.8	50.2	51.3
- Consumed at Home	45.3	50.7	42.0	47.0	49.3	48.7
- Consumed Outside the Home	2.3	1.5	1.4	0.8	0.9	2.6
2 Tobacco and Alcoholic	2.2	2.4	3.3	3.0	2.1	2.8
3 Clothing, Other Wear	3.5	3.7	4.2	3.4	3.5	4.2
4 Housing Expenses	21.5	21.8	17.2	17.9	17.3	17.1
- Fuel, Light & Water	4.8	3.8	4.3	4.3	6.7	4.7
- Non-Durable Furnishing	0.4	1.0	0.8	1.0	0.6	0.8
- Furniture and Equipment	1.7	1.4	1.5	3.7	0.4	3.6
- Rental Value of Dwelling Unit	13.4	15.2	8.9	7.1	8.5	6.7
- Maintenance & Repairs	1.2	0.4	1.7	1.8	1.1	1.3
5 Taxes Paid	2.1	0.7	1.4	1.1	1.5	1.2
6 Other Expenses	23.1	19.2	30.5	26.8	25.4	23.4
- Education	5.1	3.3	7.1	5.5	6.0	5.1
- Medical Care	2.1	1.2	4.9	3.0	1.8	2.4
- Others	15.9	14.7	18.5	18.3	17.6	15.9
IV. Annual Savings (Balance)	50,975	29,196	17,687	20,141	13,345	12,490

Source: 1997 Family Income and Expenditure Survey, Integrated Survey of Households Bulletin Series No.98, Volume II, June 1999, NSO

Table 5.5.1 Subsistence Incidence and Agricultural Conditions by Municipality (1/4)

Region/ Province/Municipality	Social condition			Agricultural Conditions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Population	**Below Subsistence Threshold Level****	**Total No. of House-Hold (HH)**	**Farming House-hold (FH)**	**% of FH to Total HH**	**Rate of Paddy Area (Paddy +Corn)**	**Average Paddy Area /FH**	**Average Irrigated Paddy Area /FH**	**% of Irrigated Paddy Area**	**Average Corn Area/ FH**	**Average Vegetable Area / FH**	**Average fruits area/FH**	**Average No. of Carabao / FH**	**Average No. of Cattle / FH**	**Average No. of Hog / FH**	**Average No. of Goat / FH**	**Average No. of Chicken / FH**
Region II		(%)			(%)	(%)	(ha)	(ha)	(%)	(ha)	(a)	(a)	(head)	(head)	(head)	(head)	(head)
CAGAYAN																	
3 Allacapan	23,997	52.0	5,119	3,809	74.4	98.2	2.8	1.20	42.6	0.05	2.4	9.4	1.6	0.1	2.5	0.4	0.9
4 Amulung	37,744	65.0	7,947	6,337	79.7	58.6	1.0	0.71	70.1	0.72	1.6	2.8	1.5	0.0	2.1	0.5	0.9
5 Aparri	53,639	65.7	10,633	3,628	34.1	99.0	1.4	0.72	52.2	0.01	1.3	10.7	1.1	0.2	2.8	0.5	0.8
6 Baggao	60,060	46.0	12,332	10,865	88.1	69.6	0.7	0.37	54.3	0.29	1.5	5.0	0.6	0.1	1.4	0.2	0.7
7 Ballesteros	25,644	37.4	5,566	1,686	30.3	98.5	2.8	0.52	18.1	0.04	3.5	18.5	0.9	0.8	3.5	0.5	0.9
8 Buguey	25,058	67.9	5,182	3,011	58.1	97.5	1.6	1.29	80.8	0.04	2.3	9.9	0.3	0.3	1.4	0.6	1.0
9 Calayan	12,243	61.0	2,659	1,692	63.6	96.0	0.6	0.33	52.2	0.03	0.5	8.1	1.0	2.0	1.4	0.4	1.2
11 Claveria	25,363	35.0	5,480	3,236	59.1	100.0	1.0	0.88	90.8	0.00	0.9	6.7	0.4	0.2	1.5	0.1	0.7
12 Enrile	28,736	55.0	7,735	4,623	59.8	68.7	0.8	0.48	58.6	0.38	0.8	3.2	0.9	0.2	1.3	0.4	0.9
13 Gattaran	44,034	72.0	9,413	6,476	68.8	80.4	1.1	0.68	60.6	0.27	1.4	3.8	1.3	0.6	2.7	0.5	1.1
14 Gonzaga	27,997	35.9	5,461	3,989	73.0	66.6	0.8	0.69	81.7	0.42	0.5	3.2	1.0	0.8	1.4	0.4	0.4
15 Iguig	19,100	77.6	4,108	2,454	59.7	59.8	0.6	0.27	43.9	0.41	1.9	2.1	1.7	0.2	1.3	0.2	1.6
18 Pamplona	18,107	57.9	4,212	2,594	61.6	89.9	1.9	0.85	44.3	0.22	2.5	7.2	0.6	0.3	1.4	0.3	1.3
19 Penablanca	33,190	44.6	6,126	3,093	50.5	26.5	0.3	0.30	93.9	0.87	2.8	14.0	2.1	0.3	1.9	0.8	1.9
20 Piat	17,472	62.9	4,605	2,816	61.2	40.7	0.7	0.22	33.0	0.96	2.1	3.6	0.1	0.2	1.8	0.4	1.1
21 Rizal	13,901	66.4	2,591	2,354	90.9	13.9	0.2	0.07	39.1	1.17	0.6	81.5	1.5	0.2	2.7	0.1	0.6
22 Sanchez-Mira	18,904	44.5	4,026	2,289	56.9	99.9	1.3	0.63	49.1	0.00	2.6	11.1	0.4	0.6	2.6	0.1	1.3
24 Santa Praxedes	2,709	73.0	522	406	77.8	100.0	1.1	0.97	90.0	0.00	1.9	11.7	0.8	0.1	1.1	0.1	1.1
25 Santa Terresita	12,566	34.0	2,469	2,092	84.7	91.7	0.9	0.70	79.3	0.08	1.4	5.0	0.5	0.2	0.7	0.3	0.8
27 Solana	60,346	69.5	12,606	8,890	70.5	75.7	1.1	0.85	78.6	0.35	1.6	2.1	0.9	0.1	1.5	0.1	0.9
28 Tuao	49,285	43.0	9,465	6,264	66.2	68.8	0.9	0.67	72.6	0.42	1.5	5.8	0.9	0.0	2.4	0.2	1.4

Table 5.5.1 Subsistence Incidence and Agricultural Conditions by Municipality (2/4)

Region/ Province/Municipality	Social condition			Agricultural Conditions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Population	**Below Subsistence Threshold Level****	**Total No. of House-Hold (HH)**	**Farming House-hold (FH)**	**% of FH to Total HH**	**Rate of Paddy Area (Paddy +Corn)**	**Average Paddy Area /FH**	**Average Irrigated Paddy Area /FH**	**% of Irrigated Paddy Area**	**Average Corn Area/ FH**	**Average Vegetable Area / FH**	**Average fruits area/FH**	**Average No. of Carabao / FH**	**Average No. of Cattle / FH**	**Average No. of Hog / FH**	**Average No. of Goat / FH**	**Average No. of Chicken / FH**
		(%)			(%)	(%)	(ha)	(ha)	(%)	(ha)	(a)	(a)	(head)	(head)	(head)	(head)	(head)
ISABELA																	
1 Alicia	52,666	43.3	13,246	7,158	54.0	98.2	1.4	1.42	99.1	0.03	0.4	1.6	0.3	0.4	0.7	0.3	6.4
2 Angadanan	33,145	30.8	9,025	7,421	82.2	34.9	0.5	0.40	75.9	0.98	1.1	6.1	0.6	0.4	0.5	0.1	4.8
3 Aurola	26,385	68.7	6,488	4,188	64.5	41.9	0.5	0.52	100.0	0.72	2.7	4.6	0.3	0.9	1.7	0.2	5.1
4 Benito Soliven	20,685	78.9	4,410	3,974	90.1	27.5	0.4	0.16	37.2	1.16	1.2	50.2	1.0	0.5	1.2	0.1	7.7
5 Burgos	19,052	54.8	3,126	1,954	62.5	59.4	1.9	1.93	100.0	1.32	0.3	1.8	0.5	0.9	3.1	0.3	7.8
6 Cabagan	35,054	64.4	8,003	5,606	70.0	39.3	0.5	0.38	79.2	0.74	0.8	1.9	0.7	1.5	1.2	0.2	6.9
7 Cabatuan	28,449	36.0	6,849	3,678	53.7	86.8	1.4	1.38	100.0	0.21	1.1	3.1	0.2	1.0	2.1	0.2	7.6
8 Cauayan	92,677	46.1	18,120	10,661	58.8	46.3	1.0	0.83	84.3	1.14	0.8	4.6	1.4	2.2	1.8	0.2	7.3
9 Cordon	30,461	58.0	6,854	4,892	71.4	74.6	1.0	0.87	90.8	0.33	2.2	8.3	0.5	0.7	1.2	0.3	8.6
10 Delfin Albano	21,811	45.9	5,027	4,129	82.1	78.8	1.8	1.10	60.0	0.49	1.0	3.7	0.6	0.5	1.1	0.5	7.8
11 Dinapigue	3,046	66.9	476	291	61.1	98.9	0.9	0.55	60.8	0.01	3.8	17.5	1.3	0.4	1.6	1.0	7.0
12 Divilican	2,593	84.1	477	346	72.5	89.0	1.9	1.03	55.0	0.23	8.3	14.8	1.8	0.1	0.4	0.1	23.0
13 Echague	56,119	10.0	13,019	8,257	63.4	32.9	0.7	0.31	47.4	1.34	1.2	11.4	1.1	1.1	1.5	0.4	9.3
14 Gamu	22,765	30.1	5,348	2,852	53.3	64.0	1.2	1.07	86.3	0.70	0.3	2.5	0.8	0.9	1.2	0.3	6.0
15 Ilagan(Capital)	106,912	52.3	26,071	17,890	68.6	28.7	0.4	0.17	45.7	0.92	1.2	3.8	1.0	0.7	1.3	0.1	7.3
16 Jones	34,669	30.0	8,260	7,364	89.2	15.6	0.2	0.05	22.9	1.24	0.9	25.2	1.0	0.4	1.6	0.2	12.3
17 Luna	13,255	69.4	2,755	2,022	73.4	65.3	1.1	1.10	96.4	0.60	1.3	1.8	0.2	1.2	1.3	0.1	10.6
18 Maconacon	5,895	76.5	799	300	37.5	100.0	1.7	1.05	63.4	0.00	3.0	10.3	1.7	0.1	3.3	0.2	19.7
19 Mallig	23,344	51.1	4,970	3,316	66.7	86.4	2.9	2.47	84.2	0.46	1.5	9.3	0.6	0.5	1.6	0.2	9.2
20 Naguilian	24,268	11.8	5,292	3,574	67.5	31.5	0.7	0.25	36.5	1.47	2.2	13.3	1.0	0.4	1.5	0.4	10.7
21 Palanan	13,220	90.3	2,826	2,099	74.3	23.7	0.4	0.08	18.2	1.38	2.3	16.5	1.4	0.0	0.9	0.0	7.4
22 Quezon	17,617	78.6	3,719	2,852	76.7	92.0	2.9	2.46	85.1	0.25	1.1	3.1	0.9	1.3	2.7	0.3	5.0
23 Quirino	18,320	84.1	4,077	3,209	78.7	44.9	0.9	0.82	96.8	1.04	0.8	2.4	1.5	0.5	1.6	0.2	8.6
24 Ramon	35,885	60.1	8,248	5,084	61.6	97.8	1.8	1.77	97.9	0.04	0.5	5.4	0.2	0.7	2.5	0.5	7.2
25 Reina Mercedes	17,816	76.2	3,827	2,666	69.7	36.1	0.5	0.45	82.7	0.97	1.9	6.7	1.0	1.1	2.0	0.4	7.7
26 Roxas	45,187	55.0	8,315	5,854	70.4	70.8	1.1	0.94	85.9	0.45	0.9	2.6	2.1	0.4	2.6	0.2	10.0
27 San Agustin	17,861	14.6	3,469	2,995	86.3	23.1	0.4	0.06	15.9	1.21	0.7	33.9	1.9	1.0	2.1	0.3	64.1
28 San Quillermo	12,506	48.5	2,595	2,097	80.8	30.0	0.6	0.30	51.1	1.37	2.3	130.8	1.1	0.4	1.5	0.3	7.4
29 San Isidro	16,043	47.5	3,129	2,462	78.7	93.5	1.6	1.59	100.0	0.11	0.6	2.3	0.3	0.7	0.9	0.2	8.9
30 San Manuel	25,527	65.1	5,207	4,230	81.2	95.7	1.7	1.63	94.7	0.08	0.5	1.3	0.3	0.4	1.8	0.2	6.1
31 San Mariano	37,861	80.7	7,751	6,071	78.3	24.8	0.3	0.17	51.1	1.00	0.3	33.7	1.0	0.2	1.0	0.1	7.0
32 San Mateo	48,861	68.2	10,955	6,184	56.4	93.4	1.6	1.55	95.9	0.12	0.8	2.8	0.1	0.7	1.7	0.2	9.1
33 San Pablo	17,122	68.7	3,469	2,458	70.9	31.2	0.4	0.22	52.0	0.91	0.9	2.1	1.7	0.6	1.2	0.1	4.5
34 Santa Maria	19,462	49.6	3,583	2,927	81.7	61.1	1.3	0.42	33.4	0.81	1.2	1.5	0.8	0.7	0.7	0.4	4.3
35 Santo Tomas	98,542	63.4	4,129	3,645	88.3	29.1	0.4	0.29	70.3	1.02	1.1	2.4	0.8	1.5	1.4	0.3	9.8
37 Tumauini	45,551	49.8	11,782	9,209	78.2	31.2	0.4	0.36	92.9	0.86	1.1	3.2	0.6	0.5	0.7	0.2	4.4

Table 5.5.1 Subsistence Incidence and Agricultural Conditions by Municipality (3/4)

Region/ Province/Municipality	Social condition			Agricultural Conditions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Population	**Below Subsistence Threshold Level****	**Total No. of House-Hold (HH)**	**Farming House-hold (FH)**	**% of FH to Total HH**	**Rate of Paddy Area (Paddy +Corn)**	**Average Paddy Area /FH**	**Average Irrigated Paddy Area /FH**	**% of Irrigated Paddy Area**	**Average Corn Area/ FH**	**Average Vegetable Area / FH**	**Average fruits area/FH**	**Average No. of Carabao / FH**	**Average No. of Cattle / FH**	**Average No. of Hog / FH**	**Average No. of Goat / FH**	**Average No. of Chicken / FH**
		(%)			(%)	(%)	(ha)	(ha)	(%)	(ha)	(a)	(a)	(head)	(head)	(head)	(head)	(head)
NUEVA VIZCAYA																	
1 Alfonso Castarieda	4,447	61.6	897	794	88.5	97.3	1.0	0.49	50.6	0.03	0.4	4.1	0.5	0.2	0.1	0.7	2.4
2 Ambaguio	9,485	76.5	1,758	1,714	97.5	98.2	0.4	0.11	30.3	0.01	0.4	6.7	0.3	0.1	0.8	0.3	5.0
3 Aritao	29,151	51.7	5,837	3,128	53.6	66.2	1.0	0.91	95.8	0.49	4.1	7.3	0.3	0.4	1.2	0.3	7.4
4 Bagabag	28,279	33.6	5,922	5,023	84.8	87.4	0.7	0.68	94.7	0.10	1.3	3.2	0.3	0.5	1.2	0.3	6.4
5 Bambang	36,975	40.1	8,441	5,083	60.2	95.2	0.7	0.67	90.0	0.04	1.3	6.9	0.4	0.5	2.0	0.5	13.2
6 Bayombong	46,315	53.1	10,185	4,252	41.7	55.6	0.6	0.52	81.9	0.50	1.4	27.2	0.4	0.1	1.9	0.5	9.0
7 Diadi	12,469	49.1	2,793	2,375	85.0	77.4	0.4	0.26	67.6	0.11	3.3	42.2	0.6	0.4	1.1	0.5	8.2
8 Dupax del Norte	22,142	59.2	4,838	4,238	87.6	98.6	0.5	0.49	93.2	0.01	4.4	10.5	0.6	0.4	0.7	0.4	5.0
9 Dupax del Sur	13,900	34.5	2,866	1,893	66.1	60.5	0.7	0.64	95.3	0.44	5.4	38.5	1.3	1.1	1.5	0.3	7.1
10 Kasibu	26,252	30.9	4,980	4,770	95.8	99.0	0.4	0.35	86.8	0.00	1.6	12.8	0.8	0.2	1.0	0.2	16.5
11 Kayapa	19,376	33.5	3,888	3,878	99.7	34.7	0.2	0.19	93.0	0.38	0.7	2.5	0.3	1.4	0.8	0.2	3.6
12 Quezon	13,944	32.1	3,267	2,882	88.2	98.1	0.4	0.35	87.3	0.01	0.7	20.4	0.8	0.5	1.0	0.2	4.1
13 Santa Fe	11,854	60.2	2,308	1,506	65.3	71.4	0.6	0.52	91.8	0.23	8.0	19.7	0.7	1.5	1.6	0.4	8.3
14 Solano	46,945	41.5	10,706	6,089	56.9	74.1	0.7	0.69	96.3	0.25	0.3	2.5	0.1	0.2	1.3	0.1	2.9
15 Villaverde	13,431	47.8	2,892	2,188	75.7	100.0	1.5	0.87	58.0	0.00	1.0	32.6	0.6	0.8	5.4	0.3	11.9
QUIRINO																	
1 Aglipay	20,205	38.9	4,323	3,767	87.1	27.6	0.5	0.19	41.0	1.19	2.6	78.7	1.1	0.6	1.5	0.3	12.2
2 Cabarroguis	22,812	60.5	5,257	3,978	75.7	50.7	0.3	0.34	97.8	0.34	1.1	80.3	0.4	0.2	0.5	0.2	2.0
3 Diffun	36,048	53.8	7,821	6,142	78.5	55.0	0.5	0.40	88.3	0.37	1.4	35.1	0.7	0.2	1.1	0.4	8.9
4 Maddela	8,645	38.5	6,078	4,796	78.9	33.4	0.4	0.19	54.6	0.71	0.2	89.1	1.0	0.3	1.5	0.2	8.4
5 Saguday	12,509	50.5	2,183	2,040	93.4	74.3	1.0	0.83	86.1	0.33	0.3	4.3	0.6	0.9	0.8	0.5	5.7
6 Nagtipunan	10,900	44.2	3,183	2,945	92.5	34.0	0.2	0.05	26.5	0.39	1.0	58.7	1.0	0.3	1.0	0.1	4.3

Table 5.5.1 Subsistence Incidence and Agricultural Conditions by Municipality (4/4)

Region/ Province/Municipality	Social condition			Agricultural Conditions													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Population	**Below Subsistence Threshold Level****	**Total No. of House-Hold (HH)**	**Farming House-hold (FH)**	**% of FH to Total HH**	**Rate of Paddy Area (Paddy +Corn)**	**Average Paddy Area /FH**	**Average Irrigated Paddy Area /FH**	**% of Irrigated Paddy Area**	**Average Corn Area/ FH**	**Average Vegetable Area / FH**	**Average fruits area/FH**	**Average No. of Carabao / FH**	**Average No. of Cattle / FH**	**Average No. of Hog / FH**	**Average No. of Goat / FH**	**Average No. of Chicken / FH**
CAR		(%)			(%)	(%)	(ha)	(ha)	(%)	(ha)	(a)	(a)	(head)	(head)	(head)	(head)	(head)
KALINGA																	
1 Balbalan	11,742	92.2	1,806	1,754	97.1	98.4	0.5	0.31	61.4	0.01	0.7	5.9	0.6	0.2	1.6	0.0	7.1
2 Lubuagan	9,897	89.1	1,791	1,694	94.6	97.4	0.3	0.30	96.3	0.01	0.3	2.1	0.1	0.1	1.4	0.1	1.0
3 Pasil	8,935	88.7	1,519	1,437	94.6	95.2	0.2	0.24	96.3	0.01	0.1	6.1	0.2	0.0	1.6	0.0	5.2
4 Pinukpuk	23,057	84.8	4,421	4,182	94.6	67.9	0.8	0.44	54.3	0.38	1.4	32.6	0.6	0.4	1.9	0.1	6.5
5 Rizal	12,173	81.7	2,653	2,390	90.1	81.8	0.8	0.67	79.3	0.19	2.2	3.8	0.3	0.2	1.2	0.2	5.7
6 Tabuk	63,507	71.2	13,799	8,741	63.3	93.4	1.6	1.29	78.7	0.11	1.2	11.1	0.6	0.5	2.8	0.2	9.1
7 Tanudan	11,243	94.1	1,534	1,489	97.1	96.6	0.7	0.51	73.8	0.02	0.7	2.3	0.9	0.6	2.8	0.1	8.1
8 Tinglayan	13,591	82.1	2,431	2,386	98.1	83.1	0.3	0.26	90.4	0.06	0.5	12.6	0.6	0.0	1.6	0.0	3.2
MOUNTAIN																	
1 Barlig	7,477	88.6	1,464	1,388	94.8	98.8	0.5	0.49	97.6	0.01	0.0	1.2	0.1	0.0	0.2	0.0	4.2
2 Bauko	24,242	49.4	4,846	4,673	96.4	99.6	0.3	0.26	94.3	0.00	1.3	1.1	0.1	0.0	0.5	0.0	3.5
3 Besao	9,147	66.7	1,745	1,514	86.8	97.5	0.7	0.61	89.2	0.02	0.4	1.8	0.3	0.2	0.8	0.0	5.4
4 Bontoc	21,192	67.2	5,032	4,133	82.1	99.7	0.1	0.12	96.6	0.00	0.1	2.6	0.2	0.1	0.6	0.0	2.4
5 Natonin	8,997	82.3	1,606	1,606	100.0	100.0	0.6	0.49	76.0	0.00	0.0	2.7	0.2	0.0	0.8	0.0	4.5
6 Paracelis	15,882	79.9	3,230	3,050	94.4	68.5	0.8	0.14	16.8	0.37	0.0	3.1	0.2	0.2	0.9	0.0	5.5
7 Sabangan	8,609	56.2	1,764	1,548	87.8	99.5	0.3	0.31	100.0	0.00	1.2	3.4	0.1	0.0	0.8	0.0	10.6
8 Sadanga	8,373	83.3	1,611	1,520	94.4	100.0	0.3	0.34	100.0	0.00	0.0	2.3	0.5	0.5	0.9	0.0	4.2
9 Sagada	10,354	66.6	2,124	1,810	85.2	96.7	0.5	0.50	96.3	0.02	0.8	2.8	0.2	0.1	0.9	0.0	8.9
10 Tadian	16,482	72.6	3,122	2,918	93.5	97.4	0.5	0.40	81.8	0.01	0.3	6.3	0.3	0.1	0.7	0.0	8.0
IFUGAO																	
1 Aguinaldo	12,623	62.5	3,002	2,906	96.8	73.7	0.4	0.35	85.0	0.15	0.0	4.0	0.0	0.0	0.8	0.0	19.1
2 Alfonso Lista	9,964	62.9	3,777	3,169	83.9	24.0	0.6	0.40	68.0	1.84	0.6	6.7	0.0	0.0	1.0	0.2	7.6
3 Asipulo	20,514	94.0	1,871	1,623	86.7	96.3	0.5	0.42	82.9	0.02	0.3	7.8	0.0	0.0	0.2	0.0	5.5
4 Banaue	9,724	30.4	3,926	3,647	92.9	98.7	0.3	0.27	96.6	0.00	0.1	0.4	0.0	0.0	0.5	0.0	11.3
5 Hingyon	9,491	93.5	2,187	1,974	90.3	99.2	0.3	0.15	53.5	0.00	0.2	0.5	0.0	0.0	0.5	0.0	31.9
6 Hungduan	13,514	39.9	2,003	1,993	99.5	99.2	0.5	0.50	99.8	0.00	0.3	0.2	0.0	0.0	0.5	0.0	10.9
7 Kiangan	14,898	78.1	2,646	2,283	86.3	98.8	0.9	0.82	91.7	0.01	0.1	3.8	0.0	0.0	0.3	0.0	5.5
8 Lagawe	17,081	27.3	3,188	1,836	57.6	73.7	0.5	0.47	86.4	0.19	0.3	3.6	0.0	0.0	0.3	0.0	13.1
9 Lamut	14,733	36.7	3,633	2,661	73.2	65.3	0.7	0.45	62.1	0.39	0.3	11.2	0.0	0.0	0.6	0.0	8.1
10 Mayoyao	17,552	19.5	3,316	2,854	86.1	80.1	0.4	0.37	96.8	0.09	0.1	1.8	0.0	0.0	0.5	0.0	2.5
11 Tinoc	9,504	63.1	1,651	1,604	97.2	98.6	0.3	0.27	94.2	0.00	0.9	1.1	0.0	0.0	1.3	0.1	12.1

** The incidnece is mentioned in percentage of the family unable to meet its subsistence income level.

Data source: MBN survey results obtained from the PPDO concerned, and the agricultural conditions are based on the reults of Barangay Screening Survey by BAS, respectively.

Table 5.6.1 Consumer Price Index and Inflation Rate: 1984-2000

Year / Month	Philippines		Metro Manila		Outside Metro Manila		CAR		Region 2	
	CPI	IR (%)	CPI	IR (%)	CPI	IR (%)	CPI	IR (%)	CPI	IR (%)
1984	37.4	-	33.0	-	39.0	-	-	-	36.7	-
1985	46.1	23.1	39.8	20.7	48.2	23.6	-	-	45.9	24.9
1986	46.4	0.8	41.9	5.3	48.2	-0.1	-	-	48.0	4.6
1987	48.2	3.8	44.8	6.7	49.7	3.2	-	-	49.6	3.3
1988	52.4	8.8	49.3	10.1	53.0	6.7	-	-	53.7	8.2
1989	58.8	12.2	54.0	9.6	60.0	13.1	65.7	-	59.5	10.8
1990	67.1	14.2	62.7	16.1	68.8	14.7	73.8	12.3	68.5	15.3
1991	79.5	18.5	75.6	20.6	81.0	17.7	85.4	15.7	79.2	15.5
1992	86.3	8.6	83.8	10.8	87.4	7.9	91.0	6.6	87.8	10.8
1993	92.3	7.0	91.6	9.3	92.5	5.8	97.9	7.6	94.6	7.8
1994	100.0	8.3	100.0	9.2	100.0	8.1	100.0	2.1	100.0	5.7
1995	108.0	8.0	108.2	8.2	108.0	8.0	117.7	17.7	106.6	6.6
1996	117.8	9.1	117.3	8.4	118.0	9.3	126.0	7.0	116.2	9.0
1997	124.8	5.9	125.1	6.6	124.6	5.6	128.6	2.1	120.6	3.8
1998	136.9	9.7	137.9	10.2	136.5	9.6	130.4	1.4	136.3	13.0
1999	146.0	6.6	145.2	5.3	146.3	7.2	141.5	8.5	148.9	9.2
2000										
Jan.	148.8	0.5	147.9	0.7	149.2	0.5	144.1	-0.3	152.6	0.9
Feb.	149.3	0.3	148.3	0.3	149.7	0.3	144.6	0.3	152.3	-0.2
Mar.	149.4	0.1	148.6	0.2	149.7	0.0	144.6	0.0	152.3	0.0
April	149.7	0.2	148.9	0.2	150.1	0.3	144.5	-0.1	151.7	-0.4
May	150.4	0.5	150.4	1.0	150.3	0.1	144.4	-0.1	151.7	0.0
June	151.4	0.7	150.4	0.0	151.8	1.0	146.1	1.2	152.9	0.8
July	152.1	0.5	151.3	0.6	152.4	0.4	147.1	0.7	153.0	0.1
Aug.	153.1	0.7	152.2	0.6	153.5	0.7	148.9	1.2	154.5	1.0
Sep	153.8	0.5	153.6	0.9	153.8	0.2	149.2	0.2	154.6	0.1
Oct	154.8	0.7	154.2	0.4	155.0	0.8	150.0	0.5	155.4	0.5
Nov	156.7	1.2	157.5	2.1	156.4	0.9	150.8	0.5	157.3	1.2
Dec	157.8	0.7	157.7	0.1	157.9	1.0	151.9	0.7	158.4	0.7
2001										
Jan.	159.0	7.4	159.1	7.4	158.9	7.3	153.0	3.3	159.9	8.0
Feb.	159.3	0.2	159.5	0.3	159.2	0.2	152.8	-0.1	159.2	-0.4
Mar.	159.4	0.1	159.9	0.3	159.2	0.0	153.1	0.2	158.3	-0.6
April	159.8	0.3	160.7	0.5	159.4	0.1	152.8	-0.2	158.2	-0.1
May	160.0	0.1	160.9	0.1	159.7	0.2	153.2	0.3	158.0	-0.1
June	161.6	1.0	162.5	1.0	161.2	0.9	-	-	-	-

Source: NSO, Industrial and Trade Statistics Department
Note: CPI stands for Consumer Price Index (1994=100)
IR stands for Inflation Rate, an annual inflation rate in percent.

Table 5.6.2 Wholesale Price Index of Construction Materials in Metro Manila: 1984-2000

Year	Month	Wholesale Price Index									
		General Index (1985=100)			Construction Materials in Metro Manila (1985=100)						
		All Items	Crude Materials Ex. Fuel	Manu-factured Goods	All Items	Cement	Sand, Stone & Gravel	Rain-forced Steel	Lumber Products	Fuel & Lubricant	Machinery & Equip-ment Rental
1984		85.5	108.3	83.7	-	-	-	-	-	-	-
1985		100.0	100.0	100.0	-	-	-	-	-	-	-
1986		97.5	96.3	103.7	-	-	-	-	-	-	-
1987		105.4	115.3	109.6	-	-	-	-	-	-	-
1988		118.5	143.2	119.6	-	-	-	-	-	-	-
1989		129.9	157.0	130.1	-	-	-	-	-	-	-
1990		141.8	154.3	144.8	157.5	157.9	221.9	171.3	176.2	104.8	182.8
1991		166.1	181.9	165.4	182.6	193.0	258.3	182.7	208.5	152.1	182.8
1992		172.2	192.5	172.6	189.3	200.7	265.4	187.6	221.2	131.6	182.8
1993		172.0	180.2	174.1	191.4	176.1	281.7	189.3	236.0	127.5	254.8
1994		186.9	223.4	179.8	200.6	179.8	300.9	188.5	264.9	126.7	254.8
1995		197.1	217.8	181.6	208.2	196.0	312.0	198.5	268.0	124.5	254.8
1996		214.7	249.8	186.2	214.5	214.7	330.5	207.0	270.4	133.0	254.8
1997		215.8	238.4	190.4	219.5	198.3	343.5	208.6	277.7	140.8	254.8
1998		240.9	285.9	196.6	227.1	182.9	365.9	224.8	284.9	145.4	254.8
1999		254.8	315.9	198.8	229.0	174.7	380.1	224.4	284.3	153.7	296.9
2000											
	Jan.	259.8	300.7	201.6	231.4	190.4	386.5	221.9	286.6	170.0	296.9
	Feb.	258.0	273.2	201.5	231.5	190.9	386.5	221.9	286.6	175.7	296.9
	Mar.	257.7	267.6	201.3	232.4	199.1	389.5	221.9	286.6	180.9	296.9
	April	254.2	259.0	201.3	232.6	199.6	389.5	221.9	286.6	183.3	296.9
	May	256.0	257.8	201.7	232.9	198.9	389.5	221.9	286.6	182.9	296.9
	June	254.0	236.9	201.5	233.1	199.7	389.5	221.9	286.4	188.5	296.9
	July	258.3	-	-	233.4	199.7	359.5	221.9	286.4	195.9	296.9
	Aug.	257.5	-	-	233.5	199.5	389.5	221.9	286.4	200.6	296.9
	Sept.	260.4	-	-	234.0	201.1	391.8	224.0	286.4	204.3	296.9
	Oct.	261.4	-	-	235.8	201.9	391.8	224.0	288.2	217.8	296.9
	Nov.	270.9	-	-	237.2	203.8	391.8	232.7	288.2	218.0	296.9
	Dec.	265.5	-	-	238.0	207.4	392.9	232.7	288.2	230.0	296.9
	Jan.	265.5	-	-	240.6	209.7	395.8	237.5	292.9	226.3	296.9
	Feb.	262.3	-	-	241.3	215.3	395.8	237.5	292.9	223.6	296.9
	Mar.	260.1	-	-	242.5	215.4	402.0	237.5	296.5	223.6	296.9
	April	260.4	-	-	242.9	217.5	402.0	237.5	295.9	223.6	296.9
	May	262.9	-	-	243.1	219.8	403.8	237.5	295.9	222.8	296.9

Source: 1999 Philippine Statistical Yearbook, October 1999, NSCB
Economic Indicators, July 2000, NSCB

Table 5.6.3 Foreign Exchange Rate of Pesos per US Dollar at the end of Period: 1987-2000

Month	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Jan.	20.478	20.870	21.350	22.543	28.000	26.527	25.348	27.676	24.573	26.185	26.344	42.410	38.717	40.390	*50.969*
Feb.	20.528	21.010	21.350	22.761	28.000	26.045	25.280	27.701	25.732	26.177	26.333	30.364	39.098	40.845	*48.290*
Mar.	20.550	21.016	21.330	22.750	28.000	25.383	25.513	27.565	25.987	26.197	26.367	37.081	38.766	41.063	*48.467*
Apr.	20.484	21.018	21.564	22.805	27.842	25.804	26.385	27.277	26.021	26.173	26.369	39.979	38.018	41.278	*50.185*
May	20.466	20.905	21.608	22.977	27.806	26.250	27.094	26.874	25.797	26.222	26.374	38.898	38.095	42.829	*50.539*
June	20.456	21.062	21.807	23.270	27.750	25.584	27.272	26.910	25.575	26.203	26.384	42.091	38.019	43.154	
July	20.440	21.038	21.880	23.860	27.750	24.910	27.695	26.829	25.585	26.228	28.968	42.016	38.245	44.941	
Aug.	20.453	21.079	21.880	25.000	27.000	23.924	28.043	26.484	25.875	26.202	30.165	43.874	39.671	45.077	
Sep.	20.600	21.336	21.945	25.750	27.000	25.120	29.813	26.000	26.065	26.257	33.873	43.809	41.112	46.283	
Oct.	20.725	21.392	22.100	25.750	27.000	24.636	28.831	24.928	25.992	26.285	34.938	40.831	40.158	51.427	
Nov.	20.877	21.379	22.234	28.000	26.700	25.492	27.958	23.879	26.183	26.287	34.655	39.462	40.787	49.393	
Dec.	20.800	21.335	22.440	28.000	26.650	25.096	27.699	24.418	26.214	26.288	39.975	39.059	40.313	*49.896*	
Average	20.571	21.120	21.791	24.456	27.458	25.398	27.244	26.378	25.800	26.225	29.471	40.893	40.313	44.715	

Source: Data presented by Central Bank
International Financial Statistics, IMF
NSO Monthly Bulletin of Statistics, May 2001, NSO
Note: Italic figures were referred from "NSO Monthly Bulletin of Statistics, May 2001, NSO".

Table 6.1.1 Inventory of Educational Facility: 1997-98 School Year

Item	Philippines *1	Region 2	Cagayan Province	Iasbela Province
Number of Schools				
Pre-School	7,590	69	17	27
Government	5,056	13	-	-
Private	2,534	56	17	27
Elementary School	37,665	2,075	674	917
Government	34,858	1,988	647	878
Private	2,807	87	27	39
Secondary School	6,423	252	94	99
Government	3,815	158	54	62
Private	2,608	94	40	37
Tertiary School	1,316	52 *2	19 *2	21 *2
Government	271	12 *2	2 *2	5 *2
Private	1,045	40 *2	17 *2	16 *2
Number of Enrolment				
Pre-School	555,502	-	-	-
Government	288,672	-	-	-
Private	266,830	-	-	-
Elementary School	11,847,794	457,074	157,266	213,824
Government	10,959,632	441,884	153,928	206,346
Private	888,162	15,190	3,338	7,478
Secondary School	4,988,301	-	71,382 *3	92,332 *3
Government	3,544,446	-	55,880 *3	72,663 *3
Private	1,443,855	-	15,502 *3	19,669 *3
Tertiary School	2,220,838	63,284	-	-
Government	-	18,592	-	-
Private	-	44,692	-	-

Source: 1999 Philippine Statistical Yearbook, NSCB
Cagayan Valley Statistical Yearbook 1999, NEDA Region 2
Data from DECS (Department of Education, Culture & Sports), Provincial Division

Note: *1 Data in school year of 1996-1997
*2 Data in July 2000
*3 Data in school year of 1999-2000
*4 In general, the peroid of school attendance for respective schools are as follows:
2 years for pre-school; 6 years for primary school; 4 years for secondary school; and
4 years for tertiary school. The period of tertiary school depends on the field of study.

Table 6.2.1 Inventory of Hospitals, Barangay Health Station and Rural Health Units: 1997

Item	Philippines	Region 2	Cagayan Province	Isabela Province
1. Hospital	1,817	81	29	42
Public	645	38	16	14
Private	1,172	43	13	28
Bed Capacity	81,905	-	786	1,040
Bed Capacity per 1000 Population	1.1	-	0.8	0.9
2. Barangay Health Station	13,096	717	204	322
3. Rural Health Unit	2,405	98	31	38

Source: 1999 Pilippine Statistical Yearbook, NSCB
Cagayan Valley Statistical Yearbook 1999, NEDA Region 2
Data from Department of Health (DOH), Regional Division

Table 6.3.1 Inventory of Roads and Bridges: 1999

Item	Philippines	Ragion 2*1	Cagayan Prov.	Isabela Prov.
1. Road by System Classification (km)				
a. National	29,247	1,713	663	417
b. Provincial	-	1,650	541	593
c. Municipal & City	-	1,159	256	506
d. Barangay	-	10,008	3,021	4,356
Total	-	14,530	4,481	5,872
2. Road by Surface Type (km)				
a. Concrete	9,949	1,295	548	548
b. Asphalt	6,902	387	123	140
c. Gravel	12,009	8,575	2,663	3,734
d. Earth	387	4,273	1,147	1,450
Total	29,247	14,530	4,481	5,872
3. Road Density (m./sq.km)				
Land Area (Sq.km.)	300,000	26,628	9,003	10,665
a. National	97	64	74	39
b. Provincial	-	62	60	56
c. Municipal & City	-	44	28	47
d. Barangay	-	376	336	408
Total	-	546	498	551
4. Bridge				
Length of Bridges (m)	276,878	20,768	9,938	6,157
- Permanent *2	247,129	19,906	9,307	6,157
- Temporary *3	29,749	862	631	0

Source: (1) 1999 Philippine Statistical Yearbook, NSCB
(2) Data presented by DPWH, Region 2
(3) Data presented by DPWH, Head Office

Note: *1 Withough Batanes Province
*2 Concrete, Steel and Similar Materials
*3 Bailey, Timber, Coconut and Similar Materials

Table 6.3.2 Inventory of Road Systems in Region 2 and CAR: 1999

(Unit: km)

Management	Road Specification	Region 2					CAR					Grand Total
		Cagayan	Isabela	N. Vizcaya	Quirino	Total	Ifugao	Apayao	Kalinga	Mr. Prov.	Total	
1. National Road	Concrete	397.0	269.7	84.4	12.2	763.4	73.7	7.9	22.8	10.2	114.6	878.0
	Asphalt	12.3	68.6	54.5	48.9	184.3	2.5	-	3.0	10.9	16.4	200.7
	Gravel	253.8	78.9	209.2	198.7	740.6	177.7	287.2	285.5	297.0	1,047.3	1,787.9
	Earth	-	-	-	25.0	25.0	-	-	24.0	-	24.0	49.0
	Total	663.2	417.2	348.1	284.9	1,713.3	253.9	295.1	335.2	318.0	1,202.2	2,915.5
2. Provincial Road	Concrete	34.5	49.4	26.0	3.5	113.4	-	-	15.5	28.3	43.8	157.2
	Asphalt	81.8	55.4	16.9	-	154.0	0.5	-	-	14.2	14.7	168.7
	Gravel	413.9	488.4	350.1	119.1	1,371.5	28.5	105.7	76.0	133.3	343.5	1,715.0
	Earth	10.8	-	-	-	10.8	125.5	15.6	11.0	143.7	295.9	306.7
	Total	541.0	593.1	393.0	122.6	1,649.8	154.5	121.3	102.6	319.5	697.8	2,347.6
3. Municipal Road	Concrete	37.8	95.6	38.4	7.2	179.0	10.6	0.9	0.4	9.1	21.0	199.9
	Asphalt	26.4	8.7	3.9	-	39.1	0.5	-	-	0.9	1.4	40.5
	Gravel	151.1	243.4	138.4	84.7	617.6	21.5	90.3	13.9	4.0	129.7	747.3
	Earth	40.4	158.1	123.6	1.7	323.8	59.9	0.5	18.0	13.7	92.1	415.9
	Total	255.7	505.9	304.3	93.5	1,159.4	92.5	91.7	32.3	27.6	244.2	1,403.5
4. Barangay Road	Concrete	79.0	133.6	23.7	3.3	239.6	9.7	-	10.0	20.2	39.8	279.5
	Asphalt	2.0	6.9	1.1	-	9.9	0.0	-	1.1	61.3	62.4	72.3
	Gravel	1,844.0	2,923.0	712.2	365.7	5,844.9	209.6	648.8	184.2	71.0	1,113.6	6,958.5
	Earth	1,096.0	1,292.1	1,098.3	427.2	3,913.5	483.2	23.5	304.2	-	811.0	4,724.5
	Total	3,020.9	4,355.6	1,835.3	796.2	10,008.0	702.5	672.3	499.4	152.5	2,026.8	12,034.7
5. Total	Concrete	548.4	548.4	172.5	26.2	1,295.4	94.0	8.8	48.6	67.7	219.2	1,514.6
	Asphalt	122.5	139.6	76.4	48.9	387.3	3.4	-	4.1	87.3	94.8	482.2
	Gravel	2,662.8	3,733.7	1,409.8	768.2	8,574.6	437.3	1,132.0	559.5	505.3	2,634.1	11,208.6
	Earth	1,147.2	1,450.2	1,221.9	453.9	4,273.1	668.6	39.6	357.2	157.4	1,222.9	5,496.0
	Total	4,480.8	5,871.8	2,880.6	1,297.2	14,530.4	1,203.4	1,180.4	969.5	817.7	4,171.0	18,701.4

Source: DPWH, Planning Service
DPWH, Regional Office 2

Table 6.4.1 Number of Households by Water Supply Systems: 1990

Item	Philippines	Region 2 *1	Cagayan Prov.	Isabela Prov.
1. Number of Households by Main Source of Potable Water in 1990 Census Year (Unit: 1000)				
a. Own Use, Faucet, Community Sys	2,572.4	39.9	-	-
b. Shared, Faucet, Community Syster	2,169.7	35.2	-	-
c. Own Use, Tubed, Piped, Deep We	967.4	65.1	-	-
d. Shared, Tubed, Piped, Deep Well	1,696.1	107.0	-	-
e. Tubed, Shallow Well	920.2	77.5	-	-
f. Dug Well	1,566.2	93.3	-	-
g. Spring, River, Rain, etc.	1,314.0	27.6	-	-
h. Peddler	201.2	1.2	-	-
Total	11,407.3	446.8	-	-
2. Households Served by Potable Water Systems		As of 1997		
Level I *2	3,395.2			
Level II *3	28.0	262.6	71.0	130.4
Level III *4	634.2	111.9	56.6	41.2
Total	4,057.4	374.5	127.6	171.6
3. Coverage of Household Served (%)		As of 1997		
Population (1000)	60,559.1	2,623.0	925.2	1,210.6
Households (1000)	11,407.3	524.6	185.0	242.1
Coverage by Level I, II & III (%)	35.6	71.4	69.0	70.9
Coverage by Level III	5.6	21.3	30.6	17.0

Source: (1) 1999 Philippine Statistical Yearbook, NSO
(2) Cagayan Valley Statistical Yearbook 1999, NEDA Region 2
(3) Data presented by LWUA

Note: *1 Excluding Batanes Province
*2 Level I is a point source, consisting of shallow wells, deep wells, dug wells, developed springs, rivers/ponds/undeveloped springs and rain collectors.
*3 Level II is a communal faucet system, generally suitable for rural areas.
*4 Level III is a piped system with individual house connections, suitable for densely inhabited urban areas.

Table 6.5.1 Electrification Program: Coverage, Number and Percentage Served: December 1998

Item	Philippines	Region 2
1. Municipality Level		
Program Coverage (nos)	1,450	97
Number Energized (nos)	1,450	97
Percent Served (%)	100%	100%
2. Barangay Level		
Program Coverage (nos)	36,018	2,386
Number Energized (nos)	25,893	1,732
Percent Served (%)	72%	73%
3. Total Connection		
Program Coverage (nos)	7,519,000	439,000
Number Energized (nos)	4,738,648	306,445
Percent Served (%)	63%	70%

Source: 1999 Philippine Statistical Yearbook, NSCB

Table 6.6.1 Telephone Service Penetration by Operation by Operator Category: 1998

Item	Philippines	Region 2
Telephone Distribution		
- Telephone		
Lines	6,641,480	41,246
Exchange	1,050	39
- Subscribers	2,512,113	8,449
- Population (1000)	72,557	2,695
- Telephone Density per 100 Persons		
Lines	9.2	1.5
Subscribers	3.5	0.3

Source: (1) 1999 Philippine Statistical Yearbook, NSCB
(2) 1995 Census-Based National, Regional and Provincial Population Projections Vol.2, May 1998,
Note: *1 Population based on ten year projection by region of NEDA on May 1998
*2 As a reference, the telephone density in NCR, was 30.2 of lines and 14.8 of subscribers.
*3 Telephone lines were managed by PLDT, DIGITEL and ETPI in Region 2.

Table 7.1.1 Economic Growth Scenario in Medium-Term Plan at 1998 Constant Prices, 1999-2004

(Unit: Million Pesos)

Area	GRDP at Current Prices 1998	GRDP Projection 1999	2000	2001	2002	2003	2004	Average Growth Rate (%)	Projected Population in 2004	Per Capita GRDP in 2004 (Pesos/capita)
GDP Projection										
High Scenario	2,667,109	2,752,456	2,901,089	3,034,539	3,213,577	3,425,673	3,627,788	5.3	82,636,689	43,900
Low Scenario	2,667,109	2,736,454	2,867,804	2,979,648	3,140,549	3,332,122	3,505,393	4.7	82,636,689	42,419
GDP under Low Growth Scenario without El Nino Occurrence in 2001 and 2004										
Philippines	2,667,109	2,738,161	2,871,964	3,025,160	3,201,083	3,396,142	3,612,954	5.2	82,636,689	43,761
1. NCR	925,412	948,547	998,820	1,054,754	1,119,094	1,189,597	1,268,111	5.4	11,112,687	114,114
2. CAR	59,661	61,868	65,766	70,436	76,634	83,991	92,810	7.7	1,522,654	60,953
3. Region 1	86,011	89,537	94,820	100,983	108,052	116,048	125,332	6.5	4,413,599	28,397
4. Region 2	54,529	56,765	60,057	63,721	67,735	72,273	77,477	6.0	3,031,999	25,553
5. Region 3	206,221	210,964	221,301	233,030	246,080	260,845	277,017	5.1	8,278,712	33,461
6. Region 4	372,365	381,302	399,604	420,384	444,346	470,562	499,737	5.0	12,508,472	39,952
7. Region 5	77,651	79,437	82,456	86,001	90,215	94,816	99,841	4.3	5,083,404	19,641
8. Region 6	180,019	185,420	193,763	203,064	213,420	224,732	236,193	4.6	6,772,424	34,876
9. Region 7	176,656	181,249	190,130	200,778	213,025	226,446	241,391	5.4	5,962,484	40,485
10. Region 8	68,787	70,575	73,469	76,849	80,691	84,968	89,726	4.5	4,055,416	22,125
11. Region 9	66,428	68,288	71,088	74,500	78,300	82,449	86,984	4.6	3,448,619	25,223
12. Region 10	79,882	82,119	85,650	90,446	95,783	101,625	108,028	5.2	3,047,244	35,451
13. Region 11	156,375	160,597	167,663	175,879	185,201	195,757	207,307	4.8	5,728,835	36,187
14. Region 12	69,289	71,298	73,794	76,746	80,276	84,530	89,602	4.4	2,909,499	30,796
15. Region 13	63,339	65,049	67,456	70,289	73,592	77,346	81,522	4.3	2,391,977	34,082
16. ARMM	24,484	25,145	26,126	27,301	28,639	30,157	31,876	4.5	2,368,698	13,457
Country w/o NCR	1,741,697	1,789,614	1,873,144	1,970,406	2,081,989	2,206,545	2,344,843	5.1	71,524,002	32,784
Regions w/o NCR, CAR, and Region 2	1,627,507	1,670,981	1,747,321	1,836,250	1,937,620	2,050,281	2,174,556	5.0	66,969,349	32,471

Source: (1) Medium-Term Philippine Development Plan 1999-2004, September 1999, NEDA
(2) 1995 Census-Based National and Regional Population Projections, 1997, NSO

Table 7.2.1 1999-2002 Medium-Term Public Investment Program

(Unit: Billion Pesos)

Sector	1999			2000			2001			2002			Total		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
Philippines (Billion Pesos)															
All Sectors	211.5	13.2	224.6	245.2	14.1	259.3	312.4	30.8	343.2	310.8	30.2	341.0	1,079.9	88.3	1,168.2
1. Agriculture, Natural Resources & Agrarian Reform	32.6	3.0	35.6	44.1	5.1	49.2	68.0	12.7	80.7	69.6	10.6	80.2	214.3	31.3	245.6
2. Governance & Institutional Development	38.0	1.6	39.5	46.5	2.0	48.5	72.0	8.5	80.4	87.8	10.3	98.1	244.2	22.4	266.6
3. Industry & Services	5.8	0.0	5.8	4.9	0.1	4.9	5.8	0.5	6.2	5.0	0.0	5.1	21.5	0.6	22.0
4. Infrastructure Development	29.4	7.5	36.9	38.6	4.9	43.5	38.4	6.9	45.3	25.9	7.0	32.9	132.3	26.3	158.6
5. Social Reform & Development	105.7	1.1	106.8	111.1	2.1	113.1	128.3	2.3	130.6	122.5	2.3	124.7	467.6	7.7	475.3
Region 2 (Million Pesos)															
All Sectors	357	70	426	454	86	540	969	143	1,112	1,254	175	1,429	3,033	474	3,507
1. Agriculture, Natural Resources & Agrarian Reform	51	70	120	229	86	315	439	113	552	644	20	663	1,362	289	1,651
2. Governance & Institutional Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Industry & Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Infrastructure Development	298	0	298	223	0	223	529	30	559	610	155	766	1,661	185	1,846
5. Social Reform & Development	8	0	8	2	0	2	0	0	0	0	0	0	10	0	10
CAR (Million Pesos)															
All Sectors	941	258	1,199	1,058	573	1,632	952	583	1,536	1,046	420	1,466	3,998	1,835	5,833
1. Agriculture, Natural Resources & Agrarian Reform	23	0	23	93	99	192	58	81	139	49	44	93	224	224	448
2. Governance & Institutional Development	57	188	246	108	272	380	84	409	493	125	166	291	374	1,036	1,410
3. Industry & Services	10	0	10	36	0	36	19	33	52	7	33	40	72	66	138
4. Infrastructure Development	815	70	885	821	202	1,023	792	60	852	865	177	1,042	3,293	509	3,802
5. Social Reform & Development	35	0	35	0	0	0	0	0	0	0	0	0	35	0	35

Source: 1999-2002 Medium-term Public Investment Program, 1999, NEDA

Table 8.2.1 Population Projection of Areas Related to Cagayan River Basin: 2000-2020

Nation, Region Province Municipality	Census Population 1995	Projected Population 2000	2005	2010	2015	2020
Philippines						
Low Assumption	68,349,452	75,505,061	82,079,348	87,940,171	93,440,274	98,864,348
Medium Assumption	68,349,452	76,320,126	84,214,747	91,851,266	99,007,576	105,503,141
High Assumption	68,349,452	76,755,914	85,386,261	94,058,374	102,551,948	110,715,179
Region II	2,525,811	2,814,299	3,087,476	3,338,158	3,550,691	3,727,834
Region II-1P *1	2,511,724	2,799,222	3,071,424	3,321,176	3,532,891	3,709,372
Cagayan	891,671	977,956	1,058,763	1,133,874	1,199,288	1,253,229
Isabela	1,156,118	1,297,104	1,428,688	1,546,116	1,641,393	1,718,492
Nueva Vizcaya	333,372	373,804	413,556	451,166	484,219	512,963
Quirino	130,563	150,358	170,417	190,020	207,991	224,688
CAR	1,249,331	1,403,570	1,560,867	1,716,384	1,862,366	1,996,020
CAR-2P *2	516,200	573,274	628,040	678,522	722,207	759,548
Ifugao	149,073	166,927	184,553	201,526	217,208	231,364
Kalinga	153,653	170,683	186,644	200,719	211,980	221,052
Apayao	83,370	93,081	102,026	109,736	115,712	120,384
Mt. Province	130,104	142,583	154,817	166,541	177,307	186,748
Region IV	9,903,971	11,324,634	12,860,104	14,524,674	16,357,408	18,225,345
Aurora	159,047	182,045	203,673	223,509	243,076	260,622
Total Population of Provinces Related to Cagayan River Basin	3,186,971	3,554,541	3,903,137	4,223,207	4,498,174	4,729,542

Source: (1) 1995 Census-Based National and Regional Population Projections Vol.1, May 1997, NSO
(2) 1995 Census-Based National, Regional and Provincial Population Projections Vol.2, May 1998, NSO
Note: *1 The total population in Region 2 excluding Batanes Province
*2 The total population in Cordillera Administrative Region (CAR) excluding Abra and Benguet Provinces
*3 The regional and provincial populations were projected under the medium assumption.

Table 8.2.2 Population Projection by Province in Cagayan River Basin: 2000-2020

Province	Census Population 1995	Projected Population 2000	2005	2010	2015	2020
Cagayan	562,200	616,603	667,552	714,909	756,153	790,163
Isabela	1,125,003	1,262,195	1,390,237	1,504,505	1,597,218	1,672,242
Nueva Vizcaya	314,090	352,183	389,636	425,071	456,212	483,294
Quirino	131,119	150,998	171,143	190,829	208,877	225,645
Ifugao	149,598	167,515	185,203	202,236	217,973	232,179
Kalinga	154,145	171,230	187,242	201,362	212,659	221,760
Apayao	14,549	16,244	17,805	19,150	20,193	21,008
Mt. Province	88,641	97,143	105,478	113,466	120,801	127,233
Aurora	8,826	10,066	11,262	12,359	13,441	14,411
Cagayan River Basin	2,548,171	2,844,176	3,125,557	3,383,886	3,603,526	3,787,934

Source: (1) 1995 Census-Based National and Regional Population Projections Vol.1, May 1997, NSO
(2) 1995 Census-Based National, Regional and Provincial Population Projections Vol.2, May 1998, NSO
Note: (1) The population in Cagayan River Basin means the total population within the catchment area surrounded by its watershed. A basin population in a province is estimated applying the basin ratio, which was calculated as a rate of a basin population in the province over the total provincial population in 1995.
(2) The population in 2025 was estimated referring to the growth curve till 2020.

Table 8.2.3 Population Projection by Municipality Related to Cagayan River Basin: 2000-2020 (1/3)

Nation, Region Province Municipality	Municipal Area (km^2)	Area in Basin (km^2)	Census Population Administrative 1995	 Basin 1995	Population Projected in Cagayan River Basin 2000	 2005	 2010	 2015	 2020
Cagayan River Basin	-	27,281	-	2,548,171	2,844,176	3,125,557	3,383,886	3,603,526	3,787,934
Cagayan Province	9,002.7	4,251	895,050	562,200	616,603	667,552	714,909	756,153	790,163
Abulug	162.6	0	23,548	0	0	0	0	0	0
Alcala	187.2	187	32,035	32,035	34,434	36,520	38,297	39,647	40,534
Allacapan	306.8	126	23,997	11,787	13,345	14,908	16,467	17,957	19,337
Amulung	242.2	242	37,744	37,744	40,849	43,622	46,059	48,010	49,421
Aparri	286.6	101	53,639	28,898	31,421	33,710	35,759	37,448	38,728
Baggao	920.6	516	60,060	37,544	41,641	45,571	49,312	52,677	55,571
Ballesteros	120.0	0	25,644	0	0	0	0	0	0
Buguey	138.2	0	25,058	0	0	0	0	0	0
Calayan	494.5	0	12,243	0	0	0	0	0	0
Camalaniugan	76.5	60	19,915	16,631	17,866	18,936	19,845	20,532	20,978
Claveria	194.8	0	25,363	0	0	0	0	0	0
Enrile	184.5	185	28,736	28,736	30,792	32,556	34,035	35,125	35,800
Gattaran	707.5	453	44,034	29,900	32,257	34,336	36,139	37,550	38,531
Gonzaga	486.2	0	27,997	0	0	0	0	0	0
Iguig	108.1	108	19,100	19,100	20,231	21,144	21,851	22,291	22,458
Lallo	702.8	127	32,156	8,698	9,617	10,491	11,317	12,052	12,674
Lasam	213.7	162	30,235	24,265	26,410	28,361	30,115	31,569	32,680
Pamplona	173.3	0	18,107	0	0	0	0	0	0
Penablanca	1,193.2	740	33,190	21,537	24,282	27,011	29,711	32,261	34,595
Piat	139.6	140	17,472	17,472	18,814	19,990	21,001	21,780	22,308
Rizal	124.4	124	13,901	13,901	14,663	15,261	15,706	15,956	16,009
Sanchez-Mira	198.4	0	18,904	0	0	0	0	0	0
Santa Ana	441.3	0	18,640	0	0	0	0	0	0
Santa Praxedes	110.0	0	2,709	0	0	0	0	0	0
Santa Teresita	25.0	0	12,566	0	0	0	0	0	0
Santo Nino (Faire)	512.9	386	21,151	17,047	17,939	18,627	19,124	19,383	19,401
Solana	234.6	235	60,346	60,346	67,000	73,396	79,501	85,012	89,773
Tuao	215.5	216	49,285	49,285	54,392	59,229	63,773	67,786	71,155
Tuguegarao City	144.8	145	107,275	107,275	120,648	133,880	146,897	159,116	170,208
Isabela	10,664.6	8,237	1,162,716	1,125,003	1,262,195	1,390,237	1,504,505	1,597,218	1,672,242
Alicia	138.2	138	52,666	52,666	60,550	68,390	75,811	82,350	88,120
Angadanan	204.4	204	33,145	33,145	35,676	37,725	39,152	39,816	39,888
Aurora	48.0	48	26,385	26,385	28,690	30,647	32,131	33,009	33,407
Benito Soliven	166.8	167	20,685	20,685	22,334	23,690	24,662	25,158	25,282
Burgos	57.7	58	19,052	19,052	21,044	22,836	24,320	25,381	26,093
Cabagan	430.4	430	35,054	35,054	37,719	39,872	41,366	42,054	42,117
Cabatuan	72.0	72	28,449	28,449	31,289	33,807	35,850	37,253	38,134
Cauayan	380.2	380	92,677	92,677	107,521	122,547	137,083	150,263	162,255
Cordon	144.0	144	30,461	30,461	35,564	40,790	45,917	50,651	55,039
Dinapigue	574.4	431	3,046	1,572	1,945	2,364	2,820	3,296	3,796
Divilican	197.8	138	2,593	1,815	2,425	3,182	4,099	5,174	6,433
Echague	258.4	258	56,119	56,119	60,305	63,663	65,961	66,969	66,979
Gamu	129.4	129	22,765	22,765	25,226	27,462	29,342	30,720	31,684
Ilagan	550.0	468	106,912	94,453	109,057	123,704	137,714	150,232	161,446
Jones	670.1	670	34,669	34,669	37,339	39,506	41,024	41,745	41,845
Luna	45.7	46	13,255	13,255	14,820	16,278	17,549	18,538	19,291
Maconacon	22.4	12	5,895	2,725	3,458	4,311	5,276	6,326	7,472
Delfin Albano	145.7	146	21,811	21,811	23,490	24,854	25,809	26,262	26,325
Mallig	133.4	133	23,344	23,344	26,283	29,071	31,558	33,569	35,177
Naguilian	169.7	170	24,268	24,268	26,080	27,534	28,529	28,967	28,973
Palanan	880.2	326	13,220	3,948	4,255	4,506	4,683	4,769	4,784
Quezon	189.9	190	17,617	17,617	20,697	23,888	27,060	30,037	32,844
Quirino	126.2	126	18,320	18,320	20,188	21,855	23,221	24,176	24,796
Ramon	75.0	75	35,885	35,885	41,935	48,143	54,245	59,892	65,141
Reina Mercedes	35.0	35	17,816	17,816	19,347	20,639	21,610	22,172	22,409
Roxas	184.8	185	45,187	45,187	50,909	56,347	61,208	65,153	68,320

(To be continued)

Table 8.2.3 Population Projection by Municipality Related to Cagayan River Basin: 2000-2020 (2/3)

(Continuation)

Nation, Region Province Municipality	Municipal Area (km^2)	Area in Basin (km^2)	Census Population Administrative 1995	Census Population Basin 1995	Population Projected in Cagayan River Basin 2000	2005	2010	2015	2020
San Agustin	278.4	278	17,861	17,861	19,204	20,284	21,027	21,360	21,375
San Guillermo	168.1	168	12,506	12,506	13,442	14,193	14,709	14,937	14,942
San Isidro	71.9	72	16,043	16,043	17,979	19,794	21,388	22,647	23,622
San Manuel	76.4	76	25,527	25,527	29,569	33,649	37,582	41,131	44,345
San Mariano	1,469.5	1,323	37,861	34,846	40,639	46,562	52,359	57,694	62,626
San Mateo	100.2	100	48,861	48,861	53,162	56,823	59,610	61,278	62,053
San Pablo	155.2	116	17,122	11,572	12,461	13,181	13,684	13,921	13,951
Santa Maria	140.0	140	19,462	19,462	21,468	23,264	24,742	25,786	26,474
Santiago City	255.5	256	98,542	98,542	111,227	123,335	134,225	143,142	150,377
Santo Tomas	60.7	61	20,089	20,089	21,720	23,070	24,050	24,568	24,722
Tumauini	467.3	467	45,551	45,551	51,212	56,562	61,314	65,129	68,150
Nueva Vizcaya	3,903.9	3,301	334,965	314,090	352,183	389,636	425,071	456,212	483,294
Ambaguio	156.2	156	9,485	9,485	13,401	18,611	25,375	33,867	44,364
Aritao	402.7	403	29,151	29,151	31,561	33,587	35,092	35,891	36,027
Bagabag	118.0	118	28,279	28,279	30,651	32,654	34,155	34,971	35,143
Bambang	302.2	302	36,975	36,975	40,194	42,946	45,051	46,263	46,627
Bayombong	62.9	63	46,315	46,315	50,519	54,163	57,012	58,745	59,409
Diadi	104.1	104	12,469	12,469	14,828	17,332	19,889	22,343	24,634
Dupax del Norte	351.8	352	22,142	22,142	25,218	28,231	31,029	33,384	35,252
Dupax del Sur	590.0	531	13,900	12,875	14,327	15,671	16,828	17,690	18,251
Kasibu	358.5	359	26,252	26,252	32,197	38,813	45,936	53,220	60,516
Kayapa	481.4	191	19,376	8,086	8,740	9,284	9,683	9,886	9,906
Quezon	186.2	186	13,944	13,944	16,433	19,035	21,648	24,099	26,332
Santa Fe	399.8	180	11,854	6,184	7,093	7,997	8,852	9,591	10,200
Solano	114.5	115	46,945	46,945	50,634	53,680	55,872	56,927	56,927
Villaverde	111.1	111	13,431	13,431	14,515	15,418	16,079	16,415	16,447
Alfonso Castaneda	373.9	131	4,447	1,556	1,873	2,214	2,571	2,922	3,259
Quirino	3,057.2	3,057	131,119	131,119	150,998	171,143	190,829	208,877	225,645
Aglipay	391.2	391	20,205	20,205	23,144	26,085	28,919	31,466	33,783
Cabarroguis	240.1	240	22,812	22,812	26,783	30,941	35,159	39,211	43,151
Diffun	352.8	353	36,048	36,048	41,162	46,250	51,113	55,441	59,339
Maddela	296.1	296	28,645	28,645	33,247	37,971	42,654	47,027	51,161
Nagtipunan	1,711.4	1,711	12,509	12,509	14,519	16,581	18,627	20,536	22,341
Saguday	65.5	66	10,900	10,900	12,144	13,314	14,358	15,195	15,869
Ifugao	2,517.8	2,518	149,598	149,598	167,515	185,203	202,236	217,973	232,179
Aguinaldo	126.5	127	12,623	12,623	14,119	15,556	16,885	18,044	19,007
Asipulo	70.7	71	9,964	9,964	11,520	13,119	14,718	16,258	17,701
Banaue	267.2	267	20,514	20,514	21,813	22,845	23,573	23,948	23,980
Hingyon	137.4	137	9,724	9,724	10,381	10,917	11,310	11,536	11,598
Hungduan	213.1	213	9,491	9,491	10,082	10,548	10,874	11,035	11,039
Kiangan	443.3	443	13,514	13,514	15,624	17,792	19,962	22,050	24,007
Lagawe	209.4	209	14,898	14,898	16,024	16,976	17,719	18,208	18,443
Lamut	104.6	105	17,081	17,081	19,631	22,223	24,786	27,216	29,457
Mayoyao	343.7	344	14,733	14,733	16,480	18,156	19,707	21,060	22,184
Alfonso Lista (Potia)	410.2	410	17,552	17,552	21,670	26,351	31,571	37,239	43,296
Tinoc	192.2	192	9,504	9,504	10,170	10,719	11,131	11,380	11,467
Kalinga	3,077.5	3,078	154,145	154,145	171,230	187,242	201,362	212,659	221,760
Balbalan	518.3	518	11,742	11,742	12,568	13,228	13,679	13,876	13,885
Lubuagan	329.5	330	9,897	9,897	10,588	11,140	11,514	11,675	11,678
Pasil	188.0	188	8,935	8,935	9,602	10,146	10,534	10,729	10,778
Pinukpuk	726.1	726	23,057	23,057	25,104	26,880	28,275	29,178	29,700
Rizal (Liwan)	177.5	178	12,173	12,173	13,141	13,951	14,550	14,887	15,024
Tabuk	641.7	642	63,507	63,507	73,097	82,738	92,005	100,369	108,003
Tanudan	306.9	307	11,243	11,243	12,588	13,859	14,990	15,907	16,649
Tinglayan	189.5	190	13,591	13,591	14,541	15,300	15,815	16,038	16,042

(To be continued)

Table 8.2.3 Population Projection by Municipality Related to Cagayan River Basin: 2000-2020 (3/3)

(Conclusion)

Nation, Region Province Municipality	Municipal Area (km^2)	Area in Basin (km^2)	Census Population Administrative 1995	Census Population Basin 1995	Population Projected in Cagayan River Basin 2000	2005	2010	2015	2020
Apayao	3,970.1	598	83,660	14,549	16,244	17,805	19,150	20,193	21,008
Calanasan (Bayag)	1,293.2	0	11,679	0	0	0	0	0	0
Conner	694.3	535	17,461	13,445	15,054	16,546	17,843	18,864	19,674
Flora	324.4	23	12,310	566	611	647	673	686	689
Kabugao	806.4	40	12,710	538	579	612	634	644	645
Luna	655.4	0	12,126	0	0	0	0	0	0
Pudtol	238.9	0	8,656	0	0	0	0	0	0
Santa Marcela	70.4	0	8,718	0	0	0	0	0	0
Mt. Province	2,097.3	1,844	130,755	88,641	97,143	105,478	113,466	120,801	127,233
Barlig	85.4	85	7,477	7,477	8,287	8,971	9,573	10,022	10,348
Bauko	153.0	92	24,242	14,766	16,185	17,326	18,284	18,929	19,330
Besao	107.8	0	9,147	0	0	0	0	0	0
Bontoc	396.1	378	21,192	20,398	21,906	22,975	23,755	24,096	24,108
Natonin	490.5	491	8,997	8,997	9,669	10,149	10,501	10,659	10,673
Paracelis	567.7	568	15,882	15,882	19,139	22,525	26,135	29,748	33,399
Sabangan	127.5	128	8,609	8,609	9,251	9,709	10,045	10,196	10,208
Sadanga	83.3	52	8,373	5,275	5,709	6,033	6,286	6,425	6,478
Sagada	83.3	50	10,354	7,237	6,996	6,606	6,149	5,615	5,058
Tadian	145.2	0	16,482	0	0	0	0	0	0
Aurora	3,239.5	398	159,621	8,826	10,066	11,262	12,359	13,441	14,411
Baler	92.6	0	26,919	0	0	0	0	0	0
Casiguran	715.4	136	19,578	2,318	2,492	2,621	2,697	2,744	2,745
Dilasag	306.3	110	12,825	3,585	4,321	5,098	5,883	6,713	7,533
Danalungan	316.9	76	8,187	1,007	1,095	1,165	1,214	1,249	1,265
Dingalan	304.6	0	19,325	0	0	0	0	0	0
Dipaculao	507.3	76	21,044	1,916	2,158	2,378	2,565	2,734	2,867
Maria Aurora	426.2	0	30,796	0	0	0	0	0	0
San Luis	605.9	0	20,947	0	0	0	0	0	0

Sources: (1) 1970 Census Population and Housing, 1974, NCSO
(2) 1980 Census of Population and Housing, 1983, NCSO
(3) 1990 Census of Population and Housing 1993, NSO
(4) 1995 Census of Population, 1997, NSO
(5) 1995 Census Maps, NSO

Note: *1 "*" mark means that an urban area of the municipality is included in the basin.
*2 Since urban populations were not identified in the 1995 census, the population ratio in the river basin was applied that in the 1990 census to estimate the basin population in 1995.
*3According to NSO, the provincial total area is not equal to individual figures due to unfinished cadastral survey.
*4 A percentage of basin area to the total municipal territory was estimated on the basis of the administrative boundary map delineated applying the census maps of NSO by the JICA study team.

Table 8.3.1 Project Summary of Cagayan Special Economic Zone and Freeport (CEZAFP)

(Unit: Million Pesos)

	Project	Component	Total Project Cost		Public Investment	Proposed Financial Schemes
1.	Power Supply and Distribution System	- 200MW Power Generating Plant - Rental Power Barge - 4 x 500MW Power Substation - Transformers - 18km Transmission Line - 500km Distribution Line - 600km Streetlighting	Main Power Plant Power Distribution Streetlighting Miscellaneous Engineering Fee Land Acquisition Total	12,480 4,129 1,620 3,646 1,750 19 23,644	=> 2,364	BOT Initial electric supply was made by NAPOCOR barge. Memorandum of understanding with NAPOCOR signed on Dec. 7, 1998. NPC to install 69l line, substation 2MVA.
2.	Water Supply & Sewerage System	- Peak Water Supply: 65,328 m3/day - 48 Deep-wells & Pump Stations - Ground / Elevated Reservoir - 52km Transmission Line - 500km Distribution Line - Peak Wastewater: 83,930 m3/day - 6 Treatment Plants - 500km Sewer Line	Water Supply Development Sewerage System Miscellaneous/Contingencies Engineering Fee Land Acquisition Total	1,142 4,145 1,057 508 15 6,867	=> 0	BOT South Australian Water Corp. interested to implement this component by BOT.
3.	Telecommunication	- State-of-the-Art - Telecommunication System - 30,312 Lines in 2015 - 43,944 Lines in 2025 - Underground Line	Telephone System Data Communication Equip. Engineering Fee Total	1,977 118 158 2,253	=> 2,253	BOT/Joint Venture Eastern Telecom is interesting to implement this component through Joint Venture with CEZA. Negotiation is in process
4.	Road Circulation & Drainage System	- 6-lane Roads: Calaya-Seaport (20km), Magapit-Calaya (40km) - 4-lane Secondary Trunk Road & Other Road Network (73.5+383km) - Interchange - Related Drainage System - Bridges	Land Acquisition Road Interchange Bridge Drainage Engineering Fee Total	831 18,891 5,260 2,217 62 2,114 29,375	=> 29,375	GOP/Foreign Assisted 2-lane road to Sta. Ana was completed 85% by GOP. Rehabilitation of Dugo-San Vicente road on going.
5.	Seaport	- One 600m Wharf - One Fishing Port & Ferry Port - Dredging - 600m Breakwater - 23ha Backup Area: Container Yard Terminal, Administration Bldgs, Fish Market, Cold Storage, Processing Plants	Ship Berths/ Seaside Facilities Dredging/ Reclamation Landside Facilities Container Crane Miscellaneous/Contingencies Engineering Fee Land Acquisition Total	1,409 360 674 292 489 235 60 3,519	=> 0	BOT Proposal of BOT scheme by Asia-Pacific International Terminal Inc. for Phase I (P1.6 Bil.) of the seaport was approved by NEDA-ICC. CEZA expected that a BOT contract will be awarded by July, 1999.
6.	Airport	- International Airport 4,200m runway, Taxiway, Terminal Buildings, Control Tower - Global Transpark System (Central Cargo Facilities)	Airport Facilities Miscellaneous/Contingencies Engineering Fee Land Acquisition Total	19,149 3,830 1,838 783 25,600	=> 19,149	Airside facilities: GOP Other facilities: BOT
7.	Housing (Industrial Parks & Residential Housing)	- Housing Development 1,043ha - Road & Open Space 445ha	Land Acquisition & Develop. Public Buildings Factory Bldgs (Industrial Park Low-cost Housing Total	7,600 5,743 6,500 4,224 24,067	=> 7,600	GOP BOT Developers
8.	Sta. Ana Regional Agri-Industrial Growth Center (SARAIGC)	- Total Development Area 800ha Industrial Zone 549ha Residential Zone 128ha Communication Zone & Expansion Area 49ha Facility Buildings - Road Network - Privately Generated Power Supply - Water Supply & Sewage System - Waste Disposal System - Telecommunication Facilities - Off-site Development - Housing, Recreation, Communication	Site Development Utilities Building Structures Off-site Development Engineering Fee Total	405 958 728 944 45 3,080	=> 0	BOT Special Yen Loan (200ha only) Investors This component was down scaled to 400ha industrial area only by NEDA. Phase I (200ha) in site development was applied to Special Yen Loan package by NEDA.
9.	Solid Waste Management System	- Landfill, 3ha - Administration Buildings	Landfill Development Other Facilities Engineering Fee Land Acquisition Total	69 27 8 3 107	=> 69	GOP BOT
10.	Eco-Tourism & Leisure Complex	- Eco-Tourism Facilities/Nature Trails - Sports/Recreational Facilities 9-hole Golf Course, Health Club - Housing/Accommodation Facilities Hotel, Casino, Restaurants - Support System	Road Network Water Supply Power Supply Site Development Housing Total	173 74 44 26 478 795	=> 0	Investors
11.	Cagayan Upland Agricultural Development	- Small Water Impounding Projects 8 Sites, 500ha - Marketing Development Post-harvest Facilities Farm to Market Road - Watershed Development	Civil Works Purchase Equipment Cost Contingencies Land Acquisition Management/Engineering Fee Total	116 5 25 1 27 174	=> 174	Special Yen Loan Proposed by the consultant
			Grand Total	119,481	60,984	

Remark: Quoted from CEZA Feasibility Report.

Table 8.3.2 GRDP Projection at 1998 Constant Prices: 1998-2020

Area	Actual 1998 *1	Estimate 2004 *2	Projection 2005	Projection 2010	Projection 2020	Growth Rate (%) 2005 - 2010	Growth Rate (%) 2010 - 2020
GRDP Under Medium Growth Scenario (Billion Pesos)							
1. Philippines	2,667.1	3,613.0	3,800.7	4,896.3	8,125.9	5.2	5.2
2. NCR	925.4	1,268.1	1,336.6	1,738.6	2,941.8	5.4	5.4
3. CAR	59.7	92.8	99.9	144.6	302.6	7.7	7.7
4. Region 2 *3	54.5	77.5	83.1	100.6	143.0	3.9	3.6
5. Other Regions	1,627.5	2,174.6	2,281.1	2,912.5	4,738.5	5.0	5.0
6. Philippines without NCR	1,741.7	2,344.8	2,464.1	3,157.7	5,184.1	5.1	5.1
7. Region 2							
1) Low Scenario*3	54.5	77.5	83.1	100.6	143.0	3.9	3.6
2) High Scenario*4	54.5	77.5	83.1	126.6	268.3	8.8	7.8
GRDP per Capita (1000 Pesos)							
1. Philippines	36.5	43.8	45.1	53.3	77.0	3.4	3.7
2. NCR	92.5	114.2	118.4	144.6	225.9	4.1	4.6
3. CAR	44.6	61.0	64.3	85.0	154.5	5.7	6.2
4. Region 2	20.2	25.6	26.9	30.1	38.2	2.3	2.4
5. Other Regions	27.6	32.5	33.4	38.9	54.6	3.1	3.4
6. Philippines without NCR	29.6	32.8	33.8	39.6	**56.1**	3.2	3.5
7. Region 2							
1) Low Scenario	20.2	25.6	26.9	30.1	**38.2**	2.3	2.4
2) High Scenario	20.2	25.6	26.9	37.9	71.7	7.1	6.6
Expected Capital Investment and GRDP in Region 2 (Billion Pesos)							
1. Low Scenario							
	ICOR = 5.9		5.9	5.9	5.9		
a. Incremental GDP (Billion Pesos)		5.2	5.6	2.6	5.5		
b. Required Basic Capital Formation		30.7	33.2	15.2	32.4		
2. Special Projects for Region 2		8.8	15.5	20.0	33.3		
AFMA*5		0.5	0.6	0.7	1.2		
CEZA*5		1.2	1.3	1.6	2.7		
W/R Projects in M/P*6		-	1.3	1.6	2.7		
Ripple & Private Capital Formation		7.0	12.4	16.0	26.6		
Total Capital Formation		39.5	48.8	35.2	65.7		
	ICOR= 5.9		5.9	5.8	5.5		
Incremental GRDP		6.7	8.3	6.1	11.9		
GRDP		79.0	85.7	119.1	211.5	6.8	5.9
GRDP per Capita (1000 Pesos)		26.1	27.8	35.7	**56.1**	5.1	4.6
Reference							
Philippines (Billion Pesos)	ICOR = 5.5		5.5	5.5	5.5		
a. Incremental GDP	-	216.8	187.7	241.9	401.4		
b. Required Capital Formation		1,192.5	1,032.6	1,330.2	2,207.6		

Note: *1 Actual values at current prices

*2 Estimates in Medium-Term Development Plan 1999-2004

*3 Estimates based on the past trend by NEDA Regional Office 2

*4 Estimates by NEDA Regional Office 2. They include AFMA, CEZA and other economic development programs in addition to the ordinal investment programs.

*5 The capital investment of special projects are assumed by means of trend projection. (Unit: Bil. Pesos)

Projects	Initial Investment **1 2000	Initial Investment **1 2001	Growth Rate **2	Total Investment **3	Expected Total Investment**4
AFMA	0.447	0.492	5.2%	16.3	28.6
CEZA	0.108	1.063	5.2%	36.0	61.0

**1 AFMA's investment 447 million pesos for Region 2 in 2000 was already appropriated by the central government. The investment of CEZA in 2000 was appropriated around 108.38 million pesos. In the following year, it was assumed to increase to 1.06 billion pesos, which is a minimum investment to attain the target public investment of 60 billion pesos by 2020. The total investment of CEZA is estimated at around 120 billion pesos including private investment.

**2 The growth rates are assumed to be the same as the national economic growth rate, although they were expected as 10% by NEDA Regional Office II in the high scenario.

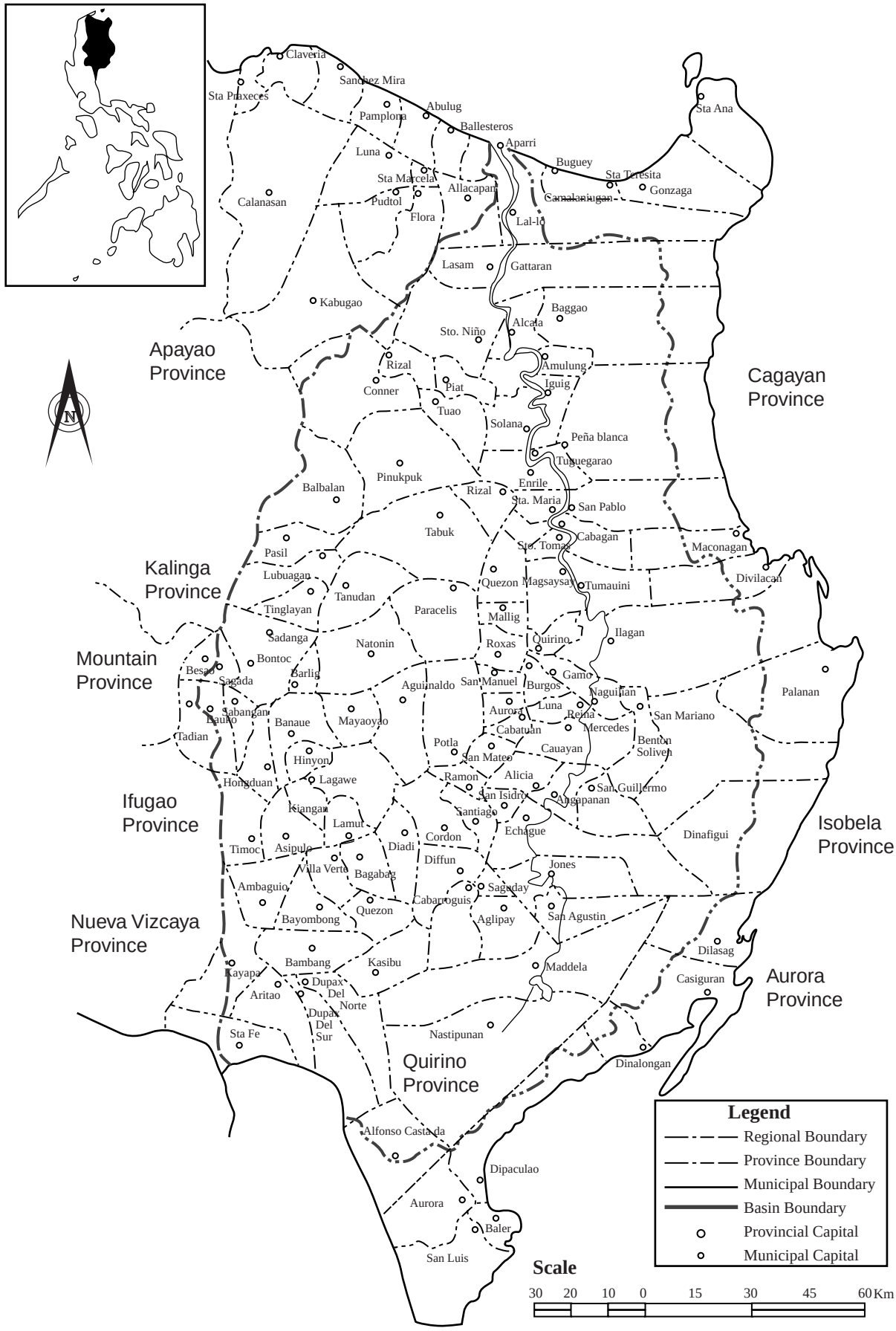
**3 The total investment of the respective projects by the target year 2020.

**4 The accumlated amount by 2020

*6 The minimum investment to attain the regional economic target of 56,100 pesos per capita in 2020. The total investment was estimated at around 30 billion pesos by 2020, accounting for 1/3 of the total amount, 90.6 billion pesos in the M/P.

*7 ICOR was assumed to be improved to the national level due to improvement of regional economic environment.

Figures



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 2.1.1

Administrative Boundary Map

APPENDIX

Rethinking Budget Allocation

Abbreviations

N.GDP	Nominal Gross Domestic Products
GK	Real Government Development Expenditure
N.CON	Nominal private consumption
GRDP	Gross Regional Domestic Products

sectoral GK:

EDU	Education
HEA	Health
SSW	Social security and welfare
HCA	Housing and community amenities
AG	Agriculture[1]
IN	Industry[2]
EGW	Electricity, gas and water
T&C	Transport and communications
OES	Other economic services[3]
OTHERS	Others[4]

sectoral GDP:

AGR	Agriculture
MIN	Mining
MANU	Manufacturing
ELEC	Electricity, Gas and Water
CONST	Construction
TRADE	Trade
TRC	Transport and Communications
FIN	Finance
PAB	Public Administration
OTHE	Others

[1] Includes agrarian reform and natural resources.
[2] Includes trade and tourism.
[3] Includes subsidy to local government units (LGUs).
[4] Includes other social services, subsidy to LGUs (under social services), net lending, debt services and land distribution.

Abbreviations *(continued)*

regional department:

AG	Department of Agrarian Reform & Department of Agriculture
EDU	Department of Education, Culture, and Sports & State University and Colleges
HEA	Department of Health
OES	Department of Local Government
PWH	Department of Public Works and Highways
SWD	Department of Social Welfare and Development
IN	Department of Tourism & Department of Trade and Industry
T&C	Department of Transportation and Communications

employed persons by sector:

AGL	Agriculture, fishery and forestry
MIQ	Mining and quarrying
MAN	Manufacturing
EGWL	Electricity, gas and water
CONST	Construction
TRA	Wholesale and retail trade
TCL	Transportation, storage and communication
FIN	Financing, insurance, real estate & business services
OTHL	Others

Sources: "Key Indicators 2000", ADB, and "Budget of Expenditures and Sources of Financing", various years, DBM, "Philippine Statistical Year Book", various years, NSCB.

Regional Development Scenario
-Rethinking Budget Allocation-

I. Introduction

The purpose of this study is to suggest macroeconomic framework and procedure of decision-making with which the Government can allocate development capital in consideration with nation-wide development. This is an empirical study in terms of econometrics. I would like to show how to allocate precious resources form the standpoint of macroeconomic effectiveness.

I think the authorities should establish transparent criteria for the budget (including ODA) allocation to each sector and region based on macroeconomic analysis. Although the development budget is distributed to various sectors and each region based on their request, it is clear that the procedure does not always lead to sustainable economic growth. The lessons have demonstrated the application of request-based allocation is not always without defects. We need to rethink decision-making and to postulate different procedure incorporating the result of macroeconomic analysis.

In Section II, we outline a methodology of econometric analysis. In Section III, I show the results of regression analysis. Finally, in Section IV, suggestions and conclusions are presented. The point concerning the framework and methodology I explain is to make clear the amount of budget allocation by sector and region from the viewpoint of macroeconomic impact.

II. Methodology of rethinking budget allocation

The following approach was employed in this study.

Step 1 Making decision on the target of GDP per capita. Then, estimate the goal of GDP growth rate employing the following equation.

$$XG = Ge^{(r-n)t}$$

Where: X= multiple number, G = real GRDP per capita, r = real GRDP growth rate, n = population growth rate, t = years.

Step 2 Assessing impact of the Government development expenditure on the macro-economy of Philippines in terms of econometrics (Simultaneous-Equation Models). Then, estimate the necessary development expenditure to reach at the growth target.

Step 3 Evaluating impact of development expenditure by sectors on each sectoral GDP in terms of econometrics (Rating of the development expenditure by sector). Then, make decision on priority for allocation of capital resources.

Step 4 Making decision on the amount of allocation to each region employing econometric method and in consideration of GRDP structure and growth rate by sector.

III. The results of economic analysis

Step 1 We set the economic target and employed an assumption in order to calculate required economic growth rate as follows:

(1) Growth target: GDP per capita = 2.0 times in 2018 comparing with the year 1999 (20-year period).
(2) Population growth rate during the 20-year period = 2.0 percent.

According to the above equation, target and assumption, the necessary real GDP growth rate is estimated to be at 5.5 percent on average. Real GDP is estimated to be at 2521.6 billion pesos in 2018 in the case of 5.5 percent growth rate. Consequently, the growth of real GDP is calculated to be 1604.2 billion pesos during 20-year period (1999-2018).

Step 2 Simultaneous equation models:

1. Outline of Models

The purpose of the following simultaneous equation models is to reveal the exogenous impact on the endogenous variables.

I try to examine the exogenous impact on the endogenous variables according to the models expressed in function (1), (2), (3), (4), (5), (6) and (7) as follows;

Consumption Function: $C = f(Y, P)$ (1)
where C = nominal private consumption expenditure, Y = nominal GDP, P = GDP deflator.

GDP Deflator Function: $P = f\{M2, GK, P(-1)\}$ (2)
where P = GDP deflator, M2 = nominal money supply, GK = development expenditure by Government, P(-1) = P lagged one year.

Import Function: $IM = f(Y)$ (3)
where IM = import, Y = nominal GDP.

Export Function: $EX = f(ER)$ (4)
where EX = export, ER = foreign exchange rate.

Government Revenue Function: $GR = f(Y, P)$ (5)
where GR = government revenue, Y = nominal GDP, P = GDP deflator.

Exchange Rate Function: $ER = f(P, INT)$ (6)
where ER = foreign exchange rate, P = GDP deflator, INT = interest rate.

Identity: $Y = C + GC + GK + EX - IM$ (7)

In the preceding models, the variables C, Y, P, IM, EX, GR and ER are treated as endogenous variables. The variables M2, GK, INT and GC are treated as exogenous variables. The variable P(-1) is treated predetermined. In all, there are seven equations (including the one identity) to study the interdependence of seven endogenous variables.

2. Performance of Models

The results of estimation of models are presented in the following section. I estimated parameters of the above models by the system method, that is *Three Stage Least Squares method (3SLS)*, and solved the simultaneous equation by *Newton method*. The period of estimation is from 1983 to 1999, that is, during 17 years. The regression software package, *TSP Ver. 4.3A,* is employed for estimation.

The results of model evaluation are presented on Figure 1. The chart shows the evaluation by graphics and quantitative evaluations, *RMSE*[1] and *Theil's U*. According to graphics, *RMSE* and *Theil's U*, we see each performance of the above models is acceptable.

3. Simultaneous-Equation Models[2]

(1) Consumption Function

$$C_t = -93.1 + 0.552(Y_t) + 1.90(P_t)$$
$$(-5.30^a)\ (14.5^a)\quad (4.94^a)$$
$$ser = 14.0 \qquad DW = 1.21$$

(2) GDP Deflator Function

$$P_t = 23.4 + 0.03(M2_t) + 0.107(GK_t) + 0.719(P_t)$$
$$(4.10^a)\ (2.36^b)\quad (1.88^c)\qquad (6.71^a)$$
$$ser = 6.34 \qquad DW = 1.84$$

(3) Import Function

$$IM_t = -234.1 + 0.550(Y_t)$$
$$(-3.64^a)\quad (13.6^a)$$
$$ser = 131.1 \qquad DW = 1.69$$

(4) Export Function

$$EX_t = -1040.0 + 55.3(ER_t)$$
$$(-7.94^a)\quad (11.4^a)$$
$$ser = 148.9 \qquad DW = 0.999$$

(5) Government Revenue Function

$$GR_t = -65.6 + 0.09(Y_t) + 0.952(P_t)$$
$$(-4.54^a)\ (3.50^a)\quad (3.66^a)$$
$$ser = 19.1 \qquad DW = 1.13$$

(6) Foreign Exchange Function

$$ER_t = 5.89 + 0.09(P_t) + 0.204(INT_t)$$
$$(2.27^b)\quad (9.67^a)\quad (2.63^b)$$
$$ser = 2.97 \qquad DW = 1.61$$

(7) Identity

$$Y_t = C_t + GC_t + GK_t + EX_t - IM_t$$

---

[1] RMSE = Root Mean Squared Error.

[2] For evaluation of each economic model, see *Model Evaluation (Appendix I)*.

where[2]

C = nominal private consumption expenditure
Y = nominal GDP
P = GDP deflator (1985=100)
M2 = nominal money supply
GK = nominal development expenditure
IM = import
EX = export
ER = foreign exchange rate (pesos/US$)
GR = nominal Government revenue
INT = interest rate
GC = nominal Government consumption
t = time

where the figures in parentheses are the estimated t -values[3], ser = standard error of regression, and DW = Durbin-Watson *d* statistics.

According to the above econometric models, the following figures are estimated.

△ GK (bn. pesos)	Y (bn. pesos)	P (1985=100)	Real Y (bn. pesos)	△ Real Y (bn. pesos)
500	4014.6	400.2	1003.1	85.7
600	4218.3	414.9	1016.7	99.3

The above figures lead to the following simultaneous equations.

$$500.0 = 1003.1\ X + 85.7\ Y \quad \cdots ①$$
$$600.0 = 1016.7\ X + 99.3\ Y \quad \cdots ②$$

The solution: X = -0.17, Y = 7.8

As I mentioned earlier, in order to reach at the growth target the following conditions are requirement: Real Y = 2521.6 (bn. pesos) and △Real Y = 1604.2 (bn. pesos). Therefore the necessary Government development expenditure is estimated to be at 12,084.1 (bn. pesos; total amount during 20-year period).

Step 3 Macroeconomic data employed in this study is changed to available index for this study. I would like to explain how to change the data to the index briefly.

<u>The index of GDP, GK and labour in this study</u>

Each of nominal GDP and GK is classified into 10 sectors following with data source (*"Key Indicators 2000"*, ADB). Besides Labour is classified into 9 sectors according to the "*Philippine Statistical Yearbook*, various years".

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[2] *Source:* "Key Indicators 2000", ADB.
[3] For estimation, time series is used from 1983 to 1999.
a: Significant at the 1 percent level by two-tailed test.
b: Significant at the 5 percent level by two-tailed test.
c: Significant at the 10 percent level by two-tailed test.

The each data is converted into the particular index as follows:

To illustrate the construction of the index, the AGR sector is selected.

Sectoral GDP (in billions pesos)

	1982	1983	- - - - - 1999 (year)
AGR	74.1	82.5	- - - - - 528.2

The portion of annual GDP (%)

	1982	1983	- - - - - 1999 (year)
AGR	23.4	22.4	- - - - - 17.6

The index based the year 1985

	1982	1983	- - - - - 1999 (year)
AGR	52.7	58.7	- - - - - 375.7

According to the above conversion factors, the particular AGR index is computed with the following steps:

Step one
Computing the index with the following formula

$IA_t * (PA_t/100) + 100 = Index_{1,\,t}$

where: IA_t = the index of AGR based the year 1985 for year *t*;
PA_t = the AGR portion of GDP for year *t*;
t = 1982-99.

According to the above formula,

	1982	1983	- - - - - 1999 (year)
AGR $index_{1,\,t}$	112.3	113.1	- - - - - 166.2

Step two
Constructing the cumulative index from the $index_{1,\,t}$

$AGR\ index_{2,\,1983} = (AGR\ index_{1,\,1982} * AGR\ index_{1,\,1983}) / 100 = 127.0$
$AGR\ index_{2,\,1984} = (127.0 * AGR\ index_{1,\,1984}) / 100 = 156.1$
: : :
: : :
$AGR\ index_{2,\,1999} = (AGR\ index_{2,\,1998} * AGR\ index_{1,\,1999}) / 100 = 40406.5$

The AGR index would be:

	1982	1983	- - - - - 1999 (year)
AGR $index_{2,\,t}$	112.3	127.0	- - - - - 40406.5

The other sectoral GDP index and sectoral GK index are computed as well as the above method.

The Labour index (the year 1985-98) is simply calculated through the year 1985 based (not modified by the sectoral portion and not accumulated).

These computed indices are converted into logarithm in order to apply econometric analysis (the Granger Causality Test and the Ordinary Least Squares Method).

The results of econometric analysis

First, we applied the Granger Test to detect the direction of causality between the GDP indices and GK ones explained above. Second, picked up variables which are recognized statistically significant that a change of GK leads to a change of GDP. Finally, we estimated regression coefficient employing both multiple linear regression models and simple ones. The estimated coefficient shows elasticity. The statistically significant coefficients of regression appear in the following three tables show the results of multiple linear regression analysis. the second table shows the results of simple linear regression analysis.
In the same way as the procedures mentioned above, the causality between sectoral GK and sectoral Labour was examined, then estimated the coefficient of regression under the simple linear regression models. The statistically significant coefficients appear in the third table.

	EDU	HEA	SSW	HCA	AG	IN	EGW	T&C	OES	OTHERS
AGR	-	-	-	-	-	-	-	-	0.417	0.127
MIN	-	0.227	-	-	-	0.443	-	-	-	0.015
MANU	-	1.280	-	-	-	-	-	0.201	0.344	0.147
ELEC	-	-	-	-	-	-	-	0.085	-	-
CONST	-	1.230	-	-	-	-	-	-	-	-
TRADE	0.255	0.901	-	-	-	-	0.397	-	-	-
TRC	-	-	-	-	-	-	-	0.230	0.189	0.047
FIN	0.080	-	0.087	-	-	-	0.214	0.225	-	0.018
PUB	0.240	-	0.243	-	-	-	0.257	0.352	-	0.044
OTHE	-	-	-	-	-	-	0.537	0.667	-	0.102
N.GDP	0.337	-	-	-	-	-	0.450	0.548	-	0.057

Note: The abbreviations in row and column stand for sectoral GK and sectoral GDP, respectively.

	EDU	HEA	SSW	HCA	AG	IN	EGW	T&C	OES	OTHERS
AGR	-	4.185	-	-	1.285	7.545	5.978	-	-	-
MIN	-	-	-	-	-	-	0.207	-	-	-
MANU	-	-	-	-	1.568	8.871	6.948	1.254	-	-
ELEC	0.103	-	-	-	0.228	-	-	-	0.209	-
CONST	0.248	1.763	-	-	0.606	3.183	2.296	0.472	0.472	-
TRADE	-	3.246	-	-	1.110	5.895	4.458	-	0.822	-
TRC	-	1.289	-	-	0.444	-	1.750	0.345	0.337	-
FIN	0.239	-	-	-	0.530	-	-	0.429	0.481	-
PUB	-	-	-	-	-	-	-	-	-	-
OTHE	-	-	-	-	1.469	-	-	1.155	1.254	-
N.GDP	-	3.843	-	-	1.340	6.847	4.592	1.035	-	-

	EDU	HEA	SSW	HCA	AG	IN	EGW	T&C	OES	OTHERS
AGL	-	-	-	-	-	-	-	-	-	-
MIQ	-	-	-	-	-	-	-	-	-	-
MAN	-	-	1.967	-	-	1.011	-	-	-	-
CONST	-	-	-	-	-	-	-	-	-	-
EGWL	-	-	-	-	-	-	-	-	-	-
TCL	-	-	-	-	-	-	-	-	-	-
TRA	-	-	-	-	-	-	-	-	0.734	
FIN	-	-	-	-	-	-	-	-	-	-
OTHL	-	-	-	-	-	-	-	-	0.677	-

Note: The abbreviations in row and column stand for sectoral GK and sectoral Labour, respectively.

EDU	HEA	SSW	HCA	AG	IN	EGW	T&C	OES	OTHERS	Total
1.502	17.964	2.297	0.000	8.580	33.795	28.084	6.998	5.936	0.557	105.713

The combined results of the regression coefficients presented above appear in the following table.

Each percentage is calculated according to the above table as follows:

(unit: %)

EDU	HEA	SSW	HCA	AG	IN	EGW	T&C	OES	OTHERS	Total
1.4	17.0	2.2	0.0	8.1	32.0	26.6	6.6	5.6	0.5	100.0

Recollect how much GK is necessary to achieve the growth target. We estimated the amount in *Step 2* (= 12084.1 bn. Pesos). Accordingly, the allocation of GK to each sector is calculated as follows:

Rating	Sectoral GK	Proportion (%)	Allocation (bn. pesos)
1	IN	32.0	3863.1
2	EGW	26.6	3210.3
3	HEA	17.0	2053.5
4	AG	8.1	980.8
5	T&C	6.6	799.9
6	OES	5.6	678.5
7	SSW	2.2	262.6
8	EDU	1.4	171.7
9	OTHERS	0.5	63.7
Total		100.0	12084.1

What needs to make clear here is that the purpose of estimation of regression coefficient is to evaluate each impact of sectoral GK on the macroeconomy. The large figure means high elasticity. Namely, that figure shows intensity of direct and indirect impact on the economy. Therefore the development capital is allocated in consideration of the intensity of macroeconomic impact.

Step 4 The question we have to ask here is how we can allocate the above sectoral budget to each region. In order to cope with this issues, we employed econometric method again. The procedure of analysis is similar to the one explained in *Step 3*. Various regional data were used—Regional GDP by sector (*source:* "*the Gross Regional Domestic Product*",

various years), the data on budget allocation (BA) to each regional department (*source:* "*the Gross Regional Domestic Product*", various years), and the data on regional labour by sector (*source:* "*Philippine Statistical Yearbook*", various years). Nominal GRDP is classified into 10 sectors. Each of BA and Labour is classified into 9 sectors. Due to data limitation, the estimation period is 10 years. The regression analysis applied here is in the same way as the one mentioned above. However, simple linear regression models were only applied here because the number of data was not sufficient comparing with the number of variables. The results of regression analysis, that is, estimation of regression coefficient are presented in Table 1 (GRDP-BA regression analysis) and Table 2 (Labour-BA regression analysis).

We need to incorporate other variables in order to reflect on the difference of regional economic structure. The difference of spread effect of public investment is dependant on the difference of economic structure. Therefore it is necessary to consider not only estimated coefficient but also other economic features by region as possible as we can. In this study each estimated coefficient is combined with sectoral GRDP proportion of sectoral GDP, contribution rate of each GRDP sector to sectoral GDP growth rate, and sectoral GRDP growth rate. I would like to explain the methodology using sample data in short.

How to combine the regression coefficient with other economic features

First, calculate the sectoral GRDP proportion of sectoral GDP on average, contribution rate of each GRDP sector to sectoral GDP growth rate on average, and sectoral GRDP growth rate on average. The result of calculation of regional AGF sector is as follows:

AGF sector (unit: %on average)

Region	Proportion	Contribution Rate	Growth Rate
NCR	0.0	0.0	0.0
R I	6.0	5.0	11.3
R II	5.1	7.4	10.5
R III	9.5	10.0	12.2
R IV	19.7	31.0	11.3
R V	5.4	7.7	10.0
R VI	10.8	9.3	10.8
R VII	4.6	4.2	11.9
R VIII	4.2	5.3	10.7
R IX	6.6	5.9	9.7
R X	8.7	6.9	9.0
R XI	13.2	9.0	9.4
R XII	6.3	4.0	4.4

Second, combine the above three kinds of figures by region.

AGF sector

Region	Total
NCR	0.0
R I	22.3
R II	23.0
R III	31.8
R IV	62.0
R V	23.0
R VI	30.9
R VII	20.6
R VIII	20.2
R IX	22.1
R X	24.6
R XI	31.6
R XII	14.6
Grand Total	326.8

Third, calculate the percentage of each region in AGF sector.

AGF sector (unit: %)

Region	Proportion
NCR	0.0
R I	6.8
R II	7.0
R III	9.7
R IV	19.0
R V	7.0
R VI	9.5
R VII	6.3
R VIII	6.2
R IX	6.8
R X	7.5
R XI	9.7
R XII	4.5
Total	100.0

Calculate the above proportion in every region and sector following with the same manner (see Table 3).

Fourth, multiply estimated coefficient presented in Table 1 by the proportion presented in Table 3. The results of calculation appear in Table 4.

Finally, combine the sectoral total figures in each region appeared in *Appendix V*, then calculate each proportion by sector and region (see Table 5).

The regional and sectoral proportion for budget allocation was determined from the viewpoint of GRDP impact as explained above. In addition, I incorporated the impact of sectoral budget allocation on regional labour absorption. The procedure of calculation of the sectoral proportion from the standpoint of that is in same as the above one. The result of calculation appeared in Table 6. Finally, the sectoral proportion of budget allocation to each region was determined through the following manner.

For instance, the sectoral proportion in Region II is determined according to Table 5 and 6.

Region II (unit: %)

Department	Appendix VI	Appendix VII	Combined	Average
AG	1.8	4.2	6.0	3.0
EDU	3.0	0.0	3.0	1.5
HEA	9.4	0.0	9.4	4.7
OES	3.0	0.0	3.0	1.5
PWH	1.8	0.0	1.8	0.9
SWD	0.0	0.0	0.0	0.0
IN	5.0	0.0	5.0	2.5
TC	12.5	13.9	26.4	13.2
OTHEAR	7.5	0.0	7.5	3.8

The above average figure is employed for the portion of budget allocation. Table 7 shows every proportion of sectoral and regional budget allocation.

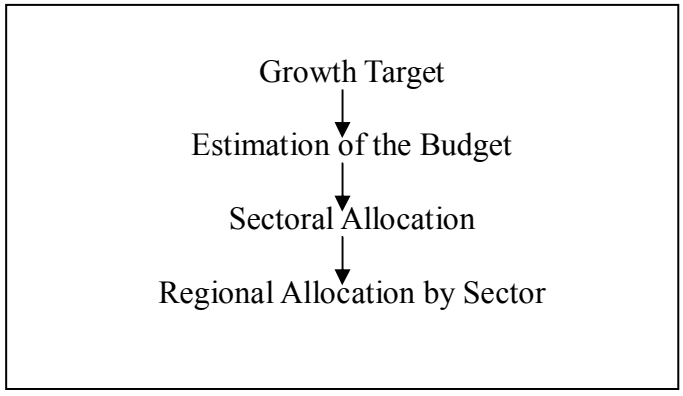
Based on the percentage appeared in Table 7, the amount of budget allocation is determined. Table 8 shows the results of this study. For instance, in the case of Region II the amount is calculated as follows:

(unit: bn. pesos)

Department	R II
AG	29.5
EDU	2.6
HEA	96.1
OES	10.0
PWH	29.6
SWD	0.0
IN	96.9
T&C	105.4
OTHEAR	2.4
Total	372.6

IV. Suggestions and Conclusions

So far we have outlined the way in which the development budget is allocated from the viewpoint of macroeconomic impact. The procedure of budget allocation can be summarized as follows:



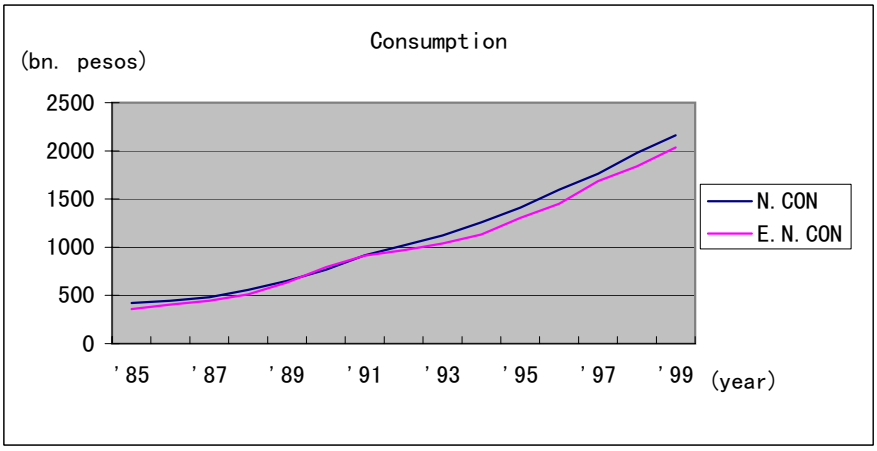
To sum up the major findings through macroeconomic analysis, the budget for tourism, trade and industry is of most significance for nation-wide development. The second significance is to allocate to public works and highways. The third is health sector. Hence one can say that, of all sectors, not only focusing on improvement of economic infrastructure but also considering the importance of human development is significant for economic growth. One of the economic features of Philippines is that labour elasticity of production is higher than the capital one.[3] It follows from this that ripple effect of human development expenditure (*ex.* easy access to safety water, hospital and medicine; free of charge for vaccination; provision against infectious disease and endemic disease, etc) on the economy seems to be fruitful. In concluding, I would like to suggest several points.

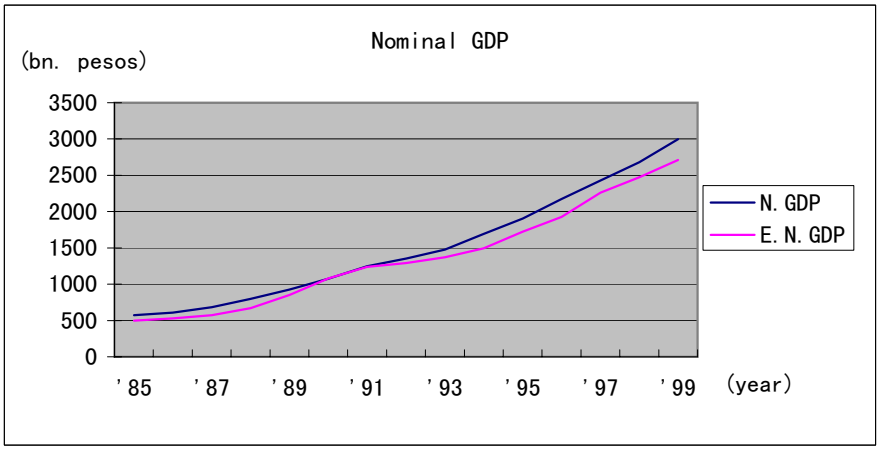
(1) The central Government should have long-term and consistent development strategy based on empirical analysis.
(2) No more arbitrary and request-based budget compilation.
(3) Postulate macroeconomic models in order to examine what sector works and what doesn't from the standpoint of economic effectiveness.
(4) Establish more objective, transparent and accountable criteria for reasonable budget allocation.
(5) Consider how to draw out self-help effort form the public.
(6) No more decision-making like the saying, *can't see the forest for the trees*.

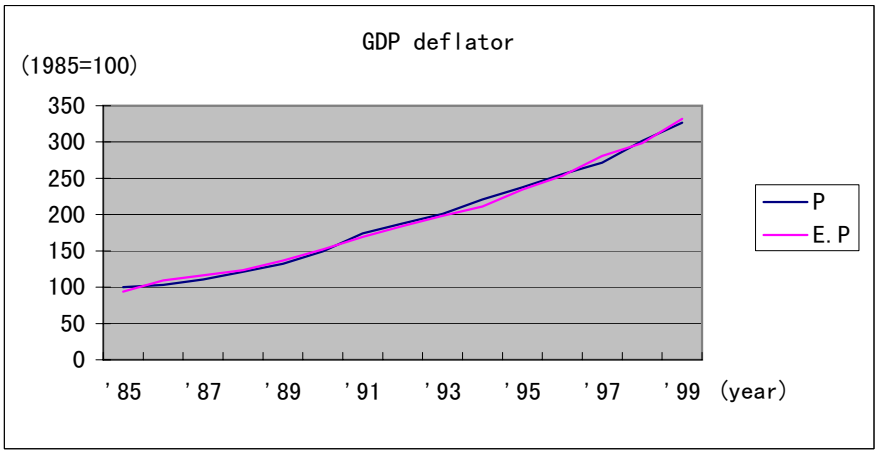
By the way, the objection will no doubt be raised that the methodology employed in this study is not the sole one. As you know, there is no methodology or models established so far. I hope this study create a stir. A foreseeable extension of this study would be to include field survey and project evaluation.

[3] The result of Panel analysis:
Y = 7.33 + 0.278(K) + 0.904 (L)
(8.32) (11.6) (6.79) R^{*2} = 0.909 Observations = 143 Model = Random
where: Y = GDP, K = Gross fixed capital formation, L = labour, the figures in parentheses are the estimated t –values, and R^{*2} = adjusted R-squared.

Figure 1
Model Evaluation



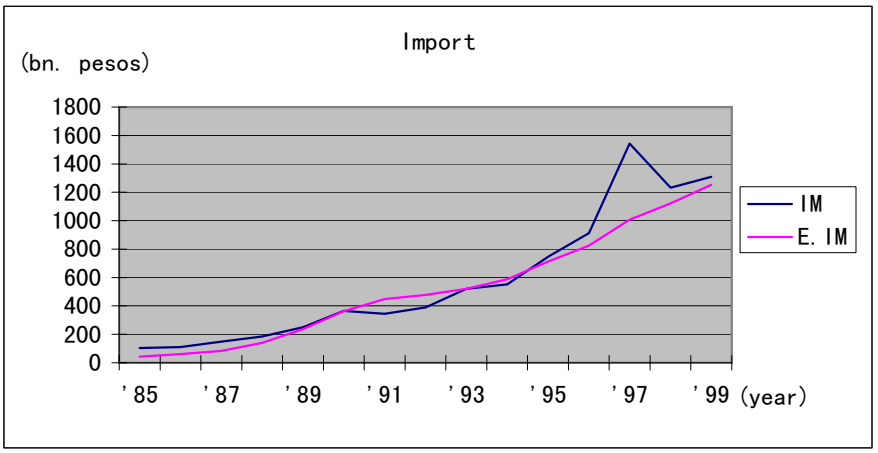


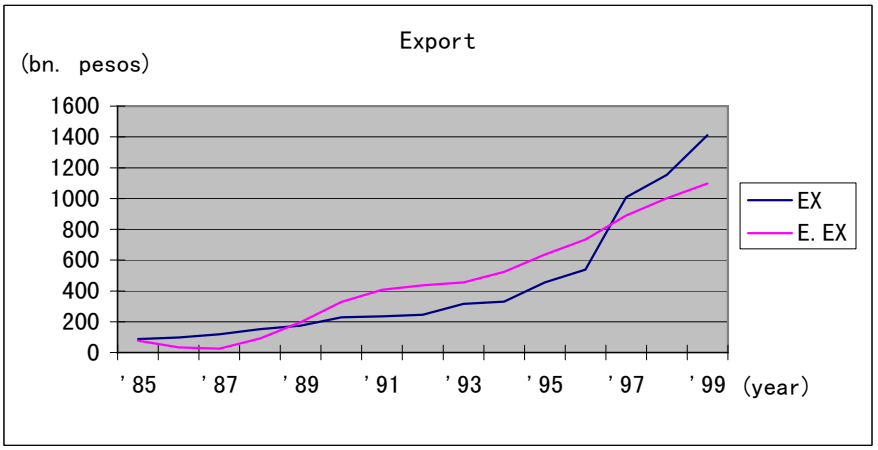


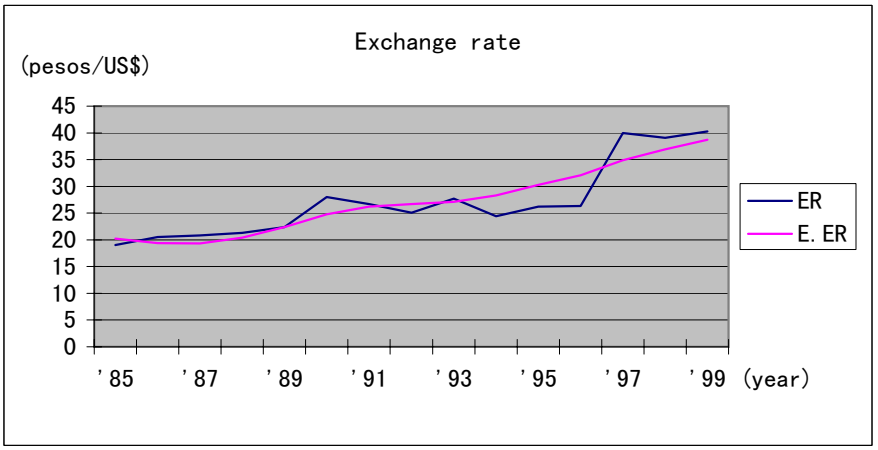
	Consumption	Nonimal GDP	GDP deflator
RMSE	85.2	151.3	5.3
Theil's U	6.9%	9.0%	2.6%

Note: "E" stands for Estimat

Figure 1 (continued)



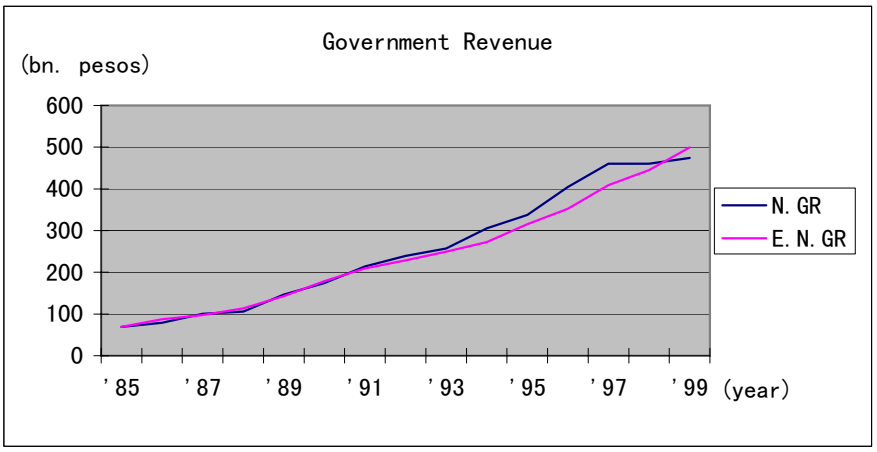




	Import	Export	Exchnage rate
RMSE	152.0	153.9	2.8
Theil's U	20.6%	25.9%	10.0%

Note: "E" stands for Estimat

Figure 1 (continued)



	Revenue
RMSE	23.3
Theil's U	8.0%

Note: "E" stands for Estimation.

Table 1

NCR

	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
EDU	-	-	0.062	0.185	0.285	0.284	0.303	0.494	-
HEA	-	-	0.059	-	-	0.270	0.285	-	-
OES	-	-	0.036	0.881	-	0.167	0.176	-	-
PWH	-	-	0.044	0.131	0.202	0.197	0.210	0.349	0.620
SWD	-	-	-	-	-	-	-	-	-
IN	-	-	-	2.334	3.513	-	-	-	-
T&C	-	-	-	0.828	-	-	-	-	-
OTHEAR	-	-	-	0.377	-	-	-	-	-

Region I

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	-	-	2.277	0.044	-	-	-	-	-	-
EDU	-	-	0.051	0.194	0.005	0.068	0.224	0.030	0.270	0.306	0.357
HEA	-	-	-	2.199	-	-	-	-	-	-	-
OES	-	-	0.718	-	0.166	1.955	6.436	0.847	7.626	8.720	10.388
PWH	-	-	0.172	-	0.018	0.237	0.776	0.102	-	-	-
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	-	-	2.854	-	0.306	3.959	12.937	1.693	15.095	17.195	19.327
T&C	0.632	-	0.056	0.365	-	0.067	0.228	0.030	0.499	-	-
OTHEAR	-	-	0.197	-	0.022	0.274	-	0.117	-	1.173	-

Notes: (1) The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 1 (continued)

Region II

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	-	-	-	-	-	1.638	-	-	2.033	-
EDU	-	-	0.056	-	0.012	0.105	-	0.025	0.334	0.236	0.591
HEA	-	-	0.435	-	-	-	1.330	0.179	-	1.679	-
OES	-	-	0.579	-	0.233	1.149	3.195	0.272	5.930	2.648	10.941
PWH	-	-	0.155	-	-	0.284	0.480	0.066	-	-	-
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	-	-	2.765	-	0.606	5.215	8.689	1.204	15.153	11.516	28.516
T&C	-	-	-	-	-	1.785	3.007	-	5.368	3.858	8.951
OTHEAR	-	-	0.218	-	0.048	0.400	0.672	0.093	-	-	2.122

Region III

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	0.175	-	-	-	-	1.968	-	-	2.423	-
EDU	-	0.011	-	-	0.081	0.111	-	0.038	0.163	0.303	0.688
HEA	-	0.143	-	-	-	-	-	-	-	-	-
OES	-	-	-	-	2.238	3.179	6.354	1.068	4.457	8.693	19.510
PWH	-	0.034	-	0.556	0.185	0.284	0.577	0.091	0.367	-	-
SWD	-	1.477	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	3.354	5.126	10.369	1.637	6.697	13.452	30.586
T&C	-	0.341	-	-	-	-	4.583	-	-	-	-
OTHEAR	-	0.048	-	0.706	0.246	0.371	-	0.120	-	-	-

Notes: (1) The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 1 (continued)

Region IV

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	-	-	-	-	-	2.913	-	-	3.290	-
EDU	-	-	-	0.171	0.103	0.072	0.257	0.064	0.142	0.325	0.750
HEA	-	-	-	-	-	-	-	-	-	-	-
OES	-	-	-	5.952	3.570	1.725	5.861	2.191	4.753	11.328	26.199
PWH	-	-	-	0.330	0.199	0.142	0.508	0.122	0.259	0.631	-
SWD	-	1.151	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	-	-	3.182	-	-	3.644	8.848
T&C	-	-	-	2.529	-	1.198	4.299	-	-	-	-
OTHEAR	-	-	-	0.563	0.349	0.247	-	0.212	0.461	-	-

Region V

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	6.236	-	-	-	-	-	-	-	-	-	-
EDU	0.503	-	0.027	0.174	0.131	0.088	-	0.022	0.312	0.382	0.689
HEA	-	-	-	-	-	-	-	0.147	-	-	-
OES	8.328	-	-	4.942	3.679	1.724	3.014	-	8.500	7.224	19.572
PWH	-	-	-	0.451	0.356	0.247	0.467	0.058	-	1.043	1.789
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	19.388	-	1.052	7.361	5.449	3.582	6.533	-	12.330	15.376	29.124
T&C	4.909	-	0.246	-	-	-	1.544	0.194	2.532	3.446	6.172
OTHEAR	1.764	-	0.089	-	-	-	0.561	-	-	-	-

Notes: (1) The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 1 (continued)

Region VI

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	0.427	2.678	-	0.339	-	3.422	0.474	1.348	3.129	6.671
EDU	-	0.042	0.264	0.110	0.037	0.074	0.328	0.477	-	0.319	0.667
HEA	-	-	-	-	-	-	-	-	-	-	-
OES	-	-	7.712	3.182	1.073	2.170	9.705	1.415	5.279	9.390	19.981
PWH	-	0.141	-	0.359	0.105	0.252	1.138	0.163	-	-	1.844
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	-	2.785	17.663	7.015	2.342	4.960	22.413	3.180	11.440	21.043	44.819
T&C	-	-	2.746	-	-	-	3.446	-	-	3.237	-
OTHEAR	-	0.145	-	-	-	0.257	-	0.166	-	-	2.192

Region VII

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	0.295	5.873	2.446	-	1.788	6.563	-	-	4.878	-
EDU	-	0.013	0.413	0.205	0.085	0.132	0.455	0.055	0.174	0.383	0.790
HEA	-	0.156	-	-	-	-	-	-	-	-	-
OES	-	-	11.486	5.322	2.274	3.594	12.640	1.477	4.585	10.181	20.878
PWH	-	0.039	-	-	-	0.255	-	-	-	-	-
SWD	-	1.311	-	-	-	-	-	-	-	-	-
IN	-	0.328	7.302	2.823	-	2.230	8.074	-	2.453	6.023	12.401
T&C	-	0.025	-	-	0.199	-	-	0.134	0.385	-	1.945
OTHEAR	-	0.026	0.646	-	-	0.200	-	-	-	0.552	-

Notes: (1) The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 1 (continued)

Region VIII

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	0.635	-	1.381	0.585	0.695	-	0.208	3.043	3.422	7.449
EDU	-	-	-	0.170	0.069	-	0.119	0.201	0.367	0.329	0.729
HEA	-	-	-	-	-	-	-	-	-	-	-
OES	-	-	-	2.932	1.208	-	2.124	0.228	6.363	5.853	13.146
PWH	-	-	-	0.251	0.104	-	0.189	0.031	-	0.517	-
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	-	-	-	8.397	3.550	-	6.099	-	18.576	17.845	39.563
T&C	-	-	-	-	-	-	1.111	-	-	3.016	6.315
OTHEAR	-	-	-	0.414	0.171	0.168	0.311	0.053	-	-	1.802

Region IX

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	9.561	-	-	-	-	-	2.528	-	-	-	-
EDU	0.674	0.036	0.189	0.167	0.031	0.107	0.178	0.015	0.237	0.265	0.713
HEA	-	-	-	-	-	-	1.558	-	-	-	-
OES	9.901	-	2.984	4.622	-	1.662	2.829	0.294	6.878	4.160	19.829
PWH	1.843	0.095	-	-	0.080	0.297	-	-	-	-	-
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	36.209	2.020	10.231	9.038	1.687	5.789	9.621	0.828	13.754	14.337	39.884
T&C	5.999	-	1.712	1.240	0.275	1.030	1.658	-	2.287	2.342	5.864
OTHEAR	1.924	0.098	-	0.435	0.083	0.304	0.510	-	-	-	-

Notes: (1) The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 1 (continued)

Region X

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	-	-	-	-	-	4.149	-	-	-	-
EDU	-	0.023		0.142	0.056	0.051	0.315	0.014	0.190	0.252	0.701
HEA	-	-	-	-	-	-	-	-	-	-	-
OES	-	0.658		4.553	1.598	1.201	7.352	0.420	5.698	7.370	20.259
PWH	-	-	-	0.308	0.104	0.094	-	0.028	0.390	0.489	-
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	-	-	-	7.567	2.586	2.423	14.834	0.687	9.471	11.958	32.956
T&C	-	-	-	-	-	-	3.624	-	-	2.720	6.955
OTHEAR	-	-	-	0.427	0.146	0.139	-	0.040	-	-	1.810

Region XI

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	-	-	-	-	0.117	-	-	0.202	-	-	-
EDU	-	-	0.288	0.125	0.013	0.060	0.299	0.018	-	0.231	0.573
HEA	-	-	2.449	-	0.103	-	2.615	-	-	-	-
OES	-	0.025	0.559	0.223	0.025	0.115	-	0.036	0.280	0.452	-
PWH	-	-	-	-	0.034	0.157	-	0.048	-	-	1.393
SWD	-	-	-	-	-	-	-	-	-	-	-
IN	-	0.606	12.887	5.099	0.566	2.668	13.385	0.822	7.289	10.315	25.641
T&C	-	-	-	0.456	0.051	0.233	-	0.073	0.594	-	2.292
OTHEAR	-	-	-	0.285	0.031	0.150	-	0.045	0.380	0.561	-

Notes: (1) The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 1 (continued)

Region XII

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
AG	7.633	-	-	-	-	-	1.668	-	-	-	-
EDU	0.514	-	0.485	0.128	0.091	0.048	0.128	0.013	-	0.225	0.608
HEA	6.237	-	-	-	-	-	-	-	-	-	-
OES	7.538	0.024	9.496	3.202	2.246		2.186	0.326	5.064	5.465	15.273
PWH	1.240	-	1.106	-	0.157	0.111	0.296	0.026	-	-	-
SWD	27.364	-	-	5.288	-	2.304	5.915	-	-	-	-
IN	20.121	-	20.473	5.481	3.852	2.034	5.191	0.559	8.525	9.305	26.108
T&C	8.910	-	6.601	-	1.220	-	1.854	-	-	-	-
OTHEAR	1.724	-	1.523	0.400	0.277	0.157	0.407	0.043	-	-	-

Notes: (1) The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 2

NCR

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	-	-	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	-	-	-	-	-
OES	-	-	-	-	-	-	-	-	-
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	5.509	-	-	-	-	-	-
IN	-	-	-	-	-	-	-	-	-
T&C	-	-	-	-	-	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Region I

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	2.409	0.942	-	1.154	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	2.141	0.875	-	1.041	-
OES	0.535	-	-	1.990	-	-	-	-	-
PWH	-	-	-	-	0.636	-	-	-	-
SWD	-	-	2.243	-	-	-	-	-	-
IN	1.109	-	-	5.769	-	-	-	-	-
T&C	-	-	-	-	-	-	-	-	-
OTHEAR	-	-	-	-	0.782	0.311	-	-	-

Notes: (1)The abbreviations in row and column stand for sectoral labour and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 2 (continued)

Region II

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	0.710	-	-	-	-	-	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	-	-	-	-	-
OES	-	-	-	-	-	-	-	-	-
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	-	-	-	-	-
T&C	1.184	-	-	-	-	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Region III

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	-	-	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	-	-	-	-	-
OES	-	-	-	-	-	-	1.339	-	1.156
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	-	-	-	-	1.510
T&C	-	-	-	-	-	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Notes: (1)The abbreviations in row and column stand for sectoral labour and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 2 (continued)

Region IV

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	-	0.855	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	-	0.684	-	-	-
OES	-	-	1.532	-	-	-	-	-	-
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	-	0.875	-	-	-
T&C	-	-	0.764	-	-	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Region V

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	1.865	-	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	0.981	-	-	-	-
OES	-	-	-	-	2.840	-	-	-	1.126
PWH	-	-	-	-	-	-	-	-	-
SWD	1.665	7.925	-	-	8.021	-	-	-	-
IN	-	-	-	-	4.171	-	-	-	1.646
T&C	-	-	-	-	0.848	0.592	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Notes: (1)The abbreviations in row and column stand for sectoral labour and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 2 (continued)

Region VI

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	-	-	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	0.700	-	0.949	-	-	-
OES	-	-	-	-	-	-	-	1.512	1.089
PWH	-	-	-	-	0.433	-	-	-	-
SWD	-	-	3.191	-	-	-	-	-	-
IN	-	-	-	-	-	-	-	-	-
T&C	-	-	-	1.137	-	-	-	-	-
OTHEAR	-	-	-	-	0.410	-	-	-	-

Region VII

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	1.434	-	-	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	0.795	-	-	-	-
OES	-	-	0.531	1.930	-	-	-	-	-
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	1.361	-	-	-	-	-	-
IN	-	-	-	-	-	-	-	-	-
T&C	-	-	-	-	-	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Notes: (1)The abbreviations in row and column stand for sectoral labour and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 2 (continued)

Region VIII

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	0.610	-	0.764	-	-	-
EDU	-	0.268	-	-	-	-	-	-	-
HEA	-	-	-	-	2.571	0.569	-	-	-
OES	-	-	-	-	-	-	0.553	-	0.942
PWH	-	0.402	-	-	-	-	-	-	-
SWD	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	-	-	1.560	-	-
T&C	-	-	-	-	-	0.852	-	-	-
OTHEAR	-	0.759	-	-	-	-	-	-	-

Region IX

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	2.606	-	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	1.493	-	-	-	-
OES	-	-	-	-	-	-	0.651	1.693	
PWH	-	-	-	-	0.395	-	-	-	-
SWD	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	-	-	1.242	-	-
T&C	-	-	-	-	2.230	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Notes: (1)The abbreviations in row and column stand for sectoral labour and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 2 (continued)

Region X

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	1.236	-	-	-	1.318	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	0.688	-	-	-	0.763	-
OES	-	-	-	1.427	-	-	-	-	-
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	-	3.882	-	-	-	-	-
IN	-	-	-	2.645	-	-	-	-	-
T&C	-	-	-	0.851	-	-	-	1.046	-
OTHEAR	-	-	-	-	-	-	-	-	-

Region XI

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	-	-	0.640	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	-	-	-	-	-
OES	-	-	-	-	-	-	-	-	-
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	1.610	-	-	-	-	-	2.883
IN	-	-	0.903	-	-	-	-	-	1.443
T&C	-	-	-	-	-	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Notes: (1)The abbreviations in row and column stand for sectoral labour and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 2 (continued)

Region XII

	AGL	MIQ	MAN	CONST	EGWL	TCL	TRA	FIN	OTHL
AG	-	-	-	-	-	1.207	-	-	-
EDU	-	-	-	-	-	-	-	-	-
HEA	-	-	-	-	-	-	-	-	-
OES	-	-	-	1.869	3.867	-	-	-	-
PWH	-	-	-	-	-	-	-	-	-
SWD	-	-	-	-	-	-	-	-	-
IN	-	-	-	-	5.766	-	-	-	-
T&C	-	-	-	-	-	-	-	-	-
OTHEAR	-	-	-	-	-	-	-	-	-

Notes: (1)The abbreviations in row and column stand for sectoral labour and budget allocation by department, respectively.
(2) The figures show statistically significant regression coeeficient.

Table 3

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP
NCR	0.0	0.0	30.1	6.4	17.8	32.0	21.5	44.4	23.4	26.0	23.2
R I	6.8	5.2	2.2	14.6	3.1	4.3	5.0	3.6	5.6	4.8	4.8
R II	7.0	6.8	2.3	8.2	2.8	4.8	3.8	3.5	5.6	3.7	4.3
R III	9.7	0.2	7.8	4.5	9.8	8.2	7.4	5.8	7.0	8.1	8.0
R IV	19.0	7.3	12.2	5.5	16.8	8.7	11.7	8.6	8.1	10.7	11.9
R V	7.0	10.7	3.6	3.7	7.2	5.4	4.6	3.7	6.5	5.7	5.4
R VI	9.5	10.7	6.5	8.3	6.5	6.3	8.6	5.7	7.0	7.5	7.5
R VII	6.3	3.9	7.9	10.5	8.1	7.8	10.3	6.1	6.4	7.8	7.6
R VIII	6.2	12.4	4.6	8.9	5.6	3.8	4.1	3.6	6.3	4.7	5.1
R IX	6.8	7.2	4.0	3.9	5.3	4.5	4.3	3.5	5.6	4.2	4.8
R X	7.5	6.6	6.3	11.4	6.1	4.6	6.9	4.1	6.6	6.0	6.3
R XI	9.7	10.8	6.7	11.2	5.3	5.7	8.2	4.3	7.0	6.4	6.9
R XII	4.5	18.2	5.8	2.9	5.5	3.8	3.5	3.2	4.9	4.4	4.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: The abbreviations in row and column stand for sectoral GRDP and region, respectively.

Table 4

NCR

	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
EDU	0.00	0.00	1.11	5.93	6.14	12.60	7.10	12.85	0.00	45.7
HEA	0.00	0.00	1.05	0.00	0.00	11.98	6.68	0.00	0.00	19.7
OES	0.00	0.00	0.64	28.23	0.00	7.41	4.12	0.00	0.00	40.4
PWH	0.00	0.00	0.78	4.20	4.35	8.74	4.92	9.08	14.39	46.5
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	0.00	0.00	0.00	74.79	75.63	0.00	0.00	0.00	0.00	150.4
T&C	0.00	0.00	0.00	26.53	0.00	0.00	0.00	0.00	0.00	26.5
OTHEAR	0.00	0.00	0.00	12.08	0.00	0.00	0.00	0.00	0.00	12.1

Region I

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	0.00	0.00	33.21	0.14	0.00	0.00	0.00	0.00	0.00	0.00	33.3
EDU	0.00	0.00	0.11	2.83	0.02	0.29	1.13	0.11	1.52	1.47	1.71	9.2
HEA	0.00	0.00	0.00	32.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.1
OES	0.00	0.00	1.56	0.00	0.51	8.38	32.40	3.06	42.93	41.93	49.63	180.4
PWH	0.00	0.00	0.37	0.00	0.06	1.02	3.91	0.37	0.00	0.00	0.00	5.7
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	0.00	0.00	6.20	0.00	0.94	16.96	65.12	6.12	84.98	82.69	92.35	355.4
T&C	4.31	0.00	0.12	5.32	0.00	0.29	1.15	0.11	2.81	0.00	0.00	14.1
OTHEAR	0.00	0.00	0.43	0.00	0.07	1.17	0.00	0.42	0.00	5.64	0.00	7.7

Note: The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.

Table 4 (continued)

Region II

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	0.00	0.00	0.00	0.00	0.00	6.26	0.00	0.00	7.59	0.00	13.8
EDU	0.00	0.00	0.13	0.00	0.03	0.51	0.00	0.09	1.89	0.88	2.53	6.0
HEA	0.00	0.00	1.00	0.00	0.00	0.00	5.08	0.63	0.00	6.26	0.00	13.0
OES	0.00	0.00	1.34	0.00	0.65	5.55	12.22	0.96	33.48	9.88	46.75	110.8
PWH	0.00	0.00	0.36	0.00	0.00	1.37	1.84	0.23	0.00	0.00	0.00	3.8
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	0.00	0.00	6.39	0.00	1.68	25.19	33.22	4.24	85.55	42.97	121.86	321.1
T&C	0.00	0.00	0.00	0.00	0.00	8.62	11.50	0.00	30.31	14.40	38.25	103.1
OTHEAR	0.00	0.00	0.50	0.00	0.13	1.93	2.57	0.33	0.00	0.00	9.07	14.5

Region III

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	0.03	0.00	0.00	0.00	0.00	14.59	0.00	0.00	19.65	0.00	34.3
EDU	0.00	0.00	0.00	0.00	0.80	0.91	0.00	0.22	1.14	2.46	5.49	11.0
HEA	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OES	0.00	0.00	0.00	0.00	22.04	26.13	47.11	6.17	31.16	70.49	155.70	358.8
PWH	0.00	0.01	0.00	2.52	1.82	2.33	4.28	0.53	2.57	0.00	0.00	14.1
SWD	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3
IN	0.00	0.00	0.00	0.00	33.03	42.13	76.89	9.45	46.83	109.09	244.10	561.5
T&C	0.00	0.07	0.00	0.00	0.00	0.00	33.98	0.00	0.00	0.00	0.00	34.1
OTHEAR	0.00	0.01	0.00	3.21	2.42	3.05	0.00	0.69	0.00	0.00	0.00	9.4

Note: The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.

Table 4 (continued)

Region IV

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	0.00	0.00	0.00	0.00	0.00	34.22	0.00	0.00	35.08	0.00	69.3
EDU	0.00	0.00	0.00	0.95	1.73	0.62	3.02	0.55	1.14	3.47	8.89	20.4
HEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OES	0.00	0.00	0.00	32.95	59.97	14.94	68.86	18.76	38.32	120.79	310.54	665.1
PWH	0.00	0.00	0.00	1.83	3.34	1.23	5.97	1.04	2.09	6.73	0.00	22.2
SWD	0.00	8.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.5
IN	0.00	0.00	0.00	0.00	0.00	0.00	37.38	0.00	0.00	38.86	104.88	181.1
T&C	0.00	0.00	0.00	14.00	0.00	10.37	50.50	0.00	0.00	0.00	0.00	74.9
OTHEAR	0.00	0.00	0.00	3.12	5.86	2.14	0.00	1.82	3.72	0.00	0.00	16.7

Region V

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	43.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.9
EDU	3.54	0.00	0.10	0.64	0.94	0.48	0.00	0.08	2.03	2.18	3.75	13.7
HEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.5
OES	58.67	0.00	0.00	18.12	26.45	9.39	13.96	0.00	55.41	41.15	106.45	329.6
PWH	0.00	0.00	0.00	1.65	2.56	1.35	2.16	0.22	0.00	5.94	9.73	23.6
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	136.58	0.00	3.80	26.99	39.18	19.51	30.26	0.00	80.37	87.59	158.40	582.7
T&C	34.58	0.00	0.89	0.00	0.00	0.00	7.15	0.72	16.50	19.63	33.57	113.0
OTHEAR	12.43	0.00	0.32	0.00	0.00	0.00	2.60	0.00	0.00	0.00	0.00	15.3

Note: The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.

Table 4 (continued)

Region VI

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	4.57	17.29	0.00	2.22	0.00	29.29	2.72	9.43	23.45	50.17	139.1
EDU	0.00	0.45	1.70	0.92	0.24	0.47	2.81	2.74	0.00	2.39	5.02	16.7
HEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OES	0.00	0.00	49.79	26.56	7.01	13.68	83.06	8.13	36.92	70.38	150.27	445.8
PWH	0.00	1.51	0.00	3.00	0.69	1.59	9.74	0.94	0.00	0.00	13.87	31.3
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	0.00	29.78	114.04	58.56	15.31	31.28	191.83	18.27	80.01	157.72	337.06	1033.8
T&C	0.00	0.00	17.73	0.00	0.00	0.00	29.49	0.00	0.00	24.26	0.00	71.5
OTHEAR	0.00	1.55	0.00	0.00	0.00	1.62	0.00	0.95	0.00	0.00	16.48	20.6

Region VII

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	1.14	46.47	25.70	0.00	13.94	67.61	0.00	0.00	37.83	0.00	192.7
EDU	0.00	0.05	3.27	2.15	0.69	1.03	4.69	0.33	1.12	2.97	6.03	22.3
HEA	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.6
OES	0.00	0.00	90.89	55.93	18.43	28.02	130.22	8.94	29.55	78.96	159.47	600.4
PWH	0.00	0.15	0.00	0.00	0.00	1.99	0.00	0.00	0.00	0.00	0.00	2.1
SWD	0.00	5.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.1
IN	0.00	1.26	57.78	29.67	0.00	17.38	83.18	0.00	15.81	46.71	94.72	346.5
T&C	0.00	0.10	0.00	0.00	1.61	0.00	0.00	0.81	2.48	0.00	14.86	19.9
OTHEAR	0.00	0.10	5.11	0.00	0.00	1.56	0.00	0.00	0.00	4.28	0.00	11.1

Note: The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.

Table 4 (continued)

Region VIII

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	7.89	0.00	12.25	3.28	2.65	0.00	0.74	19.11	16.23	38.05	100.2
EDU	0.00	0.00	0.00	1.51	0.39	0.00	0.49	0.72	2.30	1.56	3.72	10.7
HEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OES	0.00	0.00	0.00	26.01	6.77	0.00	8.74	0.81	39.96	27.77	67.15	177.2
PWH	0.00	0.00	0.00	2.23	0.58	0.00	0.78	0.11	0.00	2.45	0.00	6.2
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	0.00	0.00	0.00	74.50	19.89	0.00	25.09	0.00	116.66	84.66	202.08	522.9
T&C	0.00	0.00	0.00	0.00	0.00	0.00	4.57	0.00	0.00	14.31	32.26	51.1
OTHEAR	0.00	0.00	0.00	3.67	0.96	0.64	1.28	0.19	0.00	0.00	9.20	15.9

Region IX

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	64.76	0.00	0.00	0.00	0.00	0.00	10.77	0.00	0.00	0.00	0.00	75.5
EDU	4.57	0.26	0.76	0.65	0.17	0.49	0.76	0.05	1.32	1.12	3.39	13.5
HEA	0.00	0.00	0.00	0.00	0.00	0.00	6.64	0.00	0.00	0.00	0.00	6.6
OES	67.07	0.00	11.99	18.01	0.00	7.54	12.05	1.02	38.29	17.60	94.25	267.8
PWH	12.48	0.69	0.00	0.00	0.43	1.35	0.00	0.00	0.00	0.00	0.00	14.9
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	245.27	14.63	41.12	35.21	8.99	26.27	40.98	2.87	76.56	60.67	189.58	742.1
T&C	40.64	0.00	6.88	4.83	1.47	4.67	7.06	0.00	12.73	9.91	27.87	116.1
OTHEAR	13.03	0.71	0.00	1.69	0.44	1.38	2.17	0.00	0.00	0.00	0.00	19.4

Note: The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.

Table 4 (continued)

Region X

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	0.00	0.00	0.00	0.00	0.00	28.68	0.00	0.00	0.00	0.00	28.7
EDU	0.00	0.15	0.00	1.61	0.34	0.23	2.18	0.06	1.25	1.50	4.39	11.7
HEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OES	0.00	4.34	0.00	51.73	9.72	5.51	50.82	1.71	37.51	43.91	126.98	332.2
PWH	0.00	0.00	0.00	3.50	0.63	0.43	0.00	0.11	2.57	2.91	0.00	10.2
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	0.00	0.00	0.00	85.98	15.73	11.12	102.53	2.79	62.36	71.25	206.57	558.3
T&C	0.00	0.00	0.00	0.00	0.00	0.00	25.05	0.00	0.00	16.21	43.59	84.8
OTHEAR	0.00	0.00	0.00	4.85	0.89	0.64	0.00	0.16	0.00	0.00	11.35	17.9

Region XI

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.87	0.00	0.00	0.00	1.5
EDU	0.00	0.00	1.92	1.40	0.07	0.34	2.44	0.08	0.00	1.47	3.96	11.7
HEA	0.00	0.00	16.31	0.00	0.55	0.00	21.34	0.00	0.00	0.00	0.00	38.2
OES	0.00	0.27	3.72	2.49	0.13	0.65	0.00	0.15	1.95	2.88	0.00	12.3
PWH	0.00	0.00	0.00	0.00	0.18	0.89	0.00	0.21	0.00	0.00	9.64	10.9
SWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
IN	0.00	6.52	85.85	56.99	3.01	15.09	109.25	3.53	50.69	65.72	177.37	574.0
T&C	0.00	0.00	0.00	5.10	0.27	1.32	0.00	0.31	4.13	0.00	15.85	27.0
OTHEAR	0.00	0.00	0.00	3.19	0.17	0.85	0.00	0.19	2.64	3.57	0.00	10.6

Note: The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.

Table 4 (continued)

Region XII

	AGF	MIQ	MAN	CONST	EGW	TC	TRA	FIN	PUB	OTH	N.GRDP	Total
AG	34.15	0.00	0.00	0.00	0.00	0.00	5.86	0.00	0.00	0.00	0.00	40.0
EDU	2.30	0.00	2.83	0.37	0.50	0.18	0.45	0.04	0.00	1.00	2.59	10.3
HEA	27.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.9
OES	33.72	0.44	55.36	9.26	12.35	0.00	7.67	1.05	24.77	24.20	65.05	233.9
PWH	5.55	0.00	6.45	0.00	0.86	0.42	1.04	0.08	0.00	0.00	0.00	14.4
SWD	122.42	0.00	0.00	15.29	0.00	8.80	20.76	0.00	0.00	0.00	0.00	167.3
IN	90.01	0.00	119.35	15.85	21.18	7.77	18.22	1.81	41.70	41.21	111.20	468.3
T&C	39.86	0.00	38.48	0.00	6.71	0.00	6.51	0.00	0.00	0.00	0.00	91.6
OTHEAR	7.71	0.00	8.88	1.16	1.52	0.60	1.43	0.14	0.00	0.00	0.00	21.4

Note: The abbreviations in row and column stand for sectoral GRDP and budget allocation by department, respectively.

Department	Grand Total
AG	772.4
EDU	203.0
HEA	138.7
OES	3754.8
PWH	205.9
SWD	181.1
IN	6398.2
T&C	827.6
OTHEAR	192.7

Table 5

(unit: %)

Department	NCR	R I	R II	R III	R IV	R V	R VI	R VII	R VIII	R IX	R X	R XI	R XII	Total
AG	0.0	4.3	1.8	4.4	9.0	5.7	18.0	24.9	13.0	9.8	3.7	0.2	5.2	100.0
EDU	22.5	4.5	3.0	5.4	10.0	6.8	8.2	11.0	5.3	6.7	5.8	5.8	5.1	100.0
HEA	14.2	23.1	9.4	0.0	0.0	0.4	0.0	0.4	0.0	4.8	0.0	27.5	20.1	100.0
OES	1.1	4.8	3.0	9.6	17.7	8.8	11.9	16.0	4.7	7.1	8.8	0.3	6.2	100.0
PWH	22.6	2.8	1.8	6.8	10.8	11.5	15.2	1.0	3.0	7.3	4.9	5.3	7.0	100.0
SWD	0.0	0.0	0.0	0.2	4.7	0.0	0.0	2.8	0.0	0.0	0.0	0.0	92.4	100.0
IN	2.4	5.6	5.0	8.8	2.8	9.1	16.2	5.4	8.2	11.6	8.7	9.0	7.3	100.0
T&C	3.2	1.7	12.5	4.1	9.0	13.7	8.6	2.4	6.2	14.0	10.3	3.3	11.1	100.0
OTHEAR	6.3	4.0	7.5	4.9	8.6	8.0	10.7	5.7	8.3	10.1	9.3	5.5	11.1	100.0

Table 6

(unit: %)

Department	NCR	R I	R II	R III	R IV	R V	R VI	R VII	R VIII	R IX	R X	R XI	R XII	Total
AG	0.0	25.2	4.2	0.0	9.2	13.9	0.0	9.9	5.4	12.3	10.3	3.7	5.9	100.0
EDU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
HEA	0.0	25.6	0.0	0.0	8.3	8.3	10.7	3.1	29.4	8.0	6.6	0.0	0.0	100.0
OES	0.0	9.8	0.0	11.8	8.5	17.3	7.5	9.0	4.0	3.8	4.1	0.0	24.1	100.0
PWH	0.0	30.9	0.0	0.0	0.0	0.0	17.4	0.0	39.6	12.1	0.0	0.0	0.0	100.0
SWD	17.3	1.4	0.0	0.0	0.0	63.9	3.6	1.6	0.0	0.0	6.0	6.2	0.0	100.0
IN	0.0	23.3	0.0	6.3	4.7	21.7	0.0	0.0	3.3	1.9	6.4	5.0	27.4	100.0
T&C	0.0	0.0	13.9	0.0	14.3	18.8	10.8	0.0	6.6	20.7	14.9	0.0	0.0	100.0
OTHEAR	0.0	33.9	0.0	0.0	0.0	0.0	11.9	0.0	54.2	0.0	0.0	0.0	0.0	100.0

Table 7

(unit: %)

Department	NCR	R I	R II	R III	R IV	R V	R VI	R VII	R VIII	R IX	R X	R XI	R XII	Total
AG	0.0	14.7	3.0	2.2	9.1	9.8	9.0	17.4	9.2	11.0	7.0	2.0	5.5	100.0
EDU	11.3	2.3	1.5	2.7	5.0	3.4	4.1	5.5	52.6	3.3	2.9	2.9	2.5	100.0
HEA	7.1	24.3	4.7	0.0	4.2	4.3	5.3	1.8	14.7	6.4	3.3	13.8	10.1	100.0
OES	0.5	7.3	1.5	10.7	13.1	13.0	9.7	12.5	4.4	5.5	6.5	0.2	15.2	100.0
PWH	11.3	16.8	0.9	3.4	5.4	5.7	16.3	0.5	21.3	9.7	2.5	2.6	3.5	100.0
SWD	8.7	0.7	0.0	0.1	2.3	32.0	1.8	2.2	0.0	0.0	3.0	3.1	46.2	100.0
IN	1.2	14.4	2.5	7.5	3.8	15.4	8.1	2.7	5.7	6.7	7.6	7.0	17.4	100.0
T&C	1.6	0.9	13.2	2.1	11.7	16.3	9.7	1.2	6.4	17.4	12.6	1.6	5.5	100.0
OTHEAR	3.1	19.0	3.8	2.4	4.3	4.0	11.3	2.9	31.2	5.0	4.6	2.8	5.6	100.0

Table 8

(unit: billion pesos)

Department	NCR	R I	R II	R III	R IV	R V	R VI	R VII	R VIII	R IX	R X	R XI	R XII	Total
AG	0.0	144.5	29.5	21.8	88.9	96.2	88.3	171.1	90.2	108.1	68.7	19.3	54.3	980.8
EDU	19.3	3.9	2.6	4.7	8.6	5.8	7.1	9.4	90.4	5.7	5.0	4.9	4.3	171.7
HEA	145.9	499.8	96.1	0.2	85.2	89.3	109.8	36.8	302.3	130.8	67.7	282.8	206.6	2053.5
OES	3.7	49.6	10.0	72.5	89.1	88.5	65.7	84.9	29.7	37.0	43.8	1.1	103.1	678.5
EGW	362.2	540.7	29.6	109.6	173.3	184.0	523.0	16.7	684.0	310.7	79.2	85.1	112.3	3210.3
SSW	22.7	1.8	0.0	0.2	6.1	83.9	4.7	5.8	0.0	0.0	7.9	8.1	121.3	262.6
IN	45.4	557.1	96.9	290.3	145.7	594.7	312.1	104.6	221.8	260.7	292.6	269.9	671.4	3863.1
T&C	12.8	6.8	105.4	16.5	93.4	130.0	77.7	9.6	51.1	138.9	100.5	13.0	44.2	799.9
OTHERS	2.0	12.1	2.4	1.5	2.8	2.5	7.2	1.8	19.9	3.2	3.0	1.8	3.5	63.7
Total	614.1	1816.2	372.6	517.3	693.0	1275.0	1195.6	440.6	1489.4	995.1	668.2	686.0	1321.0	12084.1

ANNEX II :
TOPOGRAPHY

THE FEASIBILITY STUDY OF
THE FLOOD CONTROL PROJECT FOR THE LOWER CAGAYAN RIVER IN
THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

Volume III-1 SUPPORTING REPORT

ANNEX II TOPOGRAPHY

Table of Contents

List of Tables

List of Figures

CHAPTER 1 OUTLINE OF SURVEYING WORK

The following three kinds of survey work consisted of three types was carried out:

	Work Item	Work Period
1	River Profile and Cross Section Survey	From March 31 to June 20, 2000
2	Aerial Photography	From March 31 to June 20, 2000
3	Topographic Mapping	From August 16 to November 30, 2000

CHAPTER 2 DETAIL OF WORK

2.1 River Profile and Cross Section Survey

The Study Team used a local survey contractor, ACRE Surveying & Development to survey longitudinal profiles and cross-sections in accordance with the following specification.

Area

The total length of river surveyed along the Cagayan river, the Chico river and the Tuguegarao river were approximately 160 km, 12.5 km and 12.5 km, respectively.

Leveling

Leveling to establish benchmarks for longitudinal profiling and cross section survey was 3rd order leveling with the following accuracy.

Accuracy	10mm $\sqrt{S}$ (S = distance in Km)

A list of benchmarks and their locations is shown in Table 1.1 and Figure 1.1, respectively.

Longitudinal Profiling

Prior to longitudinal profiling, route surveying was carried out along the rivers. Positioning of cross sections at 500 m intervals along the rivers was done by GPS survey and traversing. Wooden stakes (and/or equivalent) were placed at each point to identify control points for longitudinal profiling. Elevations of all stakes were surveyed by the use of levels.

The requirements of this survey are:

Accuracy	3 cm $\sqrt{S}$ (S = distance in Km)
Drawing scale	H = 1/250,000 V = 1/200
Site to be surveyed	Total distance 185 Km with approximately 500m interval

Cross-Sectioning

Cross section survey was carried out along the survey lines using controlled points fixed during the longitudinal profiling by measuring levels along the line.

The requirements of these survey standards are:

River name	Cagayan River	Chico River	Tuguegarao River
Width of section (Average)	1,500 m (approx.)	600 m (approx.)	500 m (approx.)
Map scale	H = 1/2,000 V = 1/200		
Total number of sections	More than 370 sections		

2.1.1 Survey Results

The actual amount of survey works on the longitudinal profiling and cross section surveys are summarized as follows:

River name	Cagayan River	Chico River	Tuguegarao River
Longitudinal Profiling	160 km	12.5 km	12.5 km
Cross Sectioning	368 sections	28 sections	25 sections

The final outputs of each survey work are:

Products	Longitudinal Profiling	Cross Sectioning
Master of Longitudinal profiles and cross sections	1 set	1 set
Blue prints	5 sets	5 sets
Field notes and calculation sheets including CD-ROM, MO or etc)	1 set	1 set

The locations where the cross sections were measured are shown in Figure 1.2.1. Details of each cross section, coordinates and elevations, are in Table 1.2.1.

2.1.2 Survey on Boring Sites

Each bore-hole was positioned by GPS survey and leveling. Boring sites positions were as follows:

Boring Point No.	X	Y	H	Remarks
BH-MB1	2,004,294.75	570,733.13	7.22	Magapit Bridge
BH-MB2	2,003,885.91	571,071.54	10.42	Magapit Bridge
BH-NRB1	1,987,758.62	564,768.73	11.45	Barrio Nasiping
BH-NLB1	1,986,632.12	565,777.74	9.73	Barrio Nasiping
BH-NLB2	1,987,068.97	568,389.75	12.86	Barrio Nasiping
BH-NLB3	1,986,016.06	567,988.00	18.95	Barrio Nasiping
BH-NLB4	1,983,151.85	567,422.06	15.27	Barrio Nasiping
BH-TB1	1,947,617.43	577,851.47	15.92	Tuguegarao
BH-TB2	1,946,600.81	575,571,48	15.76	Tuguegarao
BH-TB3	1,949,320.29	573,823.01	17.99	Buntun Bridge

2.2 Aerial Photography

2.2.1 Scope of Work

The Study Team used a local survey contractor, CERTEZA SURVEYING & AEROPHOTO SYSTEMS, INC to take B&W aerial photography at the scale of 1:10,000 and 1:5,000 in accordance with the specifications.

Area

Aerial photographs with 1:10,000 covered the entire area from Aparri as the north end to Cauayan of Cagayan valley as the south end. Aerial photographs of 1:5,000 covered the entire area from Magapit as the north end to Tuguegarao as the south.

Programmed work volume and specifications

Scale	1:5,000	1:10,000
Flight Height above Ground Elevation	approx- 750m	approx- 1,500 km
Flight Length	approx- 1,150 km	approx- 2,030 km
Number of Flight Lines	81 lines	65 lines
Number of Photographs	approx- 2,570 pcs.	approx- 2,280 pcs.
Photographed Area	approx- 1,000 Km^2	approx- 3,000 Km^2
Overlap	60 %	60 %
Sidelap	30 %	30 %

2.2.2 Work Execution

Tuguegarao Airport was used as the airbase and the following equipment which met the requirements was used.

Equipment		Quantity
Aircraft	CESSNA 404 Titan with GPS KNAV	1 unit
	AEROCOMANDER 500U with FMS	1 unit
Aerial Camera	WILD RC-30 with FMC	1 unit
	WILD RC-10	1 unit

For photo processing, the following equipment was used. These fully satisfied the requirements.

Equipment	Quantity
ZEISS FE-130 REWIND PROCESS EQPT.	2 units
KG-30 CONTACT PRINTER	2 units
ILFOLAB MG2650 PROCESSOR	1 unit
BESSELER FILM DRYER	1 unit

2.2.3 Output

The output of aerial photography was as follows :

Items		Set Num.	Quantity	
			1:5,000	1:10,000
Aerial Photography Negative Film		1 set	13 Rolls	11 Rolls
Photo-Processing	a) Contact Prints	3 sets	7,737 pcs	7,728 pcs
	b) Dia-positives	1 set	2,579 pcs	2,576 pcs
	c) 2 Times enlargement	1 set	1,286 pcs	1,136 pcs
	d) Photo Index Map	1 set	1 pc	1 pc
Daily Report and Flight Report		1 set	1 pc	1 pc
Quality Control Sheet		1 set	1 pc	1 pc
Camera Calibration Certificate		1 set	1 pc	1 pc

The Subcontractor keeps the negative films, dia-positives and contact prints.

The flight line and number of photographs taken are presented in Figure 2.3.1 and Table 2.3.1.

2.3 Topographic Mapping

2.3.1 Scope of work

The Study Team used the local survey contractor, CERTEZA SURVEYING & AEROPHOTO SYSTEMS, INC to make Topographic Maps at a scale of 1:1,000, 1:5,000 and 1:10,000 in accordance with the following specifications.

No.	Work Items		Quantity	Unit
1	Ground control survey (by GPS)		204	stations
2	Leveling	Third order	150	km
		Minor order	431	km
3	Aerial triangulation		1810	models
4	Digital Mapping	(1/ 1,000)	35	km^2
		(1/ 5,000)	300	km^2
		(1/10,000)	700	km^2
5	Field Completion		35	km^2
6	Compilation of 1:10,000		300	km^2

The topographic map of 1:10,000 scale covers the area from Aparri to Cabagan of the Cagayan valley. The topographic map of 1:5,000 scale covers the area from Magapit to northern part of Tuguegarao. The topographic maps of 1:1,000 cover Tuguegarao, Nasipping and Magapit areas.

Mapping area at each scale is as follows.

Map scale	Mapping area (approx.)
1:10,000	1,000 km^2
1:5,000	300 km^2
1:1,000	35 km^2

Requirements of this work are tabulated below:

1	Geodetic reference ellipsoid		Clarke 1866		
2	Map projection		PTM		
3	Datum of height		Mean Sea level		
4	Sheet size		80cm×60cm		
5	Map scale		1:1,000	1:5,000	1:10,000
6	Contour interval	Index contour	5 m	5 m	10 m
		Intermediate contour	1 m	1 m	2 m
		Supplementary contour	0.5 m	0.5 m	1 m
7	Required Accuracy (Standard deviation)	Planimetry	0.5 mm on the map		
		Spot elevation	0.1 m	0.1 m	0.5 m
		Contour line	0.3 m	0.3 m	1.0 m
8	Map style and Symbol		Provided by JICA Study Team		
9	Interval of Grid Ticks		0.1 km	1 km	1 km

2.3.2 Work Specification

(1) Ground Control Survey by GPS

a) Ground control point survey shall provide the coordinates of each control points.

b) Control points were conspicuous field objects, which are identifiable on the photograph such as a corner of buildings, an edge of fences or roads, etc.

c) Measurement of control points was made with the use of existing control points.

d) The coordinates of the control points were computed based on the PTM coordinate system.

e) The Global Positioning System (GPS) was used in this survey.

f) GPS observation sessions were pre-planned such that signals from more than four (4) satellites could be received simultaneously according to the following criteria.

- Observation was carried out simultaneously at more than three (3) points.
- Only satellites with a vertical angle of more than 15° to 30° were observed.
- Observation times were more than 2 hours for 4 satellites or 1.5 hours for more than 5 satellites.
- There had to be at least one redundant observation between sessions.
- Basically, the height of control points was obtained by using direct leveling of third or minor order.
- Distribution map and index maps of control points were prepared.

g) Observed points were carefully selected on the enlarged photographs and details such as location, coordinates and other information were provided in the Description of Pricking Point.

(2) Leveling

1) Third Order Leveling

a) The elevation of benchmarks which were used for the succeeding surveying work was measured in the third order leveling.

b) Observation:
Leveling commenced from an existing benchmark (known point).
Other requirements are summarized in the table of Observation Standard.

c) Each measurement point established by leveling in the mapping area was identified carefully on aerial photos enlarged at 200% in the field.

2) Minor Order Leveling and Pricking

a) Minor order leveling was carried out to obtain the necessary elevation for aerial triangulation and stereo plotting.

b) Final proposed leveling route was transferred to the aerial photographs.

c) Preparation:
Using enlarged aerial photographs enlarged to 200%, all important points for leveling such as road junctions, bridges, other conspicuous field objects, etc. (other than 1:10,000 photographs) along the leveling route were marked by referring to route maps on the aerial photographs prior to commencement of work.

d) Observation:
Leveling commenced from existing B.M. (known points) or new Benchmarks measured by third order leveling, Leveling shall start.
Other technical specifications are summarized in the table of Observation Standard.

e) Each measured points (other than 1:10,000) by leveling was identified and marked carefully by pin-prick on the enlarged aerial photos in the field.

3) Observation standard

Item	Third Order	Minor Order
Observation	Double running	Single running In case there are no existing known points near the leveling route, double running was made.
Given Point (Take-off or reference point)	Existing BM	Existing BM Third Order Leveling Point
Maximum distance between level and staff	60m	100m
Distance between back-sight and foresight	Balanced between back-sight and foresight	
Minimum unit of measuring	1mm	1mm
Range of staff reading	The bottom 10cm and top 10cm of the staves was avoided.	
Allowable double running error	$10mm\sqrt{S}$. (S= length in km)	$60mm\sqrt{S}$. (S= length in km)
Allowable closing error	$10mm\sqrt{S}$. (S= length in km)	$60mm\sqrt{S}$. (S= length in km)

- Temporary benchmarks were marked on existing permanent structures or firm and stable natural structures at approximately 1 km intervals along the leveling route.
- In case the double running error or closing error exceeded the tolerance, re-observations were carried out.
- Field notes were submitted to the Study Team.

4) Check and adjustment of instruments

Check and adjustment of instruments were checked and adjusted three times: before commencement of work, in the middle and at the end of work.

(3) Field Identification

Field identifications were carried out. However, when the Photo-identification could be conducted sufficiently, this (Field Verification) may have been omitted. The items to be classified are as follows.

a) Actual Land Cover Criteria

Forest, Reforestation, Grassland, Agricultural land, Plantation, Inhabited area, Industrial area, Infrastructure, River, Abandoned area

b) Detail of Agricultural land

- Existing agricultural land
- Irrigated agricultural land
- Non-irrigated agricultural land
- Classification of Crops

(4) Aerial Triangulation

On the basis of the results of ground control survey and leveling, the necessary photograph coordinates of pass points and tie points for the stereo plotting were determined.

a) The aerial triangulation was done using high precision analytical plotter or Digital Photogrammetric Workstation (DPW).
b) The adjustment of computation used the Independent Model Method or Bundle Method.
c) The standard deviation of control points and discrepancies of pass points and tie points between adjacent model after adjustment was within 0.08 % of the flying height for both planimetry and height.

(5) Digital Mapping

1) Stereo Plotting

a) On the basis of the result of aerial triangulation and other field survey, the features to be shown on the topographic map were plotted by high-precision stereo plotter.
b) Three scale types of map were prepared.
c) Spot heights were measured on the following points.
   - major top of mountains
   - major fork of roads
   - mouth of a valley, junction of river
   - major changes of slopes
   - center of the plains
   - lowest part of depression
d) Transparent polyester-base materials were used for plotting in principle.
e) All plotted sheets were matched to adjacent sheets.

(6) Editing and Drawing

a) Plotted manuscripts or computer out-put was edited on the basis of the results of field identification and/or other collected data.
b) Reproducible original sheets were produced with an ink-jet plotter.
c) Elevation of leveling points was drawn to two decimal places and other spot heights were drawn to one decimal place.
d) Neat lines, control points and 1 km (and/or 0.1 km) grid ticks were plotted.

(7) Compilation of 1:10,000 Topographic Map

The production of the 1:10,000 scale map, which duplicated with the 1:5,000 mapping area, was conducted with the method of map compilation as the 1:5,000 scale maps.

(8) Field Completion Survey (for 1:1,000)

a) Obscured areas, not identifiable due to shadow caused by building, tree, etc., were surveyed in the field by Terrestrial Topographic Survey method. Necessary information for the annotation of topographic mapping such as administrative names, geographical names etc. was confirmed in the field.

b) The results of the Field Completion Survey were reflected in the topographic maps properly.

2.3.3 Final Results

The subcontractor submitted the following results to the JICA Study Team.

(1) Ground control survey

Items	Quantity	
	Proposed	Executed
Description of Pricking Point	1 set (204 stations)	1 set (204 stations)
Observation and computation results	1 set	1 set
GPS Field notes	1 set	1 set

The GPS observation networks and list of coordinates of GPS control station is shown on Figure 3.3.1 and Table 3.3.1, respectably.

(2) Leveling

Items	Quantity	
	Proposed	Executed
Field note	1 set	1 set
Two-times enlarged photos with pricked data	1 set	1 set
Information of Temporary Benchmark	1 set	1 set
Index map	1 set	1 set

The field notes and 200% enlarged photos were kept under the custody of Subcontractor in the Philippines.

(3) Aerial triangulation

Items	Quantity	
	Proposed	Executed
Computation result	1 set	1 set

The results of Aerial Triangulation are shown on Table 3.3.2.

(4) Digital Mapping

Item	Quantity					
	1/1,000 (1,000km^2)		1/5,000 (300km^2)		1/10,000 (35km^2)	
	Proposed	Executed	Proposed	Executed	Proposed	Executed
Original sheet	1 set	118 sheets	1 set	74 sheets	1 set	64 sheets
Blue Print	1 set	1 set	1 set	1 set	1 set	1 set
CD-ROM	1 set	1 set	1 set	1 set	1 set	1 set

The Map index sheets are shown on Figure 3.3.2.

(5) Field Completion Survey

Items	Quantity	
	Proposed	Executed
Field surveying result (1/1,000)	1 set	1 set

The Field surveying result was kept under the custody of Subcontractor in the Philippines.

Tables

Table 1.1 List of Used Benchmarks

No.	Existing BM	New BM	Height
1	BM SB 102		27.511
2	BM CY_9		28.753
3	BM CY_60		10.978
4	BM CY_76		5.011
5	BM CY_38		17.940
6	BM CY_57		10.942
7	BM LT_21		24.021
8		NAMRIA CGY-12	31.303
9		GPS-CYN-0	2.243
10		GPS-CYN-1	2.007
11		GPS-CYN-2	2.296
12		GPS-CYN-3	4.756
13		GPS-CYN-4	7.611
14		GPS-CYN-5	9.926
15		GPS-CYN-6	16.638
16		GPS-CYN-7	8.850
17		GPS-CYN-8	4.665
18		GPS-CYN-9	19.664
19		GPS-CYN-10	15.827
20		GPS-CYN-11	10.459
21		GPS-CYN-12	15.837
22		GPS-CYN-13	16.864
23		GPS-CYN-14	35.251
24		GPS-CYN-15	19.961
25		GPS-CYN-16	23.731
26		GPS-CYN-17	15.843
27		GPS-CYN-18	22.468
28		GPS-CYN-19	16.614
29		GPS-V	12.904

Table 1.2.1 Coordinates and Elevation of Each Cross Sections (1/7)

Section Data Cagayan River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 0+000.00					
CGL 0+000.00	2,030,453.76	565,264.16	-1,264.97	1.53	XL 0+000
CGR 0+000.00	2,031,092.46	566,356.05	0.00	2.24	
CG 0+000.00-B					
CGL 0+000.00	2,031,220.31	564,711.83	-1,649.18	1.86	Top
CGR 0+000.00	2,031,092.46	566,356.05	0.00	2.24	
CG 0+000.00-A					
CGL 0+000.00	2,031,708.72	564,486.29	-1,968.08	1.26	Sub-Sta.
CGR 0+000.00	2,031,092.46	566,356.05	0.00	2.24	
CG 0+500.00	-0.03	-0.08			
CGR 0+500.00	2,030,628.08	566,543.59	0.00	2.37	
CG 1+000.00	-0.04	-0.06			
CGL 1+000.00	2,029,548.46	565,763.34	-1,360.31	1.37	Top Bank XL 1+000
CGR 1+000.00	2,030,292.32	566,902.25	0.00	1.72	
CG 1+500.00	-0.04	-0.07			
CGL 1+500.00	2,029,104.76	565,910.07	-1,537.97	1.53	Top Bank XL 1+500
CGR 1+500.00	2,029,903.77	567,224.20	0.00	1.69	
CG 2+500.00	-0.12	-0.20			
CGL 2+500.00	2,028,097.82	566,193.86	-2,067.24	1.40	Ground
CGR 2+500.00	2,029,151.69	567,995.51	0.00	1.76	Edge Road
CG 2+000.00	-0.04	-0.07			
CGL 2+000.00	2,028,596.64	566,078.38	-1,660.59	0.50	XL 2+000
CGR 2+000.00	2,029,489.96	567,490.78	0.00	0.81	
CG 3+000.00	-0.10	-0.18			
CGL 3+000.00	2,027,722.81	566,540.76	-1,977.57	-0.57	Edge Waterway
CGR 3+000.00	2,028,721.30	568,247.74	0.00	1.84	
CG 3+500.00	-0.14	-0.24			
CGL 3+500.00	2,027,290.77	566,745.48	-2,007.55	1.02	XL 3+500
CGR 3+500.00	2,028,300.08	568,480.86	0.00	1.92	
CG 4+000.00	-0.11	-0.22			
CGL 4+000.00	2,026,951.75	566,969.96	-1,922.12	1.47	Top Bank Hub/Nail
CGR 4+000.00	2,027,828.10	568,680.68	0.00	1.98	
CG 4+500.00	-0.04	-0.16			
CGL 4+500.00	2,026,910.05	567,040.78	-1,823.11	1.63	Top XL 4+500
CGR 4+500.00	2,027,349.62	568,810.11	0.00	2.57	
CG 5+000.00	-0.08	-0.23			
CGL 5+000.00	2,026,275.30	567,331.75	-1,701.07	1.97	Top Bank
CGR 5+000.00	2,026,835.34	568,937.98	0.00	2.47	Edge Road
CG 5+500.00	-0.05	-0.15			
CGL 5+500.00	2,025,942.48	567,761.95	-1,356.52	1.99	
CGR 5+500.00	2,026,350.88	569,055.53	0.00	2.42	Edge Road
CG 6+000.00	-0.12	-0.20			
CGL 6+000.00	2,025,280.74	568,234.46	-1,098.04	1.86	Top Bank
CGR 6+000.00	2,025,835.20	569,182.23	0.00	2.15	Edge Road
CG 6+500.00	-0.10	-0.18			
CGL 6+500.00	2,024,657.45	568,054.37	-1,435.22	1.16	Top Bank
CGR 6+500.00	2,025,382.10	569,293.22	0.00	2.38	Edge Road
CG 7+000.00	-0.10	-0.17			
CGL 7+000.00	2,024,443.40	568,755.98	-777.24	0.91	Top Bank
CGR 7+000.00	2,024,834.47	569,427.67	0.00	2.86	Edge Road
CG 7+500.00	-0.28	-0.49			
CGL 7+500.00	2,024,077.85	569,031.45	-714.44	0.84	Top Bank

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGR 7+500.00	2,024,432.10	569,851.87	0.00	2.66	Edge Road
CG 8+000.00	-0.16	-0.27			
CGL 8+000.00	2,023,220.37	568,576.11	-1,538.14	1.64	Ground
CGR 8+000.00	2,023,988.61	569,910.66	0.00	2.64	Edge Road
CG 8+500.00	-0.12	-0.21			
CGL 8+500.00	2,022,752.02	568,885.50	-1,508.77	2.33	Sub- Top Bank
CG-8+500.00	2,023,427.21	570,056.79	-156.81	2.88	
CGR 8+500.00	2,023,505.52	570,192.64	0.00	2.71	
CG 9+000.00	-0.15	-0.30			
CGL 9+000.00	2,022,469.78	568,969.97	-1,582.91	2.14	Sub-2 XL Top Bank
CG 9+000.00	2,023,102.84	570,295.40	-114.05	2.72	
CGR 9+000.00	2,023,151.99	570,398.32	0.00	2.70	
CG 9+500.00	-0.13	-0.21			
CGL 9+500.00	2,021,798.23	569,316.48	-1,618.74	2.65	Sub-2 XL Top Bank
CG 9+500.00	2,022,656.07	570,639.16	-42.24	3.14	
CGR 9+500.00	2,022,679.05	570,674.60	0.00	3.66	
CG 10+000.0	-0.12	-0.20			
CGL 10+000.0	2,021,459.28	569,521.98	-1,610.79	2.15	Sub-2 XL Top Bank
CG 10+000.00	2,022,272.58	570,912.37	0.00	4.40	
CG 10+500.0	-0.13	-0.33			
CGL 10+500.0	2,021,225.64	569,637.19	-1,622.65	1.84	Sub-5 XL Top Bank
CG 10+500.00	2,021,758.03	570,979.94	-178.21	1.86	
CGR 10+500.0	2,021,823.72	571,145.60	0.00	4.13	Edge Road
CG 11+000.0	-0.14	-0.24			
CGL 11+000.0	2,020,805.34	570,003.48	-1,528.53	2.63	Sub-2 XL Top Bank
CG 11+000.00	2,021,263.43	571,128.54	-225.13	4.58	
CGR 11+000.0	2,021,377.10	571,322.87	0.00	4.46	
CG 11+500.0	-0.08	-0.14			
CGL 11+500.0	2,020,142.66	570,188.58	-1,733.22	2.28	XL 11+500
CG 11+500.00	2,020,921.51	571,520.10	-190.64	5.40	
CGR 11+500.0	2,021,017.77	571,684.65	0.00	5.07	
CG 12+000.00					
CGL 12+000.0	2,020,298.60	570,101.73	-1,854.44	3.20	
CGR 12+000.0	2,020,486.20	571,946.66	0.00	2.46	
CG 12+500.00					
CGL 12+500.0	2,019,777.11	570,313.73	-1,699.17	1.91	XL 12+500
CGR 12+500.0	2,019,949.00	572,004.19	0.00	2.60	
CG 13+000.00	-0.06	-0.59			
CGL 13+000.00	2,019,170.79	570,478.82	-1,438.92	2.27	XL 13+000
CGR 13+000.00	2,019,307.34	571,911.25	0.00	2.90	
CG 13+500.00	-0.05	-0.52			
CGL 13+500.00	2,018,686.30	570,507.81	-1,173.04	3.08	Top Bank
CGR 13+500.00	2,018,804.98	571,674.83	0.00	2.65	
CG 14+000.00	0.07	-0.30			
CGL 14+000.00	2,018,483.94	570,472.34	-1,093.34	4.54	Sub-
CGR 14+000.00	2,018,245.89	571,539.45	0.00	1.98	
CG 14+500.00	0.11	-0.31			
CGL 14+500.00	2,018,079.51	570,451.50	-954.51	4.85	Top Bank Left Sub-5
CGR 14+500.00	2,017,774.05	571,355.81	0.00	3.39	
CG 15+000.00	0.09	-0.29			
CGL 15+000.00	2,017,704.84	570,391.83	-885.08	4.51	Top Ground Sub-6 Left Bank
CGR 15+000.00	2,017,437.23	571,235.48	0.00	2.79	

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 15+500.00	0.10	-0.30			
CGL 15+500.00	2,017,226.19	570,275.04	-827.78	4.17	Ground=Sub-4(Lt)
CGR 15+500.00	2,016,953.77	571,056.72	0.00	0.97	
CG 16+000.00	0.08	-0.23			
CGL 16+000.00	2,016,824.66	570,185.24	-824.10	3.01	L-2
CGR 16+000.00	2,016,551.30	570,962.68	0.00	3.08	
CG 16+500.00	0.07	-0.19			
CGL 16+500.00	2,016,217.92	570,002.06	-785.74	3.03	L-2
CGR 16+500.00	2,015,957.29	570,743.32	0.00	3.60	
CG 17+000.00	0.11	-0.31			
CGL 17+000.00	2,015,786.66	569,535.95	-934.35	6.18	Top XL 17+000
CGR 17+000.00	2,015,476.78	570,417.42	0.00	1.01	
CG 17+500.00	0.05	-0.15			
CGL 17+500.00	2,015,325.44	569,474.55	-817.17	2.69	Ground
CGR 17+500.00	2,015,043.22	570,241.45	0.00	3.05	
CG 18+000.00	0.11	-0.30			
CGL 18+000.00	2,014,903.47	569,151.54	-870.76	4.30	Top Bank
CGR 18+000.00	2,014,614.64	569,973.00	0.00	3.47	
CG 18+500.00	0.09	-0.27			
CGL 18+500.00	2,014,433.33	568,776.99	-1,034.99	3.96	Sub-2 (Left)
CGR 18+500.00	2,014,090.18	569,753.43	0.00	3.57	
CG 19+000.00	0.11	-0.30			
CGL 19+000.00	2,014,033.79	568,633.98	-996.70	3.74	Hub on Left Bank
CGR 19+000.00	2,013,703.18	569,574.25	0.00	2.48	
CG 19+500.00	0.10	-0.27			
CGL 19+500.00	2,013,552.95	568,543.89	-956.95	4.03	Sub-1A
CGR 19+500.00	2,013,235.52	569,446.86	0.00	3.37	
CG 20+000.00	0.00	-0.24			
CGL 20+000.00	2,012,830.18	568,424.56	-756.42	3.56	Sub-1 XL Top Bank
CGR 20+000.00	2,012,838.47	569,180.94	0.00	3.91	
CG 20+500.00	0.00	-0.57			
CGL 20+500.00	2,012,234.89	568,317.75	-980.70	5.18	Top Bank
CGR 20+500.00	2,012,242.47	569,298.42	0.00	4.09	
CG 21+000.00	0.00	-0.20			
CGL 21+000.00	2,011,741.56	568,220.03	-1,152.65	5.78	Sub-1/Left Bank
CGR 21+000.00	2,011,744.34	569,372.68	0.00	4.66	
CG 21+500.00	0.00	-0.20			
CGL 21+500.00	2,011,123.24	568,383.95	-943.00	2.24	Sub-1
CGR 21+500.00	2,011,132.03	569,326.91	0.00	4.43	
CG 22+000.00	0.04	-5.13			
CGL 22+000.00	2,010,705.82	568,455.04	-683.58	3.25	Sub-1
CG 22+000.00	2,010,700.23	569,138.59	0.00	4.58	
CG 22+500.00	0.00	-0.28			
CGL 22+500.00	2,010,232.63	568,367.13	-826.22	4.75	Top Bank
CG 22+500.00	2,010,235.97	568,967.52	-225.82	5.09	
CGR 22+500.00	2,010,237.23	569,193.34	0.00	7.87	
CG 23+000.00	0.03	-0.15			
CGL 23+000.00	2,010,021.81	567,628.59	-1,392.64	5.09	Sub-Station Top Bank
CG 23+000.00	2,009,759.94	568,870.69	-123.24	10.27	
CGR 23+000.00	2,009,734.52	568,991.28	0.00	8.20	
CG 23+500.00	0.00	-0.24			
CGL 23+500.00	2,009,220.91	567,617.01	-1,266.12	3.60	Top Bank

Table 1.2.1 Coordinates and Elevation of Each Cross Sections (2/7)

Section Data Cagayan River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 23+500.00	2,009,233.66	568,780.84	-102.22	8.73	
CGR 23+500.00	2,009,234.78	568,883.05	0.00	8.87	
CG 24+000.00	-0.11	-0.21			
CGL 24+000.00	2,008,364.12	568,220.29	-821.46	4.47	Top Bank
CG 24+000.00	2,008,741.22	568,920.84	-25.86	8.61	
CGR 24+000.00	2,008,753.48	568,943.61	0.00	9.74	
CG 24+500.00	-0.08	-0.14			
CGL 24+500.00	2,007,944.83	568,430.11	-812.67	7.99	Top Bank
CG 24+500.00	2,008,326.26	569,128.91	-16.55	9.87	
CGR 24+500.00	2,008,334.19	569,143.44	0.00	9.91	Edge Road
CG 25+000.00	-0.10	-0.17			
CGL 25+000.00	2,007,522.13	568,743.76	-854.01	4.68	
CG 25+000.00	2,007,926.96	569,411.32	-73.29	9.26	
CGR 25+000.00	2,007,964.96	569,473.99	0.00	10.63	
CG 25+500.00	-0.13	-0.21			
CGL 25+500.00	2,007,102.98	569,057.40	-869.85	5.84	Top Bank
CG 25+500.00	2,007,504.31	569,685.60	-124.40	10.07	
CGR 25+500.00	2,007,571.29	569,790.43	0.00	10.36	
CG 26+000.00	-0.13	-0.24			
CGL 26+000.00	2,006,787.40	569,304.05	-797.54	1.00	
CG 26+000.00	2,007,106.21	569,924.72	-90.41	10.64	
CGR 26+000.00	2,007,149.52	570,004.06	0.00	10.21	
CG 26+500.00	-0.16	-0.28			
CGL 26+500.00	2,006,275.51	569,579.49	-771.29	5.02	Sub-
CG 26+500.00	2,006,611.18	570,183.32	-80.43	9.17	
CGR 26+500.00	2,006,650.26	570,253.62	0.00	10.25	
CG 27+000.00	-0.10	-0.18			
CGL 27+000.00	2,005,924.83	569,822.34	-697.08	4.03	
CG 27+000.00	2,006,214.45	570,366.72	-80.45	7.79	
CGR 27+000.00	2,006,252.23	570,437.74	0.00	10.19	
CG 27+500.00	-0.14	-0.25			
CGL 27+500.00	2,005,427.71	570,037.00	-729.00	6.03	Sub-
CGR 27+500.00	2,005,777.00	570,676.88	0.00	10.55	Edge Road
CG 28+000.00	-1.36	-2.48			
CGL 28+000.00	2,004,996.82	570,322.24	-664.07	9.11	Slope
CGR 28+000.00	2,005,315.00	570,905.12	0.00	11.09	
CG 28+250.00	-0.21	-0.17			
CGL 28+250.00	2,004,669.12	570,692.32	-549.82	5.69	Sub-Station Left Bank
CG 28+250.00	2,005,010.28	570,980.61	-115.81	9.63	
CGR 28+250.00	2,005,101.31	571,032.20	0.00	11.08	
CG 28+500.00	-0.28	-0.22			
CGL 28+500.00	2,004,543.43	570,904.03	-446.99	4.56	
CG 28+500.00	2,004,773.63	571,085.06	-154.14	8.71	
CGR 28+500.00	2,004,894.79	571,180.34	0.00	13.63	
CG 28+750.00	0.00	0.00			
CGL 28+750.00	2,004,349.48	571,047.68	-411.54	6.00	Left Bank
CG 28+750.00	2,004,642.68	571,247.38	-56.79	11.67	
CGR 28+750.00	2,004,689.62	571,279.35	0.00	13.69	
CG 29+000.00					
CGL 29+000.00			-428.98	6.31	XL 29+000
CGL 29+000.00			-304.19	3.92	L-1
CG 29+000.00			-27.89	16.49	

4/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGR 29+000.00			0.00	15.41	
CG 29+250.00	-0.08	-0.16			
CGL 29+250.00	2,004,194.94	571,340.31	-343.05	4.11	
CG 29+250.00	2,004,341.56	571,623.30	-24.33	11.87	
CGR 29+250.00	2,004,352.75	571,644.90	0.00	12.61	
CG 29+500.00	-0.04	-0.11			
CGL 29+500.00	2,003,989.47	571,196.90	-564.29	9.98	L-1 Sub-Station
CGR 29+500.00	2,004,172.99	571,730.51	0.00	13.25	
CG 29+750.00	-0.02	-0.12			
CG 29+750.00	2,003,943.51	571,696.07	-46.00	13.61	
CGR 29+750.00	2,003,950.50	571,741.54	0.00	12.72	
CG 30+000.00	0.01	-0.12			
CGL 30+000.00	2,003,726.57	571,102.28	-602.51	10.76	XL 30+000
CG 30+000.00	2,003,683.45	571,685.36	-17.84	10.59	
CGR 30+000.00	2,003,682.13	571,703.15	0.00	12.21	
CG 30+250.00	0.02	-0.08			
CGR 30+250.00	2,003,489.79	571,603.09	0.00	12.48	
CG 30+500.00	0.07	-0.14			
CG 30+500.00	2,003,270.91	571,508.67	-29.75	12.85	
CGR 30+500.00	2,003,257.22	571,535.06	0.00	12.05	
CG 30+750.00	0.25	-0.25			
CGR 30+750.00	2,003,047.40	571,426.83	0.00	11.49	
CG 31+000.00	0.10	-0.06			
CGR 31+000.00	2,002,932.79	571,223.25	0.00	11.01	
CG 31+250.00	-52.22	24.52			
CGL 31+250.00	2,003,284.71	570,777.64	-489.06	7.38	Top Bank
CGR 31+250.00	2,002,842.03	570,985.52	0.00	11.26	
CG 31+500.00	-36.41	17.09			
CGL 31+500.00	2,003,290.09	570,502.06	-593.90	47.37	Top Mountain
CGR 31+500.00	2,002,752.50	570,754.49	0.00	9.41	
CG 31+750.00	-34.28	16.09			
CGL 31+750.00	2,003,313.98	570,199.87	-727.07	27.90	Top Mountain
CGR 31+750.00	2,002,655.82	570,508.83	0.00	9.70	
CG 32+000.00	0.14	-0.07			
CGL 32+000.00	2,003,418.55	569,916.54	-932.92	46.28	Slope
CGR 32+000.00	2,002,574.11	570,313.09	0.00	10.34	
CG 32+250.00	0.32	-0.15			
CGR 32+250.00	2,002,393.76	570,075.38	0.00	9.90	
CG 32+500.00	0.15	-0.12			
CGL 32+500.00	2,003,255.18	569,067.58	-1,306.77	11.50	Slope
CGR 32+500.00	2,002,231.57	569,883.12	0.00	10.66	
CG 32+750.00	0.19	-0.25			
CGL 32+750.00	2,002,851.09	568,562.90	-1,458.42	25.25	Top Slope
CGR 32+750.00	2,001,978.55	569,731.51	0.00	11.10	
CG 33+000.00	0.16	-0.22			
CGR 33+000.00	2,001,784.39	569,807.15	0.00	10.75	Nail w/ paint
CG 33+500.00	0.14	-0.19			
CGR 33+500.00	2,001,368.14	569,309.60	0.00	10.69	Edge Road
CG 34+000.00	0.06	-0.19			
CGR 34+000.00	2,000,902.70	569,141.16	0.00	9.87	
CG 34+500.00	0.05	-0.15			
CGR 34+500.00	2,000,421.11	568,966.26	0.00	9.27	

5/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 35+000.00	0.08	-0.23			
CGR 35+000.00	1,999,954.55	568,797.08	0.00	9.55	
CG 35+500.00	0.05	-0.15			
CGR 35+500.00	1,999,456.30	568,616.45	0.00	10.28	
CG 36+000.00	0.05	-0.15			
CGR 36+000.00	1,999,023.49	568,371.22	0.00	10.56	
CG 36+500.00	0.07	-0.19			
CGR 36+500.00	1,998,583.26	568,142.43	0.00	11.87	
CG 37+000.00	0.07	-0.19			
CGR 37+000.00	1,998,134.42	567,905.81	0.00	12.01	
CG 37+500.00	0.05	-0.15			
CGR 37+500.00	1,997,671.97	567,764.93	0.00	14.23	
CG 38+000.00	0.06	-0.18			
CGR 38+000.00	1,997,205.68	567,675.60	0.00	14.39	Nail with Bottle Cap
CG 38+500.00	0.05	-0.16			
CG 38+500.00	1,996,807.61	567,497.68	-68.40	15.39	
CGR 38+500.00	1,996,785.32	567,562.35	0.00	16.08	
CG 39+000.00	0.08	-0.23			
CGR 39+000.00	1,996,304.86	567,680.23	0.00	13.37	
CG 39+500.00	0.08	-0.23			
CGR 39+500.00	1,995,832.77	567,705.67	0.00	14.33	Top Conc. Post
CG 40+000.00	0.07	-0.19			
CGR 40+000.00	1,995,398.24	567,963.30	0.00	13.01	
CG 40+500.00	0.11	-0.21			
CGR 40+500.00	1,994,946.94	567,895.46	0.00	10.62	
CG 41+000.00	0.09	-0.13			
CGR 41+000.00	1,994,762.34	567,463.01	0.00	11.04	
CG 41+500.00	0.14	-0.15			
CGR 41+500.00	1,994,890.34	566,987.88	0.00	12.58	Traverse Station
CG 42+000.00	0.14	-0.15			
CGR 42+000.00	1,994,470.87	566,521.97	0.00	12.45	
CG 42+500.00	0.11	-0.12			
CGR 42+500.00	1,994,168.26	566,118.41	0.00	12.44	Traverse Station
CG 43+000.00	0.11	-0.12			
CGR 43+000.00	1,993,829.19	565,807.79	0.00	12.39	Traverse Station
CG 43+500.00	0.08	-0.09			
CGR 43+500.00	1,993,463.40	565,474.70	0.00	12.40	
CG 44+000.00	0.11	-0.12			
CGR 44+000.00	1,993,078.32	565,122.31	0.00	12.59	
CG 44+500.00	0.07	-0.15			
CGR 44+500.00	1,992,666.83	564,896.80	0.00	12.44	
CG 45+000.00	0.08	-0.18			
CGR 45+000.00	1,992,181.58	564,669.40	0.00	12.55	
CG 45+500.00	0.10	-0.21			
CGR 45+500.00	1,991,759.80	564,470.16	0.00	12.51	12.54
CG 46+000.00	0.08	-0.18			
CGR 46+000.00	1,991,296.96	564,250.48	0.00	12.89	
CG 46+500.00	0.08	-0.18			
CGR 46+500.00	1,990,839.07	564,037.77	0.00	13.70	
CG 47+000.00	-0.01	-0.23			
CGR 47+000.00	1,990,340.22	564,083.71	0.00	13.91	
CG 47+500.00	-0.05	-0.19			

6/18

Table 1.2.1 Coordinates and Elevation of Each Cross Sections (3/7)

Section Data Cagayan River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGR 47+500.00	1,989,846.54	564,224.18	0.00	14.09	
CG 48+000.00	-0.04	-0.15			
CGR 48+000.00	1,989,363.31	564,360.97	0.00	12.56	
CG 48+500.00	-0.61	-2.26			
CGR 48+500.00	1,988,919.61	564,486.23	0.00	13.81	
CG 49+000.00	-0.08	-0.31			
CGR 49+000.00	1,988,401.64	564,635.48	0.00	13.17	
CG 49+500.00	-0.13	-0.16			
CGR 49+500.00	1,987,970.52	564,886.73	0.00	13.56	
CG MAGAPIT BRIDGE					
CGR MAGAPIT BRIDGE	2,004,770.72	571,184.45	0.00	16.64	Top Railing
CG 31+250.00					
CGL 31+250.00	2,003,284.60	570,777.70	-488.98	7.30	Top Bank
CGR 31+250.00	2,002,842.00	570,985.54	0.00	11.20	
CG 31+500.00					
CGL 31+500.00	2,003,289.91	570,502.17	-593.74	47.34	Top Mountain
CGR 31+500.00	2,002,752.46	570,754.51	0.00	9.38	
CG 32+500.00					
CGL 32+500.00	2,003,255.05	569,067.68	-1,308.65	11.47	Slope
CGR 32+500.00	2,002,231.54	569,883.14	0.00	10.63	
CG 32+750.00					
CGL 32+750.00	2,002,850.92	568,563.12	-1,458.18	24.54	Top Slope
CGR 32+750.00	2,001,978.52	569,731.54	0.00	10.40	
CG 50+000.00	-0.10	-0.13			
CGL 50+000.00	1,988,892.96	564,294.70	-1,143.92	13.56	Sub-
CGR 50+000.00	1,987,613.56	565,183.11	0.00	14.32	
CG 50+250.00	-0.18	-0.17			
CGL 50+250.00	1,988,837.39	564,885.80	-729.88	11.28	Sub-
CGR 50+250.00	1,987,367.83	565,387.18	0.00	14.01	
CG 50+500.00	-0.19	-0.15			
CGL 50+500.00	1,988,711.04	565,217.85	-566.10	13.43	Sub-
CGR 50+500.00	1,987,160.44	565,562.11	0.00	15.92	
CG 50+750.00	-0.28	0.00			
CGL 50+750.00	1,988,621.77	565,798.62	-484.08	15.15	Sub-
CGR 50+750.00	1,987,105.85	565,798.09	0.00	15.76	
CG 51+000.00	-0.21	0.00			
CGL 51+000.00	1,988,494.39	566,074.67	-607.08	7.71	Sub-
CGR 51+000.00	1,987,101.47	566,073.99	0.00	14.90	
CG 51+250.00	-0.24	0.00			
CGL 51+250.00	1,988,365.45	566,294.96	-733.70	38.42	Sub-
CGR 51+250.00	1,987,099.15	566,294.13	0.00	15.01	
CG 51+500.00	-0.28	0.00			
CGL 51+500.00	1,988,359.90	566,548.00	-741.68	7.95	Sub-Station
CG 51+500.00	1,988,889.08	566,547.41	-212.40	13.32	
CGR 51+500.00	1,987,101.48	566,547.17	0.00	15.81	
CG 51+750.00	-0.24	0.01			
CGL 51+750.00	1,988,314.58	566,840.10	-790.38	8.36	Sub-Station
CGR 51+750.00	1,987,103.99	566,800.93	0.00	16.01	
CG 52+000.00	-0.17	0.00			
CGL 52+000.00	1,988,384.81	567,053.54	-721.72	13.24	
CGR 52+000.00	1,987,106.53	567,052.73	0.00	15.78	
CG 52+250.00	-0.20	0.00			

7/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGL 52+250.00	1,988,487.02	567,289.84	-677.12	7.77	Sub-Station
CG 52+250.00	1,987,113.92	567,289.15	-50.22	12.70	
CGR 52+250.00	1,987,164.14	567,289.09	0.00	16.19	
CG 52+500.00	-0.24	0.00			
CGL 52+500.00	1,988,610.35	567,521.52	-639.48	10.05	Sub-Station
CGR 52+500.00	1,987,249.83	567,520.81	0.00	18.12	
CG 52+750.00	-0.20	0.00			
CGL 52+750.00	1,988,767.53	567,765.66	-552.64	8.88	Sub-Station
CGR 52+750.00	1,987,320.17	567,765.05	0.00	21.68	
CG 53+000.00	-0.20	0.00			
CGL 53+000.00	1,988,959.97	568,048.45	-422.84	7.45	Sub-Station
CG 53+000.00	1,987,358.17	568,048.00	-24.64	24.47	
CGR 53+000.00	1,987,382.81	568,047.97	0.00	23.54	
CG 53+250.00	-0.20	0.00			
CGL 53+250.00	1,987,058.03	568,230.78	-437.90	10.91	Sub-Station
CG 53+250.00	1,987,495.93	568,230.29	0.00	18.42	
CGR 53+250.00	1,987,495.93	568,230.29	0.00	18.42	
CG 53+500.00	-0.15	0.05			
CGL 53+500.00	1,987,201.76	568,589.77	-362.87	10.47	Sub-Station
CGR 53+500.00	1,987,549.27	568,485.30	0.00	16.69	
CG 53+750.00	-0.18	-0.08			
CGL 53+750.00	1,987,187.43	568,831.97	-442.40	15.93	Sub-Station
CGR 53+750.00	1,987,595.29	568,803.31	0.00	8.33	
CG 54+000.00	-1.99	-1.44			
CGL 54+000.00	1,987,170.87	568,706.64	-399.08	12.82	Sub-Station
CGR 54+000.00	1,987,493.89	568,943.00	0.00	6.92	
CG 54+250.00	-0.10	-0.26			
CGL 54+250.00	1,987,141.90	568,773.75	-449.69	10.56	Sub-Station
CGR 54+250.00	1,987,297.27	569,195.74	0.00	7.73	
CG 54+500.00	-0.01	-0.16			
CGL 54+500.00	1,986,997.30	568,872.14	-485.91	10.89	Sub-Station
CGR 54+500.00	1,987,027.34	569,357.12	0.00	8.53	
CG 54+750.00	0.04	-0.28			
CGL 54+750.00	1,986,833.56	568,892.08	-555.87	12.22	Sub-Station
CGR 54+750.00	1,986,756.64	569,442.80	0.00	5.35	
CG 55+000.00	0.05	-0.11			
CGL 55+000.00	1,986,702.50	568,804.33	-657.17	16.25	Sub-Station
CGR 55+000.00	1,986,436.46	569,405.24	0.00	13.57	
CG 55+250.00	0.05	-0.11			
CGL 55+250.00	1,986,401.59	568,729.32	-956.33	13.08	Toe Bank
CGR 55+250.00	1,986,014.43	569,603.78	0.00	13.97	
CG 55+500.00	0.05	-0.11			
CGR 55+500.00	1,985,781.65	569,501.07	0.00	13.88	
CG 55+750.00	0.08	-0.19			
CGR 55+750.00	1,985,556.29	569,401.61	0.00	13.93	
CG 56+000.00	0.05	-0.12			
CGR 56+000.00	1,985,334.87	569,279.05	0.00	16.49	
CG 56+250.00	0.11	-0.26			
CGR 56+250.00	1,985,230.52	569,057.48	0.00	15.08	
CG 56+500.00	0.13	-0.29			
CGR 56+500.00	1,985,150.05	568,822.98	0.00	15.30	
CG 56+750.00	0.10	-0.22			

8/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGR 56+750.00	1,985,074.85	568,603.12	0.00	15.69	
CG 57+000.00	0.10	-0.22			
CGR 57+000.00	1,984,983.62	568,338.04	0.00	16.24	
CG 57+250.00	0.10	-0.22			
CGR 57+250.00	1,984,856.07	568,111.92	0.00	15.96	
CG 57+500.00	0.00	-0.15			
CGR 57+500.00	1,984,676.80	567,945.03	0.00	16.02	
CG 57+750.00	0.00	-0.12			
CGR 57+750.00	1,984,435.35	567,869.51	0.00	16.26	
CG 58+000.00	0.00	-0.16			
CG 58+000.00	1,984,187.56	567,675.44	-134.19	17.36	
CGR 58+000.00	1,984,188.17	567,809.63	0.00	16.39	
CG 58+250.00	0.00	-0.14			
CGR 58+250.00	1,983,947.39	567,752.46	0.00	17.27	
CG 58+500.00	0.00	-0.16			
CGL 58+500.00	1,983,705.51	567,335.04	-497.80	12.41	Top Bank
CG 58+500.00	1,983,705.79	567,690.61	-142.23	17.46	
CGR 58+500.00	1,983,705.91	567,832.84	0.00	13.92	
CG 58+750.00	0.00	-0.12			
CG 58+750.00	1,983,453.05	567,743.77	-110.05	14.61	
CGR 58+750.00	1,983,453.14	567,853.82	0.00	18.89	
CG 59+000.00	0.00	-0.16			
CGR 59+000.00	1,983,204.72	567,877.86	0.00	15.04	
CG 59+250.00	0.00	-0.12			
CGR 59+250.00	1,982,954.17	567,901.85	0.00	18.70	
CG 59+500.00	0.00	-0.12			
CGR 59+500.00	1,982,712.85	567,884.23	0.00	16.87	
CG 59+750.00	0.00	-0.12			
CG 59+750.00	1,982,453.67	567,796.85	-22.61	15.35	
CGR 59+750.00	1,982,453.69	567,819.26	0.00	15.82	
CG 60+000.00	0.00	-0.12			
CGL 60+000.00	1,982,207.78	567,317.12	-440.61	15.90	Top Bank
CGR 60+000.00	1,982,208.14	567,757.73	0.00	15.79	
CG 60+250.00	0.00	-0.12			
CGL 60+250.00	1,981,951.47	567,282.32	-415.96	14.09	Top Bank
CGR 60+250.00	1,981,951.81	567,698.28	0.00	15.92	
CG 60+500.00	0.00	-0.16			
CGR 60+500.00	1,981,697.08	567,664.31	0.00	15.86	
CG 60+750.00	0.00	-0.19			
CGR 60+750.00	1,981,452.55	567,675.84	0.00	15.65	
CG 61+000.00	0.00	-0.20			
CGR 61+000.00	1,981,209.58	567,695.89	0.00	15.78	
CG 61+250.00	0.00	-0.23			
CGR 61+250.00	1,980,964.76	567,751.44	0.00	16.41	
CG 61+500.00	0.00	-0.27			
CGR 61+500.00	1,980,727.06	567,839.31	0.00	16.27	
CG 61+750.00	0.00	0.00			
CGR 61+750.00	1,980,503.10	567,954.46	0.00	18.49	
CG 62+000.00	0.07	0.10			
CGR 62+000.00	1,980,212.45	567,989.60	0.00	19.69	Traverse Station
CG 62+500.00	-0.05	-0.07			
CGR 62+500.00	1,979,811.16	568,269.09	0.00	5.01	Traverse Station

9/18

Table 1.2.1 Coordinates and Elevation of Each Cross Sections (4/7)

Section Data Cagayan River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 63+000.00	-0.04	-0.06			
CGR 63+000.00	1,979,356.40	568,546.70	0.00	9.93	
CG 63+500.00	-0.04	-0.06			
CGR 63+500.00	1,978,936.24	568,835.70	0.00	9.86	Traverse Station
CG 64+000.00	-0.05	-0.06			
CGR 64+000.00	1,978,502.03	569,225.59	0.00	4.37	Traverse Station
CG 64+500.00	-0.05	-0.06			
CGR 64+500.00	1,978,145.51	569,496.12	0.00	8.32	
CG 65+000.00	0.00	-0.04			
CGL 65+000.00	1,977,708.26	569,458.33	-507.36	5.68	Top Bank
CGR 65+000.00	1,977,708.67	569,965.69	0.00	10.82	
CG 65+500.00	0.00	-0.08			
CGL 65+500.00	1,977,227.46	569,373.53	-491.50	8.23	Top Bank
CGR 65+500.00	1,977,227.85	569,865.03	0.00	12.05	
CG 66+000.00	0.00	-0.08			
CGR 66+000.00	1,976,721.05	569,896.13	0.00	11.94	
CG 66+500.00	0.01	-0.09			
CGL 66+500.00	1,976,343.44	569,028.23	-797.88	9.11	Top Bank
CGR 66+500.00	1,976,218.21	569,816.22	0.00	12.32	
CG 67+000.00	0.09	-0.08			
CGR 67+000.00	1,975,741.87	569,673.41	0.00	10.26	
CG 67+500.00	0.06	-0.06			
CGL 67+500.00	1,976,118.60	568,855.42	-1,099.79	9.87	Top Bank
CGL 67+500.00	1,975,525.19	569,205.29	-290.79	6.94	Toe
CGR 67+500.00	1,975,311.90	569,402.93	0.00	13.14	
CG 68+000.00	0.09	-0.08			
CGR 68+000.00	1,974,959.75	569,035.05	0.00	11.77	
CG 68+500.00	0.09	-0.09			
CGR 68+500.00	1,974,628.18	568,648.92	0.00	13.90	
CG 69+000.00	0.06	-0.05			
CGR 69+000.00	1,974,416.16	568,242.53	0.00	13.38	
CG 69+500.00	0.12	-0.11			
CGL 69+500.00	1,974,428.21	567,544.72	-420.23	13.12	Top Bank
CGR 69+500.00	1,974,119.96	567,830.34	0.00	13.30	
CG 70+000.00	0.06	-0.05			
CGR 70+000.00	1,973,986.39	567,282.30	0.00	11.02	
CG 70+500.00	-0.07	-0.14			
CGL 70+500.00	1,973,345.12	566,903.21	-369.30	14.01	Sub-Station
CGR 70+500.00	1,973,514.58	567,231.33	0.00	10.93	
CG 71+000.00	-0.03	-0.07			
CGR 71+000.00	1,973,033.30	567,364.97	0.00	11.29	
CG 71+500.00	-0.04	0.06			
CGR 71+500.00	1,973,355.61	567,810.39	0.00	13.16	
CG 72+000.00	-0.07	0.11			
CGR 72+000.00	1,973,785.60	568,091.57	0.00	12.81	
CG 72+500.00	-0.05	0.07			
CGR 72+500.00	1,974,105.97	568,472.53	0.00	12.27	
CG 73+000.00	-0.08	0.03			
CGR 73+000.00	1,974,407.03	568,857.53	0.00	13.25	
CG 73+500.00	-0.07	0.03			
CGR 73+500.00	1,974,634.13	569,263.22	0.00	11.07	
CG 74+000.00	-0.06	0.03			

10/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGR 74+000.00	1,974,887.39	569,713.62	0.00	13.32	
CG 74+500.00	-0.07	0.03			
CGR 74+500.00	1,975,063.46	570,238.15	0.00	10.59	
CG 75+000.00	-0.07	0.03			
CGR 75+000.00	1,975,169.31	570,708.01	0.00	13.66	
CG 75+500.00	-0.11	0.05			
CGR 75+500.00	1,975,300.46	571,199.49	0.00	14.66	
CG 76+000.00	-0.15	0.06			
CGR 76+000.00	1,975,575.42	571,633.34	0.00	14.60	
CG 76+500.00	-0.18	0.08			
CGR 76+500.00	1,975,801.16	572,097.94	0.00	13.77	Traverse Station
CG 77+000.00	-0.11	0.05			
CGR 77+000.00	1,975,926.15	572,577.53	0.00	14.27	Sub-Station
CG 77+500.00	-0.14	0.06			
CGR 77+500.00	1,976,027.40	573,071.94	0.00	15.67	Traverse Station
CG 78+000.00	-0.11	0.04			
CGR 78+000.00	1,976,044.37	573,613.27	0.00	15.73	Traverse Station
CG 78+500.00	-0.08	0.03			
CGL 78+500.00	1,975,972.44	574,181.92	-298.21	13.38	
CG 78+500.00	1,976,248.20	574,068.41	0.00	14.42	
CG 79+000.00	-0.12	-0.04			
CG 79+000.00	1,976,371.96	574,531.04	-50.78	14.78	
CGR 79+000.00	1,976,420.02	574,547.43	0.00	16.42	
CG 79+500.00	-0.06	-0.05			
CGR 79+500.00	1,976,218.16	575,049.41	0.00	20.28	
CG 80+000.00	-0.10	-0.12			
CGR 80+000.00	1,975,983.35	575,458.71	0.00	15.85	
CG 80+500.00	-0.02	-0.12			
CGR 80+500.00	1,975,628.35	575,844.71	0.00	16.10	
CG 81+000.00	-0.01	-0.15			
CGR 81+000.00	1,975,186.22	576,080.06	0.00	17.61	
CG 81+500.00	-0.03	-0.16			
CGR 81+500.00	1,974,720.83	576,288.46	0.00	16.53	
CG 82+000.00	-0.02	-0.23			
CGR 82+000.00	1,974,228.87	576,391.93	0.00	16.94	
CG 82+500.00	-0.01	-0.12			
CGR 82+500.00	1,973,713.75	576,485.13	0.00	17.32	
CG 83+000.00	0.01	-0.24			
CGR 83+000.00	1,973,203.05	576,502.04	0.00	17.37	
CG 83+500.00	-0.03	-0.15			
CGL 83+500.00	1,972,611.35	575,899.86	-677.39	8.73	Sub-
CGR 83+500.00	1,972,761.73	576,560.34	0.00	27.96	
CG 84+000.00	-0.01	-0.12			
CGR 84+000.00	1,972,227.15	576,648.36	0.00	16.57	Edge of Road
CG 84+500.00	-0.01	-0.20			
CGR 84+500.00	1,971,727.22	576,773.02	0.00	18.94	
CG 85+000.00	-0.01	-0.12			
CGR 85+000.00	1,971,231.10	576,893.71	0.00	15.68	
CG 85+500.00	-0.01	-0.12			
CGR 85+500.00	1,970,749.39	577,034.82	0.00	17.04	
CG 86+000.00	-0.01	-0.34			
CGR 86+000.00	1,970,274.86	577,101.85	0.00	17.29	Traverse Station

11/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 86+500.00	0.00	-0.16			
CGR 86+500.00	1,969,783.91	576,898.39	0.00	16.77	Traverse Station
CG 87+000.00	0.00	-0.16			
CGR 87+000.00	1,969,263.67	576,657.55	0.00	19.08	Traverse Station
CG 87+500.00	0.00	-0.16			
CGR 87+500.00	1,968,758.27	576,678.90	0.00	20.66	Traverse Station
CG 88+000.00	-0.01	-0.17			
CGR 88+000.00	1,968,303.54	576,796.30	0.00	22.91	
CG 88+500.00	0.00	-0.32			
CGR 88+500.00	1,967,832.99	577,033.47	0.00	25.01	
CG 89+000.00	0.02	-0.16			
CGR 89+000.00	1,967,396.71	577,218.43	0.00	23.06	
CG 89+500.00	0.04	-0.07			
CGR 89+500.00	1,966,809.53	576,598.14	0.00	16.55	
CG 90+000.00	0.08	-0.08			
CGR 90+000.00	1,966,474.80	576,223.14	0.00	17.05	
CG 90+500.00	0.08	-0.01			
CGR 90+500.00	1,966,174.17	575,753.55	0.00	16.38	
CG 91+000.00	0.07	0.03			
CGR 91+000.00	1,966,309.77	575,275.75	0.00	15.15	
CGN 0+500.00	0.07	0.04			
CGNR 0+500.00	1,966,733.81	574,952.44	0.00	7.99	
CGN 1+000.00	0.06	0.06			
CGNR 1+000.00	1,967,054.27	574,602.77	0.00	10.11	
CGN 1+500.00	0.06	0.05			
CGNR 1+500.00	1,967,460.74	574,321.03	0.00	10.09	
CGN 2+000.00	0.08	0.01			
CGNR 2+000.00	1,967,896.91	573,875.06	0.00	10.32	
CGN 2+500.00	0.06	-0.06			
CGNR 2+500.00	1,967,659.83	573,365.25	0.00	10.74	
CGN 3+000.00	0.02	-0.08			
CGNR 3+000.00	1,967,267.66	573,091.11	0.00	9.54	
CGN 3+500.00	-0.02	-0.08			
CGNR 3+500.00	1,966,812.05	573,283.65	0.00	10.17	
CGN 4+000.00	-0.04	-0.07			
CGNR 4+000.00	1,966,505.70	573,681.39	0.00	10.98	
CG 92+500.00	-0.13	-0.01			
CGR 92+500.00	1,966,343.59	573,964.53	0.00	15.12	
CG 93+000.00	-0.08	-0.01			
CG 93+000.00	1,966,046.08	574,303.28	0.00	12.57	
CG 93+500.00	-0.12	-0.01			
CG 93+500.00	1,965,866.60	574,761.74	0.00	15.61	
CG 94+000.00	-0.08	-0.01			
CGR 94+000.00	1,965,718.58	575,212.60	0.00	17.88	Top Bank
CG 94+000.00	1,965,718.58	575,212.60	0.00	17.88	
CG 94+500.00	-0.08	-0.01			
CG 94+500.00	1,965,623.72	575,670.53	0.00	18.10	
CG 95+000.00	-0.07	-0.05			
CG 95+000.00	1,965,383.91	576,162.59	0.00	18.41	
CG 95+500.00	-0.07	-0.05			
CG 95+500.00	1,965,121.47	576,545.30	0.00	18.39	
CG 96+000.00	-0.05	-0.05			

12/18

Table 1.2.1 Coordinates and Elevation of Each Cross Sections (5/7)

Section Data Cagayan River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 96+000.00	1,964,776.18	576,935.08	0.00	18.17	
CG 96+500.00	-0.07	-0.10			
CGR 96+500.00	1,964,368.53	577,241.05	0.00	16.44	
CG 97+000.00	-0.06	-0.10			
CGR 97+000.00	1,963,936.10	577,476.49	0.00	18.27	
CG 97+500.00	-0.02	-0.15			
CGR 97+500.00	1,963,532.91	577,720.94	0.00	35.25	
CG 98+000.00	0.02	-0.13			
CGR 98+000.00	1,963,030.40	577,613.63	0.00	11.09	
CG 98+500.00	0.09	-0.14			
CGR 98+500.00	1,962,530.67	577,621.30	0.00	12.16	
CG 99+000.00	-0.02	-0.08			
CGR 99+000.00	1,961,980.47	577,332.51	0.00	15.68	
CG 99+500.00	-0.01	-0.08			
CGR 99+500.00	1,961,489.31	577,475.44	0.00	15.34	
CG 100+000.00	-0.02	-0.08			
CGR 100+000.00	1,961,001.20	577,629.95	0.00	15.15	Traverse Station
CG 100+500.00	-0.02	-0.08			
CGR 100+500.00	1,960,515.10	577,833.07	0.00	14.84	Traverse Station
CG 101+000.00	-0.02	-0.07			
CGR 101+000.00	1,960,047.95	577,927.93	0.00	15.40	Traverse Station
CG 101+500.00	-0.02	-0.07			
CGR 101+500.00	1,959,560.41	578,075.62	0.00	16.27	Traverse Station
CG 102+000.00	-0.04	-0.12			
CGR 102+000.00	1,959,078.35	578,230.08	0.00	15.20	
CG 102+500.00	-0.03	-0.12			
CGR 102+500.00	1,958,720.98	578,598.45	0.00	17.86	
CG 103+000.00	0.00	-0.12			
CGR 103+000.00	1,958,158.47	578,668.33	0.00	15.69	Traverse Station
CG 103+500.00	0.00	-0.09			
CGR 103+500.00	1,957,615.70	578,667.21	0.00	16.75	
CG 104+000.00	0.00	-0.12			
CGR 104+000.00	1,957,073.01	578,650.65	0.00	15.57	Traverse Station
CG 104+500.00	0.05	-0.07			
CGR 104+500.00	1,956,585.93	578,525.38	0.00	15.45	Traverse Station
CG 105+000.00	0.06	-0.04			
CGR 105+000.00	1,958,140.99	578,213.37	0.00	16.04	
CG 105+500.00	0.07	-0.04			
CGR 105+500.00	1,955,844.27	577,693.37	0.00	13.29	
CG 106+000.00	0.06	-0.04			
CGR 106+000.00	1,955,603.09	577,221.70	0.00	14.11	
CG 106+500.00	0.07	-0.05			
CGR 106+500.00	1,955,354.58	576,769.90	0.00	14.44	
CG 107+000.00	0.07	-0.05			
CGR 107+000.00	1,955,080.03	576,396.39	0.00	14.72	
CG 107+500.00	0.10	-0.07			
CGR 107+500.00	1,954,668.63	576,051.87	0.00	17.50	
CG 108+000.00	0.13	-0.09			
CGR 108+000.00	1,954,445.28	575,611.66	0.00	16.40	
CG 108+500.00	0.07	-0.05			
CGR 108+500.00	1,954,153.36	575,197.18	0.00	16.32	Max. Flood Level
CG 109+000.00	0.04	-0.12			

13/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGR 109+000.00	1,953,776.77	574,869.53	0.00	16.90	
CG 109+500.00	0.05	-0.16			
CGR 109+500.00	1,953,295.02	574,813.01	0.00	18.04	
CG 110+000.00	0.02	-0.07			
CGR 110+000.00	1,952,785.42	574,765.81	0.00	18.27	
CG 110+500.00	0.02	-0.08			
CGR 110+500.00	1,952,279.27	574,710.77	0.00	18.32	Top Bank
CG 111+000.00	0.02	-0.06			
CGR 111+000.00	1,951,726.40	574,565.41	0.00	19.74	
CG 111+500.00	0.02	-0.08			
CGR 111+500.00	1,951,210.00	574,408.84	0.00	19.05	
CG 112+000.00	0.02	-0.08			
CGR 112+000.00	1,950,732.02	574,239.55	0.00	17.07	
CG 112+500.00	0.02	-0.07			
CGR 112+500.00	1,950,284.32	574,054.51	0.00	18.42	
CG 113+000.00	0.02	-0.08			
CGR 113+000.00	1,949,805.06	573,850.06	0.00	18.23	
CG 113+500.00	0.04	-0.11			
CGR 113+500.00	1,949,341.81	573,638.82	0.00	17.70	
CG 114+000.00	0.04	-0.12			
CGR 114+000.00	1,948,878.85	573,464.18	0.00	17.49	
CG 114+500.00	0.01	-0.08			
CGR 114+500.00	1,948,399.11	573,270.82	0.00	19.48	
CG 115+000.00	0.03	-0.07			
CGR 115+000.00	1,947,938.49	573,038.28	0.00	15.33	
CG 115+500.00	-0.01	-0.16			
CGR 115+500.00	1,947,437.08	572,943.22	0.00	16.76	
CG 116+000.00	0.03	-0.11			
CGR 116+000.00	1,946,930.46	572,808.71	0.00	16.41	
CG 116+500.00	0.02	-0.07			
CGR 116+500.00	1,946,436.53	572,734.67	0.00	19.44	
CG 117+000.00	0.02	-0.08			
CGR 117+000.00	1,945,953.37	572,550.76	0.00	16.17	
CG 117+500.00	0.01	0.03			
CGR 117+500.00	1,945,504.58	572,768.00	0.00	17.97	Traverse Station
CG 118+000.00	0.01	-0.16			
CGR 118+000.00	1,945,010.15	572,805.46	0.00	16.42	Traverse Station
CG 118+500.00	-0.09	-0.08			
CGR 118+500.00	1,944,447.12	572,921.85	0.00	15.56	Traverse Station
CG 119+000.00	-0.13	0.03			
CGR 119+000.00	1,944,223.66	573,381.15	0.00	17.21	Traverse Station
CG 119+500.00	-0.10	0.07			
CGR 119+500.00	1,944,643.25	573,748.40	0.00	17.15	River Bed
CG 120+000.00	-0.05	0.05			
CGR 120+000.00	1,945,011.22	574,073.91	0.00	15.98	River Bed
CG 120+500.00	-0.05	0.06			
CGR 120+500.00	1,945,397.39	574,430.84	0.00	16.44	River Bed
CG 121+000.00	-0.05	0.07			
CGR 121+000.00	1,945,671.61	574,852.21	0.00	15.40	
CG 121+250.00	-0.05	0.06			
CG 121+250.00	1,945,856.71	575,055.78	0.00	20.02	
CG 121+500.00	-0.05	0.07			

14/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 121+500.00	1,946,029.89	575,233.74	0.00	22.75	
CG 121+750.00	-0.05	0.06			
CG 121+750.00	1,946,247.41	575,377.30	0.00	22.30	
CG 122+000.00	-0.05	0.07			
CG 122+000.00	1,946,432.21	575,478.99	0.00	22.02	
CG 122+250.00	-0.07	0.09			
CG 122+250.00	1,946,670.52	575,589.95	0.00	22.34	
CG 122+500.00	-0.10	0.08			
CG 122+500.00	1,946,916.65	575,686.73	0.00	22.53	
CG 122+750.00	-0.07	0.04			
CG 122+750.00	1,947,098.41	575,802.58	0.00	15.19	
CG 123+000.00	-0.08	0.02			
CG 123+000.00	1,947,295.78	576,068.70	0.00	18.24	
CG 123+250.00	-0.08	0.02			
CG 123+250.00	1,947,351.52	576,323.50	0.00	18.26	
CG 123+500.00	-0.08	0.02			
CG 123+500.00	1,947,374.46	576,577.45	0.00	17.28	
CG 123+750.00	-0.08	0.02			
CG 123+750.00	1,947,416.15	576,838.15	0.00	17.06	
CG 124+000.00	-0.16	0.03			
CG 124+000.00	1,947,444.43	577,084.77	0.00	12.78	
CG 124+250.00	-0.13	0.03			
CGR 124+250.00	1,947,432.89	577,350.92	0.00	13.64	
CG 124+500.00	-0.08	-0.02			
CGR 124+500.00	1,947,274.57	577,648.45	0.00	12.31	
CG 124+750.00	-0.07	-0.03			
CGR 124+750.00	1,947,161.32	577,873.81	0.00	12.63	
CG 125+000.00	-0.07	-0.05			
CGR 125+000.00	1,946,994.85	578,085.49	0.00	14.33	
CG 125+250.00	-0.04	-0.07			
CGR 125+250.00	1,946,785.63	578,243.79	0.00	16.03	
CG 125+500.00	-0.03	-0.07			
CGR 125+500.00	1,946,526.32	578,379.82	0.00	16.05	
CG 125+750.00	-0.04	-0.07			
CGR 125+750.00	1,946,307.86	578,491.68	0.00	16.77	
CG 126+000.00	-0.04	-0.07			
CGR 126+000.00	1,946,128.31	578,584.88	0.00	16.83	
CG 126+500.00	-0.04	-0.07			
CGR 126+500.00	1,945,669.02	578,787.02	0.00	16.68	
CG 127+000.00	-0.04	-0.07			
CGR 127+000.00	1,945,247.09	579,032.93	0.00	18.27	
CG 127+500.00	-0.11	-0.21			
CGR 127+500.00	1,945,048.20	579,506.10	0.00	19.79	
CG 128+000.00	-0.03	-0.07			
CGR 128+000.00	1,944,591.06	579,727.72	0.00	18.08	
CG 128+500.00	-0.04	-0.07			
CGR 128+500.00	1,944,252.75	580,097.95	0.00	20.04	
CG 129+000.00	-0.06	-0.05			
CGR 129+000.00	1,943,808.77	580,345.78	0.00	17.84	
CG 129+500.00	-0.07	-0.05			
CGR 129+500.00	1,943,465.73	580,722.53	0.00	20.83	
CG 130+000.00	-0.07	-0.05			

15/18

Table 1.2.1 Coordinates and Elevation of Each Cross Sections (6/7)

Section Data Cagayan River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CGR 130+000.00	1,943,186.81	581,186.53	0.00	20.27	
CG 130+500.00	-0.06	-0.05			
CGR 130+500.00	1,942,882.04	581,594.87	0.00	20.70	
CG 131+000.00	-0.07	-0.05			
CGR 131+000.00	1,942,567.82	582,000.67	0.00	20.68	River Bed
CG 131+500.00	-0.04	-0.07			
CGR 131+500.00	1,942,152.04	582,323.60	0.00	21.06	River Bed
CG 132+000.00	-0.04	-0.07			
CGR 132+000.00	1,941,724.70	582,569.55	0.00	21.37	River Bed
CG 132+500.00	-0.04	-0.08			
CG 132+500.00	1,941,283.83	582,806.77	0.00	21.01	
CG 133+000.00	-0.04	-0.08			
CG 133+000.00	1,940,825.30	583,019.85	0.00	21.15	
CG 133+500.00	-0.04	-0.07			
CG 133+500.00	1,940,386.13	583,235.82	0.00	21.71	
CG 134+000.00	-0.06	-0.11			
CG 134+000.00	1,939,921.57	583,503.30	0.00	24.44	
CG 134+500.00	-0.02	-0.12			
CG 134+500.00	1,939,438.32	583,647.13	0.00	25.01	
CG 135+000.00	-0.02	-0.11			
CG 135+000.00	1,938,961.62	583,768.40	0.00	24.56	
CG 135+500.00	-0.02	-0.11			
CGR 135+500.00	1,938,496.64	583,996.95	0.00	24.17	
CG 136+000.00	-0.02	-0.12			
CGR 136+000.00	1,937,996.38	584,086.09	0.00	24.62	Max. Flood Level
CG 136+500.00	-0.03	-0.12			
CGR 136+500.00	1,937,510.29	584,235.08	0.00	24.00	89-55-08
CG 137+000.00	-0.03	-0.13			
CGR 137+000.00	1,936,996.61	584,139.29	0.00	25.12	1990/4/29
CG 137+500.00	-0.02	-0.12			
CGR 137+500.00	1,936,456.47	584,187.06	0.00	26.26	
CG 138+000.00	0.00	-0.08			
CGR 138+000.00	1,935,892.98	584,300.10	0.00	17.59	
CG 138+500.00	0.03	-0.08			
CGR 138+500.00	1,935,381.02	584,212.57	0.00	18.82	
CG 139+000.00	0.04	-0.11			
CGR 139+000.00	1,934,880.63	584,173.63	0.00	20.16	
CG 139+500.00	0.04	-0.11			
CGL 139+500.00	1,934,718.64	583,153.98	-957.31	21.36	Top Bank 89-45-13
CGR 139+500.00	1,934,418.23	584,062.93	0.00	21.41	
CG 140+000.00	0.04	-0.11			
CGL 140+000.00	1,934,313.42	582,927.54	-955.43	21.14	89-43-50
CGR 140+000.00	1,933,982.21	583,823.73	0.00	20.87	
CG 140+500.00	0.08	-0.23			
CGL 140+500.00	1,933,817.24	582,803.85	-916.05	19.22	Top Bank
CGR 140+500.00	1,933,499.59	583,863.07	0.00	20.97	
CG 141+000.00	0.03	-0.07			
CGR 141+000.00	1,932,993.75	583,545.74	0.00	20.59	
CG 141+500.00	0.03	-0.08			
CGR 141+500.00	1,932,560.11	583,289.50	0.00	18.54	
CG 142+000.00	0.03	-0.08			
CGR 142+000.00	1,932,111.62	583,064.50	0.00	18.16	Top Bank

16/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 142+500.00	0.03	-0.08			
CGR 142+500.00	1,931,627.92	582,912.30	0.00	24.26	89-46-20
CG 143+000.00	0.04	-0.06			
CGL 143+000.00	1,931,448.08	582,248.66	-560.34	23.31	Top Bank
CGR 143+000.00	1,931,165.18	582,733.51	0.00	16.84	88-51-35
CG 143+500.00	0.06	-0.05			
CGR 143+500.00	1,930,868.35	582,293.89	0.00	17.36	89-33-15
CG 144+000.00	0.08	-0.01			
CGR 144+000.00	1,930,501.39	581,886.62	0.00	15.48	
CG 144+500.00	0.08	-0.01			
CGR 144+500.00	1,930,480.95	581,387.15	0.00	19.81	
CG 145+000.00	0.08	-0.01			
CGR 145+000.00	1,930,426.81	580,899.42	0.00	20.19	
CG 145+500.00	0.08	-0.01			
CGR 145+500.00	1,930,391.45	580,389.07	0.00	19.71	Top
CG 145+700.00 old line (AP-177)	0.19	-0.06			
CGR 145+700.00 old line (AP-177)	1,930,364.86	580,165.10	0.00	19.21	
CG 146+000.00	0.08	-0.01			
CGR 146+000.00	1,930,277.68	579,905.03	0.00	17.64	Traverse Station
CG 146+500.00	0.07	-0.04			
CGR 146+500.00	1,930,056.49	579,420.83	0.00	19.76	Traverse Station
CG STA. MARIA BRIDGE	0.07	-0.03			
CGR STA. MARIA BRIDGE	1,930,056.37	579,475.04	0.00	20.22	
CG 147+000.00	0.07	-0.04			
CGR 147+000.00	1,929,798.12	578,990.78	0.00	20.92	Traverse Station
CG 147+500.00	0.05	-0.07			
CGR 147+500.00	1,929,359.03	578,697.83	0.00	21.97	Traverse Station
CG 148+000.00	-0.02	-0.08			
CGR 148+000.00	1,928,848.44	578,746.50	0.00	21.11	Traverse Station
CG 148+500.00	-0.06	-0.05			
CGR 148+500.00	1,928,364.46	578,844.67	0.00	21.28	Traverse Station
CG 149+000.00	-0.06	-0.05			
CGR 149+000.00	1,928,031.59	579,244.71	0.00	22.84	Top
CG 149+500.00	-0.07	-0.03			
CGR 149+500.00	1,927,777.87	579,676.28	0.00	23.23	
CG 150+000.00	-0.07	-0.03			
CG 150+000.00	1,927,609.91	580,141.44	0.00	27.50	
CG 150+500.00	-0.11	-0.04			
CG 150+500.00	1,927,484.96	580,660.72	0.00	19.41	
CG 151+000.00	-0.11	-0.04			
CG 151+000.00	1,927,396.83	581,134.18	0.00	19.84	
CG 151+500.00	-0.08	-0.03			
CG 151+500.00	1,927,259.72	581,618.30	0.00	25.56	
CG 152+000.00	-0.08	-0.03			
CG 152+000.00	1,927,045.59	582,077.00	0.00	26.36	
CG 152+500.00	-0.07	-0.03			
CGL 152+500.00	1,926,333.52	582,257.56	-431.58	19.34	
CG 152+500.00	1,926,734.22	582,417.87	0.00	26.33	
CG 153+000.00	-0.08	-0.03			
CG 153+000.00	1,926,587.50	582,901.01	0.00	27.02	
CG 153+500.00	-0.12	-0.05			
CG 153+500.00	1,926,430.96	583,379.56	0.00	26.78	

17/18

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CG 154+000.00	-0.08	-0.03			
CG 154+000.00	1,926,200.57	583,822.24	0.00	26.57	
CG 154+500.00	-0.07	-0.04			
CGR 154+500.00	1,925,899.26	584,224.40	0.00	25.84	
CG 155+000.00	-0.07	-0.10			
CGR 155+000.00	1,925,585.05	584,558.91	0.00	26.22	
CG 155+500.00	-0.07	-0.10			
CGR 155+500.00	1,925,131.56	584,838.37	0.00	26.15	River Bed
CG 156+000.00	-0.07	-0.10			
CGR 156+000.00	1,924,679.79	585,072.41	0.00	26.95	River Bed

18/18

Table 1.2.1 Coordinates and Elevation of Each Cross Sections (7/7)

Section Data Chico River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
CH 0+000.00	1,987,056.58	564,340.49	0.00	13.42	
CH 0+500.00	1,986,414.03	564,509.35	0.00	8.75	
CH 1+000.00	1,985,979.59	564,261.17	0.00	10.27	
CH 1+500.00	1,985,505.86	564,169.92	0.00	13.33	
CH 2+000.00	1,985,028.45	563,906.55	0.00	7.73	
CH 2+500.00	1,984,519.34	563,898.20	0.00	14.01	
CH 3+000.00	1,984,068.88	563,874.48	0.00	14.87	
CH 3+500.00	1,983,641.87	563,963.06	0.00	26.67	
CH 4+000.00	1,983,186.53	563,904.67	0.00	14.32	
CH 4+500.00	1,982,886.23	563,471.92	0.00	14.07	
CH 5+000.00	1,982,839.17	562,923.43	0.00	15.11	
CH 5+500.00	1,982,784.17	562,464.69	0.00	15.81	
CH 6+000.00	1,982,733.08	562,085.99	0.00	14.61	
CH 6+500.00	1,982,472.96	561,551.26	0.00	16.15	
CH 7+000.00	1,981,981.77	561,344.68	0.00	10.71	
CH 7+500.00	1,981,644.88	561,586.57	0.00	12.21	
CH 8+000.00	1,981,229.93	561,853.20	0.00	5.72	
CH 8+500.00	1,980,738.47	562,041.65	0.00	9.38	
CH 9+000.00	1,980,402.35	561,854.83	0.00	12.06	
CH 9+500.00	1,980,128.21	561,385.82	0.00	12.92	
CH 10+000.00	1,980,042.30	560,856.28	0.00	13.57	
CH 10+500.00	1,979,788.83	560,429.58	0.00	14.19	
CH 11+000.00	1,979,496.09	559,926.26	0.00	10.91	
CH 11+500.00	1,979,130.74	559,593.91	0.00	10.60	
CH 12+000.00	1,978,849.67	559,438.18	0.00	9.90	
CH 12+500.00	1,978,173.97	559,284.19	0.00	10.79	

1/1

Section Data Tuguegarao River

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
TG 0+000.00	0.00	0.00			
TG 0+000.00	1,947,473.56	577,025.33	0.00	17.45	ELEV.
TG 0+885.00=PINACANAUAN SPILLWAY	-0.05	0.06			
TG 0+885.00=PINACANAUAN SPILLWAY	1,948,127.35	577,980.55	0.00	15.80	
TG 0+500.00	-0.07	0.09			
TG 0+500.00	1,947,819.39	577,763.05	0.00	15.52	
TG 1+000.00	-0.05	0.07			
TG 1+000.00	1,948,192.46	578,085.12	0.00	13.45	ELEV.
TG 1+500.00	-0.01	0.08			
TG 1+500.00	1,948,675.98	578,221.08	0.00	18.17	ELEV.
TG 2+000.00	-0.02	0.08			
TG 2+000.00	1,949,211.90	578,234.05	0.00	18.38	ELEV.
TG 2+500.00	-0.01	0.08			
TG 2+500.00	1,949,703.70	578,341.19	0.00	15.46	ELEV.
TG 3+000.00	-1.17	1.44			
TG 3+000.00	1,950,032.22	578,661.09	0.00	21.09	90.101
TG 3+500.00	-0.08	0.01			
TG 3+500.00	1,950,531.85	578,894.46	0.00	23.24	ELEV.
TG 4+000.00	-0.08	0.00			
TG 4+000.00	1,950,468.23	579,390.26	0.00	18.92	
TG 4+500.00	-0.07	0.05			
TG 4+500.00	1,950,620.61	579,887.16	0.00	18.48	
TG 5+000.00	-0.08	0.10			
TG 5+000.00	1,950,708.73	580,547.78	0.00	22.44	
TG 5+500.00	-0.07	-0.04			
TG 5+500.00	1,950,927.06	580,759.25	0.00	19.58	PTR
TG 6+000.00	-0.03	-0.08			
TG 6+000.00	1,950,531.87	581,130.94	0.00	27.00	PTL
TG 6+500.00	-0.14	-0.20			
TG 6+500.00	1,950,280.54	581,575.51	0.00	23.11	PTR = TOP
TG 7+000.00=PINACANAUAN BRIDGE	-0.06	-0.10			
TG 7+000.00=PINACANAUAN BRIDGE	1,949,913.23	581,954.92	0.00	30.12	PTR
TG 7+500.00	-0.02	-0.07			
TG 7+500.00	1,949,531.76	582,271.29	0.00	25.84	PTR = TOP
TG 8+000.00	-0.04	-0.07			
TG 8+000.00	1,949,074.09	582,510.59	0.00	24.96	PTR
TG 8+500.00	-0.07	0.04			
TG 8+500.00	1,948,858.56	582,987.65	0.00	24.60	PTR
TG 9+000.00	-0.11	0.08			
TG 9+000.00	1,948,824.17	583,482.38	0.00	24.64	PTL = TOP
TG 9+500.00	-0.03	0.07			
TG 9+500.00	1,949,186.57	583,882.79	0.00	24.72	89.5615
TG 10+000.00	-0.02	0.08			
TG 10+000.00	1,949,710.58	583,870.49	0.00	26.12	
TG 10+500.00	-0.06	0.06			
TG 10+500.00	1,950,044.28	584,199.85	0.00	26.02	
TG 11+000.00	-0.06	0.05			
TG 11+000.00	1,950,349.66	584,616.94	0.00	28.31	
TG 11+500.00	-0.05	0.06			
TG 11+500.00	1,950,663.33	585,051.00	0.00	29.76	
TG 12+000.00	-0.02	0.08			
TG 12+000.00	1,951,128.40	585,302.54	0.00	29.15	

1/2

STATION	NORTHING	EASTING	DISTANCE	ELEV.	REMARKS
TG 12+500.00	-0.02	0.09			
TG 12+500.00	1,951,659.62	584,883.39	0.00	31.40	
TG 13+000.00	-0.03	0.07			
TG 13+000.00	1,952,139.22	584,915.12	0.00	33.28	

2/2

Table 2.3.1 List of Aerial Photographs (1/2)

The list of 1: 5,000 Contact Prints and Diapositives

Line No.	Photo. No.		Quantity	Roll No.	Sets
	from	to			
1	1	7	7	503	1
2	1	7	7	503	1
3	1	6	6	502	1
4	1	9	9	501	1
5	1	29	29	501	1
6	1	33	33	501	1
7	1	39	39	501	1
8	1	40	40	501	1
9	1	45	45	512	1
10	1	43	43	510	1
11	1	51	51	510	1
12	1	46	46	501	1
13	1	44	44	503	1
14	1	43	43	503	1
15	1	39	39	503	1
16	1	38	38	510	1
17	1	36	36	510	1
18A	1	17	17	510	1
18B	1	10	10	501	1
19A	1	17	17	510	1
19B	1	8	8	510	1
20	1	17	17	512	1
21	1	16	16	510	1
22	1	17	17	510	1
23	1	17	17	512	1
24	1	16	16	510	1
25	1	19	19	502	1
26	1	19	19	502	1
27	1	18	18	502	1
28	1	13	13	502	1
29	1	8	8	502	1
30	1	9	9	502	1
31	1	8	8	502	1
32	1	9	9	507	1
33A	1	7	7	510	1
34	1	24	24	507	1
35	1	27	27	512	1
36	1	38	38	512	1
37	1	48	48	509	1
38	1	54	54	509	1
39	1	58	58	507	1
40	1	53	53	508	1
41	1	52	52	508	1
42	1	48	48	508	1
43	1	44	44	508	1
44	1	48	48	511	1
45	1	50	50	511	1
46	1	45	45	509	1
47	1	47	47	509	1
48	1	32	32	509	1
48A	1	15	15	513	1
49	1	49	49	509	1
50	1	50	50	508	1
51	1	50	50	507	1
52	1	51	51	506	1
53	1	41	41	506	1
54	1	39	39	506	1
55	1	37	37	511	1
56	1	38	38	511	1
57	1	41	41	511	1
58	1	43	43	507	1
59	1	39	39	503	1
60	1	41	41	503	1
61	1	47	47	504	1
62	1	40	40	504	1
63	1	42	42	504	1
64	1	41	41	504	1
65	1	42	42	504	1
66	1	37	37	504	1
67	1	37	37	513	1
68	1	38	38	505	1
69	1	38	38	505	1
70	1	38	38	513	1
71	1	24	24	505	1
72	1	24	24	505	1
73	1	21	21	505	1
74	1	22	22	505	1
75	1	21	21	505	1
76	1	19	19	505	1
77	1	15	15	513	1
78	1	11	11	513	1
79	1	9	9	513	1
80	1	7	7	513	1
81	1	4	4	513	1
Total			2579		

Table 2.3.1 List of Aerial Photographs (2/2)

The list of 1:10,000 Contact Prints and Diapositives

Line No.	Photo. No. from	Photo. No. to	Quantity	Roll No.	Sets
1A	1	9	9	1002	1
2A	1	16	16	1001	1
2AA	17	44	28	1003	1
3A	1	45	45	1010	1
3B	1	8	8	1010	1
3C	1	9	9	1004	1
4A	1	46	46	1003	1
4B	1	19	19	1005	1
4C	1	17	17	1004	1
5A	1	45	45	1012	1
5B	1	16	16	1002	1
5C	1	19	19	1009	1
5D	1	18	18	1004	1
6AA	1	47	47	1003	1
6B	1	22	22	1002	1
6C	1	19	19	1005	1
6D	1	28	28	1004	1
7B	14	67	54	1002	1
7A	1	48	48	1007	1
7C	1	18	18	1003	1
7CA		19	1	1009	1
8A	1	14	14	1003	1
8B	1	25	25	1005	1
8C	1	66	66	1002	1
8D	1	26	26	1004	1
9A	1	11	11	1003	1
9B	1	71	71	1005	1
9B	72	137	66	1005	1
10	85	136	52	1002	1
10A	1	84	84	1003	1
11	1	70	70	1001	1
11	71	131	61	1001	1
12	1	109	109	1001	1
12A	110	140	31	1009	1
13	1	69	69	1007	1
13	70	140	71	1007	1
14	64	123	60	1008	1
14B	13	63	51	1009	1
14C	124	151	28	1009	1
14G	1	14	14	1011	1
15	1	71	71	1008	1
15	72	120	49	1008	1
15A	121	153	33	1009	1
16	1	17	17	1010	1
17	1	20	20	1009	1
18	1	20	20	1009	1
19	1	11	11	1009	1
20	1	8	8	1009	1
21	1	10	10	1009	1
22	1	20	20	1006	1
23	1	21	21	1006	1
24	1	22	22	1006	1
25	1	23	23	1006	1
26	1	24	24	1006	1
27	1	26	26	1006	1
28	1	16	16	1004	1
29	1	14	14	1004	1
30	1	13	13	1004	1
31	1	10	10	1004	1
32	1	10	10	1004	1
33	1	25	25	1011	1
34	1	25	25	1006	1
35	1	25	25	1004	1
36	1	11	11	1004	1
37	1	35	35	1006	1
38	1	34	34	1011	1
39	1	32	32	1008	1
40	1	34	34	1008	1
41	1	9	9	1011	1
42	1	21	21	1010	1
43	1	22	22	1010	1
44	1	12	12	1010	1
45	1	7	7	1010	1
46	1	12	12	1010	1
47	1	10	10	1006	1
48	1	12	12	1006	1
T1	1	14	14	1007	1
T2	1	12	12	1007	1
T3	1	10	10	1010	1
T4	1	6	6	1010	1
T5	1	28	28	1010	1
T6	1	9	9	1010	1
T7	1	27	27	1010	1
T8	1	10	10	1010	1
T9	1	18	18	1005	1
T10	1	25	25	1011	1
T11	1	9	9	1005	1
T12	1	16	16	1005	1
T13	1	24	24	1004	1
T14	1	13	13	1004	1
T15	1	19	19	1004	1
T16	1	19	19	1008	1
T17	1	8	8	1007	1
T18	1	17	17	1006	1
T19	1	9	9	1004	1
T20	1	8	8	1004	1
Total			2576		

Table 3.3.1 List of Coordinate of GPS Control Station (1/4)

GPS Survey **CAGAYAN** (30 October 2000)

P T M GRID COORDINATES

Station	*Northing*	*Easting*	*Elevation*
CGY 1	1,961,687.126	548,164.944	49.690
CGY 5	2,047,641.359	621,285.363	6.583
CGY 8	1,948,746.178	576,965.346	46.534
CGY 11	2,032,850.922	541,665.846	14.215
ISB 52	1,878,799.613	607,262.752	108.895
CRB 1	1,917,416.119	585,090.950	24.469
CRB 2	1,916,805.766	578,691.672	30.293
CRB 3	1,919,632.113	581,652.005	25.268
CRB 4	1,922,600.948	586,733.484	27.422
CRB 5	1,923,630.132	583,807.035	26.751
CRB 6	1,922,840.322	578,909.312	24.980
CRB 7	1,926,885.607	576,738.765	31.790
CRB 8	1,927,882.598	582,519.989	25.720
CRB 9	1,927,471.787	585,500.534	27.720
CRB 10	1,933,004.225	578,450.820	58.496
CRB 11	1,931,835.425	583,279.959	22.045
CRB 12	1,931,394.668	585,142.648	53.900
CRB 13	1,935,261.000	581,106.583	24.049
CRB 14	1,935,431.296	586,665.080	119.666
CRB 15	1,937,993.421	583,127.922	20.838
CRB 16	1,940,098.915	585,367.672	94.164
CRB 17	1,940,156.253	579,429.926	23.913
CRB 18	1,942,861.679	576,668.926	21.587
CRB 19	1,942,671.040	572,380.443	27.095
CRB 20	1,945,285.581	579,756.649	18.761
CRB 21	1,944,186.271	583,227.499	58.354
CRB 22	1,945,095.366	575,062.235	17.784
CRB 23	1,946,429.717	573,791.465	19.400
CRB 24	1,947,250.725	575,952.105	(17.51)
CRB 25	1,945,983.065	577,736.287	(21.95)
CRB 26	1,947,440.690	581,077.103	38.309
CRB 27	1,948,308.378	571,005.061	112.062
CRB 28	1,947,784.587	572,978.062	14.550
CRB 29	1,947,993.208	574,883.161	20.770
CRB 30	1,948,560.931	578,996.572	22.887
CRB 31	1,949,061.339	577,265.399	22.971
CRB 32	1,948,881.121	574,011.447	19.570
CRB 33	1,948,469.012	572,149.482	23.841
CRB 34	1,949,413.475	575,523.379	(20.16)
CRB 35	1,950,316.815	574,175.750	(18.66)
CRB 36	1,950,574.982	575,404.455	20.044
CRB 37	1,950,795.060	577,301.085	20.577
CRB 38	1,950,910.318	579,710.806	47.029
CRB 39	1,953,240.290	575,857.168	17.488
CRB 40	1,952,753.563	577,537.335	20.432
CRB 41	1,953,697.609	579,223.273	20.509
CRB 42	1,953,340.250	572,852.936	17.910
CRB 43	1,954,785.370	574,297.352	20.033
CRB 44	1,954,533.048	576,430.087	(17.28)
CRB 45	1,955,220.411	578,532.744	13.017
CRB 46	1,955,797.007	581,433.610	(61.07)
CRB 47	1,956,275.437	578,835.230	(19.77)
CRB 48	1,956,641.123	577,194.866	15.904
CRB 49	1,956,597.393	575,574.988	18.701
CRB 50	1,957,442.962	573,799.014	18.147
CRB 51	1,958,398.253	576,993.404	(14.73)
CRB 52	1,958,464.536	579,858.400	(28.57)
CRB 53	1,959,864.380	580,978.755	51.066
CRB 54	1,959,068.778	575,858.440	13.980
CRB 55	1,959,959.865	574,611.532	13.785
CRB 56	1,960,432.711	578,483.858	14.604
CRB 57	1,961,742.395	577,400.826	(15.04)
CRB 58	1,962,150.265	575,445.510	14.414
CRB 59	1,963,306.842	571,942.685	(13.71)
CRB 60	1,964,144.376	575,086.496	15.259
CRB 61	1,964,172.071	576,551.307	13.766
CRB 62	1,963,633.964	578,647.592	19.100
CRB 63	1,964,883.491	573,202.463	12.717
CRB 64	1,965,029.629	579,573.161	31.850
CRB 65	1,965,461.886	571,799.293	20.643
CRB 66	1,965,335.333	577,911.352	17.720
CRB 67	1,965,934.714	570,585.748	11.000
CRB 68	1,965,724.260	576,300.160	18.589
CRB 69	1,966,633.852	574,546.232	11.151
CRB 70	1,967,596.949	570,050.725	11.200
CRB 71	1,967,318.837	573,824.498	11.690
CRB 72	1,969,277.716	568,171.465	14.202
CRB 73	1,968,711.904	572,406.098	13.190
CRB 74	1,968,799.754	575,488.597	13.487
CRB 75	1,967,615.340	577,853.507	19.000
CRB 76	1,969,830.973	580,012.736	23.330
CRB 77	1,969,792.835	576,688.241	16.420
CRB 78	1,970,199.227	574,968.115	14.265
CRB 79	1,969,831.132	571,288.681	17.061
CRB 80	1,970,900.864	573,347.367	13.330
CRB 81	1,971,398.842	575,976.070	9.810
CRB 82	1,971,153.262	578,045.045	12.239
CRB 83	1,971,492.965	570,084.800	13.504
CRB 84	1,972,875.403	564,987.763	18.461
CRB 85	1,972,176.465	566,522.979	13.785
CRB 86	1,971,539.876	568,285.219	13.812
CRB 87	1,972,077.679	572,304.749	16.605
CRB 88	1,972,753.798	574,677.020	13.760
CRB 89	1,972,820.582	577,559.681	23.721
CRB 90	1,973,852.976	579,087.050	38.234
CRB 91	1,973,449.240	570,972.546	11.980
CRB 92	1,974,299.047	573,977.300	13.640
CRB 93	1,975,568.974	576,517.750	18.470
CRB 94	1,974,535.070	565,951.839	18.841
CRB 95	1,974,149.435	568,310.424	12.645
CRB 96	1,974,341.009	569,692.369	12.429
CRB 97	1,975,066.988	572,116.174	13.456
CRB 98	1,976,299.784	566,972.828	12.986
CRB 99	1,976,594.623	570,127.442	11.614
CRB 100	1,976,979.493	571,415.798	9.893
CRB 101	1,977,503.901	573,228.170	13.741
CRB 102	1,977,155.550	575,139.955	14.734
CRB 103	1,978,157.032	576,439.973	27.045
CRB 104	1,977,678.989	564,994.937	112.190
CRB 105	1,977,819.445	568,462.732	8.561
CRB 106	1,978,329.904	567,670.387	13.638
CRB 107	1,979,242.298	569,775.775	5.970
CRB 108	1,979,481.311	572,482.526	17.629
CRB 109	1,980,208.660	567,407.498	6.894
CRB 110	1,980,656.885	566,211.085	62.420
CRB 111	1,981,345.573	568,566.063	21.610
CRB 112	1,981,876.406	566,283.323	20.870
CRB 113	1,982,617.114	567,867.832	16.122
CRB 114	1,983,073.600	570,359.306	132.532
CRB 115	1,983,139.900	563,913.220	18.610
CRB 116	1,983,712.229	566,594.120	45.490
CRB 117	1,983,844.325	568,337.700	44.893
CRB 118	1,985,793.076	564,495.724	13.737
CRB 119	1,984,887.433	567,130.929	15.880
CRB 120	1,985,255.188	569,873.273	15.880
CRB 121	1,986,880.921	561,263.139	222.930

Table 3.3.1 List of Coordinate of GPS Control Station (2/4)

CRB 122	1,986,509.946	565,101.882	13.573
CRB 123	1,986,385.911	567,412.971	20.963
CRB 124	1,985,727.067	568,056.362	17.173
CRB 125	1,987,195.141	568,666.556	9.379
CRB 126	1,986,695.360	570,070.518	15.330
CRB 127	1,987,071.999	570,800.563	23.380
CRB 128	1,987,585.669	563,333.630	24.390
CRB 129	1,988,104.606	565,347.934	16.310
CRB 130	1,987,808.441	567,377.251	109.040
CRB 131	1,988,619.422	569,579.483	140.830
CRB 132	1,989,366.770	562,073.679	73.730
CRB 133	1,989,202.217	562,912.112	15.999
CRB 134	1,989,206.440	565,310.811	28.770
CRB 135	1,989,712.862	566,796.365	148.885
CRB 136	1,991,085.429	560,267.277	17.020
CRB 137	1,991,036.335	562,003.832	12.549
CRB 138	1,990,926.214	564,085.129	13.063
CRB 139	1,990,993.894	564,798.640	11.264
CRB 140	1,992,285.317	568,049.821	74.274
CRB 141	1,992,433.407	561,746.855	14.230
CRB 142	1,992,219.120	564,687.410	11.963
CRB 143	1,992,645.929	565,967.590	12.487
CRB 144	1,994,327.406	562,614.266	11.160
CRB 145	1,993,805.465	564,218.165	8.786
CRB 146	1,994,287.460	566,229.083	12.366
CRB 147	1,994,345.655	568,222.967	12.126
CRB 148	1,996,582.318	562,222.851	47.800
CRB 149	1,995,564.261	563,913.759	11.616
CRB 150	1,995,259.452	565,645.249	10.384
CRB 151	1,995,681.819	567,048.936	8.502
CRB 152	1,995,562.817	568,942.806	10.150
CRB 153	1,996,027.659	569,894.278	9.969
CRB 154	1,997,345.973	564,540.522	10.541
CRB 155	1,997,047.311	566,583.616	6.675
CRB 156	1,997,331.876	568,752.617	72.420
CRB 157	1,998,228.111	564,997.577	10.613
CRB 158	1,998,543.506	566,826.450	10.122
CRB 159	1,998,300.963	569,186.076	60.340
CRB 160	1,999,498.029	564,998.811	11.527
CRB 161	1,999,432.310	567,263.531	5.459
CRB 162	1,999,644.172	570,115.761	15.340
CRB 163	1,999,871.915	571,966.217	12.150
CRB 164	2,001,249.949	565,033.975	7.464
CRB 165	2,001,296.410	565,701.225	9.879

CRB 166	2,001,064.121	567,108.372	8.294
CRB 167	2,001,169.356	569,247.660	10.262
CRB 168	2,001,132.716	569,789.778	8.935
CRB 169	2,002,986.316	566,955.682	59.920
CRB 170	2,002,716.066	568,530.408	12.776
CRB 171	2,002,668.720	570,573.780	9.401
CRB 172	2,003,488.135	569,447.008	45.072
CRB 173	2,002,817.561	572,180.352	67.300
CRB 174	2,004,320.401	567,369.872	56.340
CRB 175	2,004,110.307	569,869.606	48.392
CRB 176	2,003,895.187	570,949.460	9.857
CRB 177	2,003,258.884	571,535.061	11.982
CRB 178	2,003,995.628	574,115.530	93.740
CRB 179	2,004,607.213	571,400.638	16.281
CRB 180	2,006,272.653	566,088.553	15.110
CRB 181	2,006,071.861	569,161.507	18.760
CRB 182	2,004,914.093	569,900.715	17.938
CRB 183	2,005,920.858	570,612.309	10.321
CRB 184	2,006,003.444	571,264.673	25.064
CRB 185	2,009,363.913	565,100.096	5.270
CRB 186	2,008,361.004	567,257.878	7.205
CRB 187	2,008,736.865	569,780.249	5.447
CRB 188	2,009,656.545	572,786.153	11.320
CRB 189	2,013,262.029	566,129.554	7.140
CRB 190	2,013,404.727	568,002.864	6.990
CRB 191	2,012,822.520	572,736.996	44.249
CRB 192	2,016,466.014	567,450.496	9.590
CRB 193	2,017,737.934	570,365.175	3.052
CRB 194	2,018,039.990	574,127.399	6.648
CRB 195	2,021,442.007	567,041.947	6.130
CRB 196	2,021,055.432	573,890.775	1.310
CRB 197	2,022,108.376	568,923.727	2.708
CRB 198	2,024,989.300	564,547.513	3.581
CRB 199	2,025,969.326	569,160.018	2.139
CRB 200	2,027,146.975	572,394.420	1.181
CRB 201	2,028,181.818	565,952.927	0.439
CRB 202	2,027,890.562	561,805.872	2.050
CRB 203	2,033,418.370	560,871.913	1.817
CRB 204	2,030,845.492	566,476.396	2.594
CRB 205	2,029,303.211	569,930.065	1.327
CRB 206	1,985,206.597	568,983.257	14.999

Table 3.3.1 List of Coordinate of GPS Control Station (3/4)

****** Adjusted Coordinates******

Projection Group : Geographic
Zone Name:Global
Linear Units: meter
Angular Units: degrees
Datum Name: WGS-84

Station Short Name	*Station ID*	*Latitude*	*Longitude*	*Ortho. Height*	*Ellip. Height*
CGY1		17°44'06.20931" N	121°27'19.52074" E	49.690	87.829
CGY11		18°22'41.39284" N	121°23'44.02150" E	14.215	49.419
CGY8		17°37'02.37511" N	121°43'35.38468" E	46.534	84.335
CRB1		17°20'02.27732" N	121°48'06.55898" E	30.182	68.596
CRB10		17°28'30.16466" N	121°44'23.70715" E	63.083	101.263
CRB100		17°52'21.35114" N	121°40'30.55975" E	14.027	51.441
CRB101		17°52'38.19359" N	121°41'32.18668" E	18.142	55.498
CRB102		17°52'26.63160" N	121°42'37.08163" E	19.234	56.541
CRB103		17°52'59.04397" N	121°43'21.37050" E	19.541	56.789
CRB104		17°52'44.81801" N	121°36'52.53593" E	118.117	155.641
CRB105		17°52'49.00845" N	121°38'50.34962" E	13.050	50.512
CRB106		17°53'05.69953" N	121°38'23.49336" E	18.076	55.541
CRB107		17°53'35.13922" N	121°39'35.12186" E	10.507	47.912
CRB108		17°53'42.59842" N	121°41'07.10327" E	22.156	59.494
CRB109		17°54'06.83628" N	121°38'14.77931" E	11.441	48.869
CRB11		17°27'51.52499" N	121°47'07.21513" E	27.465	65.439
CRB110		17°54'21.54590" N	121°37'34.18395" E	66.659	104.096
CRB111		17°54'43.68633" N	121°38'54.27266" E	26.170	63.553
CRB112		17°55'01.20380" N	121°37'36.77637" E	24.347	61.754
CRB113		17°55'25.12183" N	121°38'30.69781" E	20.706	58.072
CRB114		17°55'39.68723" N	121°39'55.40608" E	137.052	174.364
CRB115		17°55'42.55243" N	121°36'16.38732" E	21.315	58.721
CRB116		17°56'00.88124" N	121°37'47.54520" E	49.567	86.926
CRB117		17°56'04.98505" N	121°38'46.80618" E	49.410	86.741
CRB118		17°57'08.78747" N	121°36'36.47294" E	16.933	54.264
CRB119		17°56'39.04650" N	121°38'05.92073" E	19.822	57.146
CRB12		17°27'36.93877" N	121°48'10.27910" E	59.174	97.059
CRB120		17°56'50.69983" N	121°39'39.15289" E	20.457	57.730
CRB121		17°57'44.50403" N	121°34'46.73362" E	226.254	263.580
CRB122		17°57'32.03965" N	121°36'57.15198" E	16.682	53.989
CRB123		17°57'27.75410" N	121°38'15.67803" E	24.624	61.907
CRB124		17°57'06.25341" N	121°38'37.46602" E	21.843	59.133
CRB125		17°57'53.93455" N	121°38'58.37496" E	14.102	51.348
CRB126		17°57'37.51918" N	121°39'46.02866" E	20.076	57.312
CRB127		17°57'49.68500" N	121°40'10.88440" E	28.165	65.380
CRB128		17°58'07.21458" N	121°35'57.17603" E	28.124	65.416
CRB129		17°58'23.88046" N	121°37'05.69263" E	20.114	57.376
CRB13		17°29'43.23068" N	121°45'54.02147" E	28.973	66.951
CRB130		17°58'14.02642" N	121°38'14.62847" E	112.720	149.968
CRB131		17°58'40.15622" N	121°39'29.57095" E	145.704	182.902
CRB132		17°59'05.27581" N	121°35'14.54473" E	78.343	115.592
CRB133		17°58'59.83750" N	121°35'43.02479" E	20.574	57.824
CRB134		17°58'59.72212" N	121°37'04.55447" E	33.022	70.255
CRB135		17°59'16.03253" N	121°37'55.10470" E	153.714	190.918
CRB136		18°00'01.35795" N	121°34'13.32414" E	22.166	59.370
CRB137		17°59'59.58658" N	121°35'12.34854" E	17.476	54.676
CRB138		17°59'55.78900" N	121°36'23.08422" E	18.447	55.640
CRB139		17°59'57.91469" N	121°36'47.34535" E	16.267	53.453
CRB14		17°29'48.02460" N	121°49'02.45489" E	124.833	162.501
CRB140		18°00'39.56325" N	121°38'38.01025" E	79.065	116.187
CRB141		18°00'45.05333" N	121°35'03.76162" E	19.415	56.573
CRB142		18°00'37.77756" N	121°36'43.70074" E	17.350	54.501
CRB143		18°00'51.52197" N	121°37'27.26772" E	17.312	54.442
CRB144		18°01'46.56785" N	121°35'33.45309" E	16.150	53.247
CRB145		18°01'29.42388" N	121°36'27.92447" E	13.785	50.891
CRB146		18°01'44.88476" N	121°37'36.34428" E	17.390	54.471
CRB147		18°01'46.55664" N	121°38'44.13827" E	18.232	55.295
CRB148		18°02'59.95020" N	121°35'20.38753" E	52.800	89.826
CRB149		18°02'26.66150" N	121°36'17.76928" E	16.594	53.648
CRB15		17°31'11.83994" N	121°47'02.91499" E	25.952	63.741
CRB150		18°02'16.56250" N	121°37'16.60527" E	15.376	52.431
CRB151		18°02'30.14654" N	121°38'04.37846" E	13.390	50.424
CRB152		18°02'26.06353" N	121°39'08.75569" E	15.362	52.383
CRB153		18°02'41.07346" N	121°39'41.16135" E	14.892	51.891
CRB154		18°03'24.54586" N	121°36'39.27752" E	15.563	52.559
CRB155		18°03'14.61065" N	121°37'48.71438" E	11.778	48.774
CRB156		18°03'23.62399" N	121°39'02.49913" E	77.426	114.398
CRB157		18°03'53.18871" N	121°36'54.91773" E	15.695	52.661
CRB158		18°04'03.24788" N	121°37'57.14394" E	15.243	52.192
CRB159		18°03'55.09419" N	121°39'17.35371" E	65.406	102.346
CRB16		17°32'20.02061" N	121°48'19.14303" E	99.562	137.166
CRB160		18°04'34.49293" N	121°36'55.10223" E	16.583	53.509
CRB161		18°04'32.10789" N	121°38'12.11012" E	10.604	47.523
CRB162		18°04'38.67490" N	121°39'49.12980" E	20.509	57.401
CRB163		18°04'45.86451" N	121°40'52.08573" E	17.300	54.168
CRB164		18°05'31.47065" N	121°36'56.49501" E	12.732	49.600
CRB165		18°05'32.90965" N	121°37'19.19330" E	15.128	51.993
CRB166		18°05'25.19980" N	121°38'07.02304" E	13.483	50.351
CRB167		18°05'28.38117" N	121°39'19.79118" E	15.504	52.357
CRB168		18°05'27.12705" N	121°39'38.22383" E	14.136	50.987
CRB169		18°06'27.73618" N	121°38'02.05287" E	65.084	101.890
CRB17		17°32'22.66951" N	121°44'57.83795" E	28.542	66.453
CRB170		18°06'18.76953" N	121°38'55.58137" E	18.096	54.905
CRB171		18°06'16.99413" N	121°40'05.07476" E	14.691	51.489
CRB172		18°06'43.77622" N	121°39'26.84967" E	50.360	87.140
CRB173		18°06'21.64527" N	121°40'59.73575" E	72.505	109.285
CRB174		18°07'11.08111" N	121°38'16.29627" E	61.439	98.201
CRB175		18°07'03.96342" N	121°39'41.29898" E	53.175	89.933
CRB176		18°06'56.84063" N	121°40'18.00308" E	15.153	51.911
CRB177		18°06'36.07590" N	121°40'37.84282" E	17.191	53.963
CRB178		18°06'59.72680" N	121°42'05.70621" E	98.978	135.702
CRB179		18°07'19.94581" N	121°40'33.43758" E	21.559	58.291
CRB18		17°33'51.01204" N	121°43'24.57465" E	26.078	64.044
CRB180		18°08'14.71960" N	121°37'32.93592" E	19.795	56.492
CRB181		18°08'07.84404" N	121°39'17.44865" E	23.586	60.284
CRB182		18°07'30.10269" N	121°39'42.45453" E	22.727	59.459
CRB183		18°08'02.76451" N	121°40'06.78330" E	15.673	52.369
CRB184		18°08'05.37376" N	121°40'28.98531" E	30.337	67.027
CRB185		18°09'55.37008" N	121°36'59.65950" E	10.012	46.598
CRB186		18°09'22.51342" N	121°38'12.95836" E	12.105	48.729
CRB187		18°09'34.46108" N	121°39'38.81991" E	10.761	47.369
CRB188		18°10'04.00695" N	121°41'21.20439" E	16.344	52.908
CRB189		18°12'02.04314" N	121°37'35.13421" E	12.605	49.050
CRB19		17°33'45.32380" N	121°40'59.13263" E	31.378	69.527
CRB190		18°12'06.47512" N	121°38'38.90105" E	12.446	48.891
CRB191		18°11'46.98418" N	121°41'19.93278" E	49.052	85.511
CRB192		18°13'46.10398" N	121°38'20.46357" E	15.128	51.457
CRB193		18°14'27.13693" N	121°39'59.82426" E	8.966	45.254
CRB194		18°14'36.50735" N	121°42'07.92241" E	11.891	48.166
CRB195		18°16'27.99095" N	121°38'07.14115" E	11.828	47.960
CRB196		18°16'14.61067" N	121°42'00.25791" E	6.374	42.542
CRB197		18°16'49.45002" N	121°39'11.28668" E	8.414	44.531
CRB198		18°18'23.63925" N	121°36'42.61905" E	9.288	45.252
CRB199		18°18'54.99694" N	121°39'19.79972" E	7.392	43.352
CRB2		17°19'43.25352" N	121°44'29.76126" E	34.914	73.691
CRB20		17°35'09.46426" N	121°45'09.59954" E	23.162	60.918
CRB200		18°19'32.91466" N	121°41'10.08969" E	6.293	42.223
CRB201		18°20'07.32005" N	121°37'30.84499" E	6.018	41.858
CRB202		18°19'58.29148" N	121°35'09.57656" E	7.589	43.394
CRB203		18°22'58.17660" N	121°34'38.36069" E	7.496	43.037
CRB204		18°21'33.89548" N	121°37'48.98416" E	7.839	43.568
CRB205		18°20'43.33839" N	121°39'46.43170" E	6.015	41.841
CRB206		17°56'49.22073" N	121°39'08.90285" E	19.641	56.929

Table 3.3.1 List of Coordinate of GPS Control Station (4/4)

CRB21	17°34'33.25401" N	121°47'07.15215" E	62.964	100.575
CRB22	17°35'03.86102" N	121°42'30.37384" E	21.904	59.880
CRB23	17°35'47.41439" N	121°41'47.44319" E	23.853	61.846
CRB24	17°36'13.85862" N	121°43'00.82619" E	21.684	59.566
CRB25	17°35'32.40626" N	121°44'01.17401" E	25.553	63.387
CRB26	17°36'19.39027" N	121°45'54.67278" E	42.761	80.399
CRB27	17°36'48.84475" N	121°40'13.16453" E	116.249	154.297
CRB28	17°36'31.57920" N	121°41'20.02210" E	18.844	56.833
CRB29	17°36'38.13833" N	121°42'24.66455" E	25.190	63.099
CRB3	17°21'14.80960" N	121°46'10.39399" E	30.623	69.134
CRB30	17°36'56.09490" N	121°44'44.25706" E	27.039	64.750
CRB31	17°37'12.58882" N	121°43'45.60306" E	27.545	65.325
CRB32	17°37'07.12317" N	121°41'55.20803" E	23.992	61.914
CRB33	17°36'53.93784" N	121°40'52.00109" E	28.242	66.245
CRB34	17°37'24.25663" N	121°42'46.55922" E	24.663	62.510
CRB35	17°37'53.80118" N	121°42'00.95982" E	23.131	61.011
CRB36	17°38'02.05034" N	121°42'42.67238" E	24.619	62.443
CRB37	17°38'08.97526" N	121°43'47.03856" E	25.233	62.970
CRB38	17°38'12.41926" N	121°45'08.79718" E	52.005	89.627
CRB39	17°39'28.68633" N	121°42'58.36913" E	22.005	59.749
CRB4	17°22'50.69653" N	121°49'02.92688" E	33.231	71.342
CRB40	17°39'12.64728" N	121°43'55.30787" E	25.044	62.726
CRB41	17°39'43.13996" N	121°44'52.63015" E	25.250	62.832
CRB42	17°39'32.29795" N	121°41'16.45774" E	23.287	61.146
CRB43	17°40'19.13049" N	121°42'05.64304" E	24.538	62.310
CRB44	17°40'10.66401" N	121°43'17.97263" E	21.845	59.536
CRB45	17°40'32.75803" N	121°44'29.40390" E	17.679	55.262
CRB46	17°40'51.13723" N	121°46'07.90823" E	65.994	103.430
CRB47	17°41'07.03494" N	121°44'39.80731" E	24.637	62.184
CRB48	17°41'19.13589" N	121°43'44.19480" E	20.575	58.188
CRB49	17°41'17.91356" N	121°42'49.22304" E	23.289	60.971
CRB5	17°23'24.56818" N	121°47'23.93770" E	31.850	70.088
CRB50	17°41'45.63081" N	121°41'49.06531" E	22.719	60.452
CRB51	17°42'16.31292" N	121°43'37.58701" E	18.322	55.907
CRB52	17°42'18.10523" N	121°45'14.81990" E	33.536	70.992
CRB53	17°43'03.48996" N	121°45'53.03070" E	56.892	94.270
CRB54	17°42'38.26257" N	121°42'59.15753" E	18.861	56.479
CRB55	17°43'07.39762" N	121°42'16.95412" E	18.556	56.205
CRB56	17°43'22.29726" N	121°44'28.43554" E	19.379	56.858
CRB57	17°44'05.03219" N	121°43'51.85030" E	19.326	56.827
CRB58	17°44'18.54059" N	121°42'45.53705" E	17.965	55.536
CRB59	17°44'56.57756" N	121°40'46.78538" E	17.546	55.218
CRB6	17°22'59.51094" N	121°44'37.91710" E	29.923	68.445
CRB60	17°45'23.44413" N	121°42'33.60489" E	18.792	56.337
CRB61	17°45'24.16473" N	121°43'23.33163" E	18.455	55.942
CRB62	17°45'06.39893" N	121°44'34.41837" E	24.222	61.633
CRB63	17°45'47.71105" N	121°41'29.74258" E	16.137	53.734
CRB64	17°45'51.67420" N	121°45'06.02398" E	36.694	74.038
CRB65	17°46'06.68890" N	121°40'42.18008" E	17.459	55.089
CRB66	17°46'01.82978" N	121°44'09.65195" E	22.437	59.847
CRB67	17°46'22.20825" N	121°40'01.03959" E	15.290	52.947
CRB68	17°46'14.68159" N	121°43'15.00710" E	22.089	59.557
CRB69	17°46'44.48150" N	121°42'15.58004" E	15.079	52.594
CRB7	17°25'11.35893" N	121°43'24.90238" E	36.387	74.862
CRB70	17°47'16.33497" N	121°39'43.07374" E	15.472	53.109
CRB71	17°47'06.84806" N	121°41'51.16331" E	16.129	53.656
CRB72	17°48'11.21457" N	121°38'39.46452" E	19.112	56.762
CRB73	17°47'52.32694" N	121°41'03.17876" E	17.670	55.215
CRB74	17°47'54.81360" N	121°42'47.85021" E	17.377	54.818
CRB75	17°47'15.99518" N	121°44'07.98938" E	23.701	61.073
CRB76	17°48'27.78178" N	121°45'21.59798" E	28.193	65.439
CRB77	17°48'26.96537" N	121°43'28.71113" E	21.041	58.421
CRB78	17°48'40.39583" N	121°42'30.35649" E	17.954	55.389
CRB79	17°48'28.86125" N	121°40'25.37438" E	21.594	59.150
CRB8	17°25'43.05519" N	121°46'40.91829" E	30.413	68.563
CRB80	17°49'03.41261" N	121°41'35.41056" E	17.434	54.909
CRB81	17°49'19.28986" N	121°43'04.73703" E	14.066	51.444
CRB82	17°49'11.04275" N	121°44'14.96140" E	16.902	54.207
CRB83	17°49'23.05207" N	121°39'44.69433" E	17.764	55.320
CRB84	17°50'08.57761" N	121°36'51.76064" E	22.794	60.430
CRB85	17°49'45.67959" N	121°37'43.81860" E	18.084	55.706
CRB86	17°49'24.78060" N	121°38'43.58938" E	18.088	55.686
CRB87	17°49'41.81286" N	121°41'00.15123" E	20.139	57.624
CRB88	17°50'03.51981" N	121°42'20.79667" E	17.751	55.150
CRB89	17°50'05.33420" N	121°43'58.69999" E	28.301	65.597
CRB9	17°25'29.29457" N	121°48'21.85082" E	33.472	71.472
CRB90	17°50'38.71787" N	121°44'50.70810" E	42.862	80.083
CRB91	17°50'26.57926" N	121°40'15.07666" E	15.897	53.391
CRB92	17°50'53.86451" N	121°41'57.22891" E	17.618	55.012
CRB93	17°51'34.85721" N	121°43'23.67454" E	23.019	60.308
CRB94	17°51'02.45705" N	121°37'24.68765" E	23.186	60.767
CRB95	17°50'49.65582" N	121°38'44.74856" E	16.909	54.452
CRB96	17°50'55.73145" N	121°39'31.70587" E	16.841	54.349
CRB97	17°51'19.06396" N	121°40'54.11447" E	17.079	54.511
CRB98	17°51'59.74515" N	121°37'59.56539" E	17.313	54.837
CRB99	17°52'08.98192" N	121°39'46.75158" E	16.185	53.637
CGY5	18°30'31.40056" N	122°08'59.33546" E	6.183	40.951

Table 3.3.2 Aerial Triangulation Results

LOWER CAGAYAN RIVER MAPPING PROJECT

(Summary of Aerial Triangulation)

Scale 1: 1,000

SUB-BLOCK	MODELS	MODEL POINTS	HORIZONTAL CONTROLS	VERTICAL CONTROLS	CRITICAL POINTS	SIGMA (x,y)	SIGMA (z)
Magapit	38	321	11	11	2	0.040	0.039
Nasiping	32	262	7	7	2	0.050	0.055
Tuguegarao	87	723	14	14	0	0.041	0.034

Scale 1: 5,000

SUB-BLOCK	MODELS	MODEL POINTS	HORIZONTAL CONTROLS	VERTICAL CONTROLS	CRITICAL POINTS	SIGMA (x,y)	SIGMA (z)
CagayanA	100	847	23	23	4	0.038	0.036
CagayanB	133	1099	19	19	17	0.031	0.035
CagayanC	153	1263	21	20	20	0.033	0.040
CagayanD	175	1494	21	21	20	0.031	0.033
CagayanE	165	1360	18	18	16	0.034	0.037
CagayanF1	120	977	14	14	11	0.031	0.035
CagayanF2	111	904	11	11	4	0.040	0.041

Scale 1: 10,000

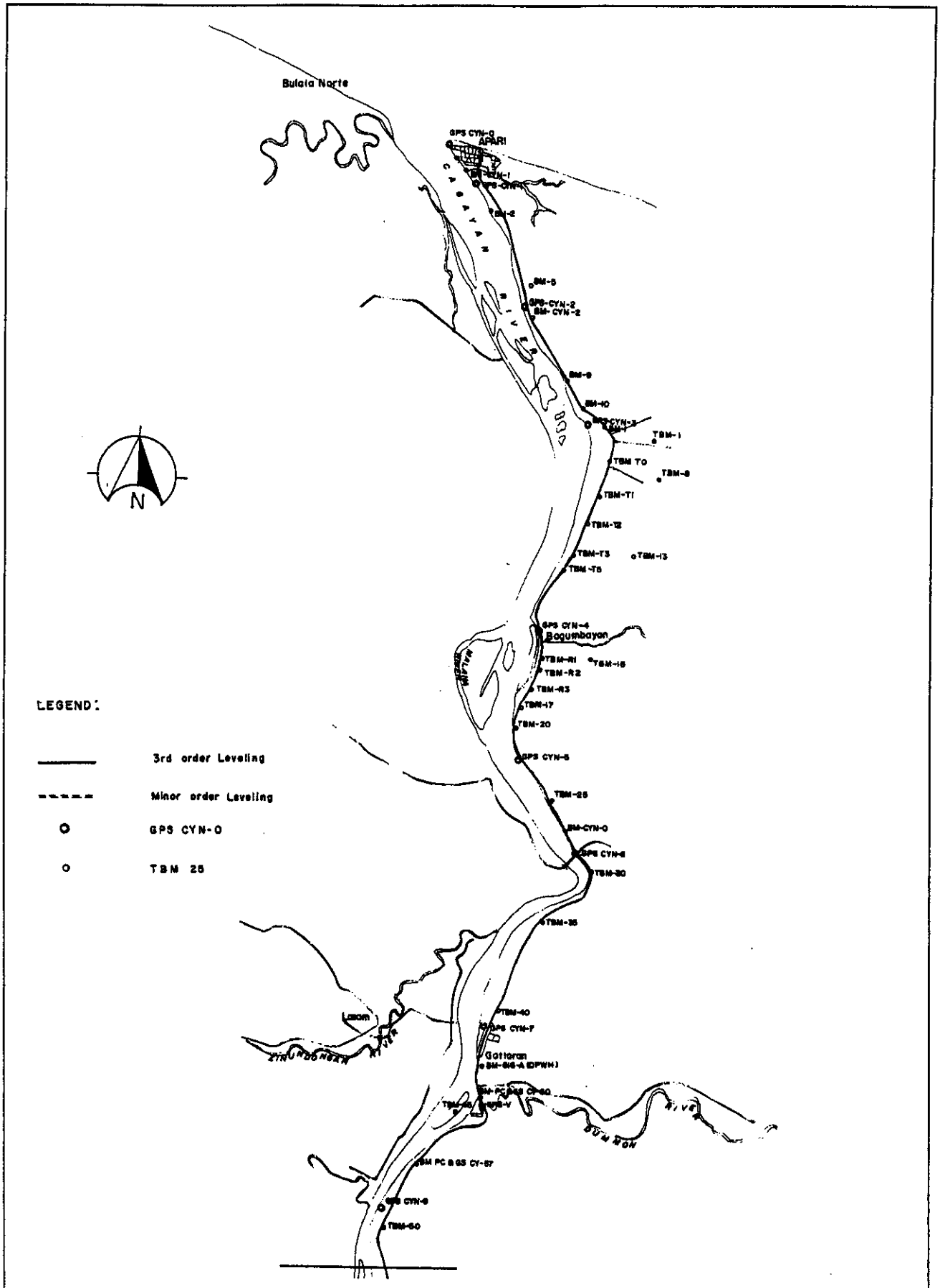
SUB-BLOCK	MODELS	MODEL POINTS	HORIZONTAL CONTROLS	VERTICAL CONTROLS	CRITICAL POINTS	SIGMA (x,y)	SIGMA (z)
CAG1	98	907	14	51	6	0.037	0.037
CAG2	96	863	22	42	13	0.034	0.039
CAG3	93	826	45	45	5	0.039	0.032
CAG4	95	826	37	41	9	0.036	0.035
CAG5	145	1244	44	53	7	0.032	0.033
CAG6	112	997	32	63	12	0.033	0.036
CAG7	106	926	20	25	5	0.029	0.032
CAG8	128	1156	14	45	6	0.028	0.032

Prepared By:

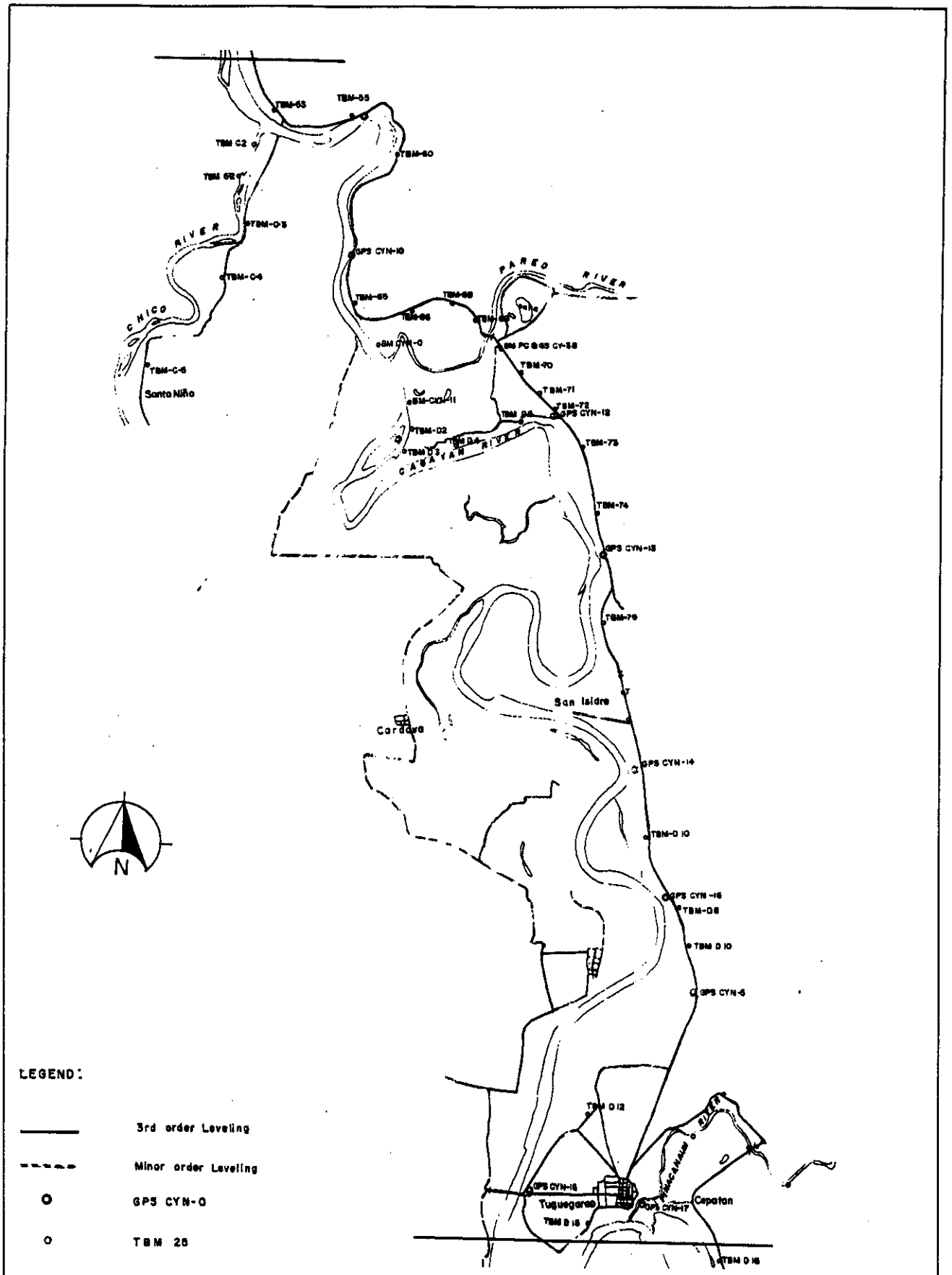
CERTEZA SURVEYING & AEROPHOTO SYSTEMS, INC.

Romel C. Quiatchon
AVP-Mapping

Figures



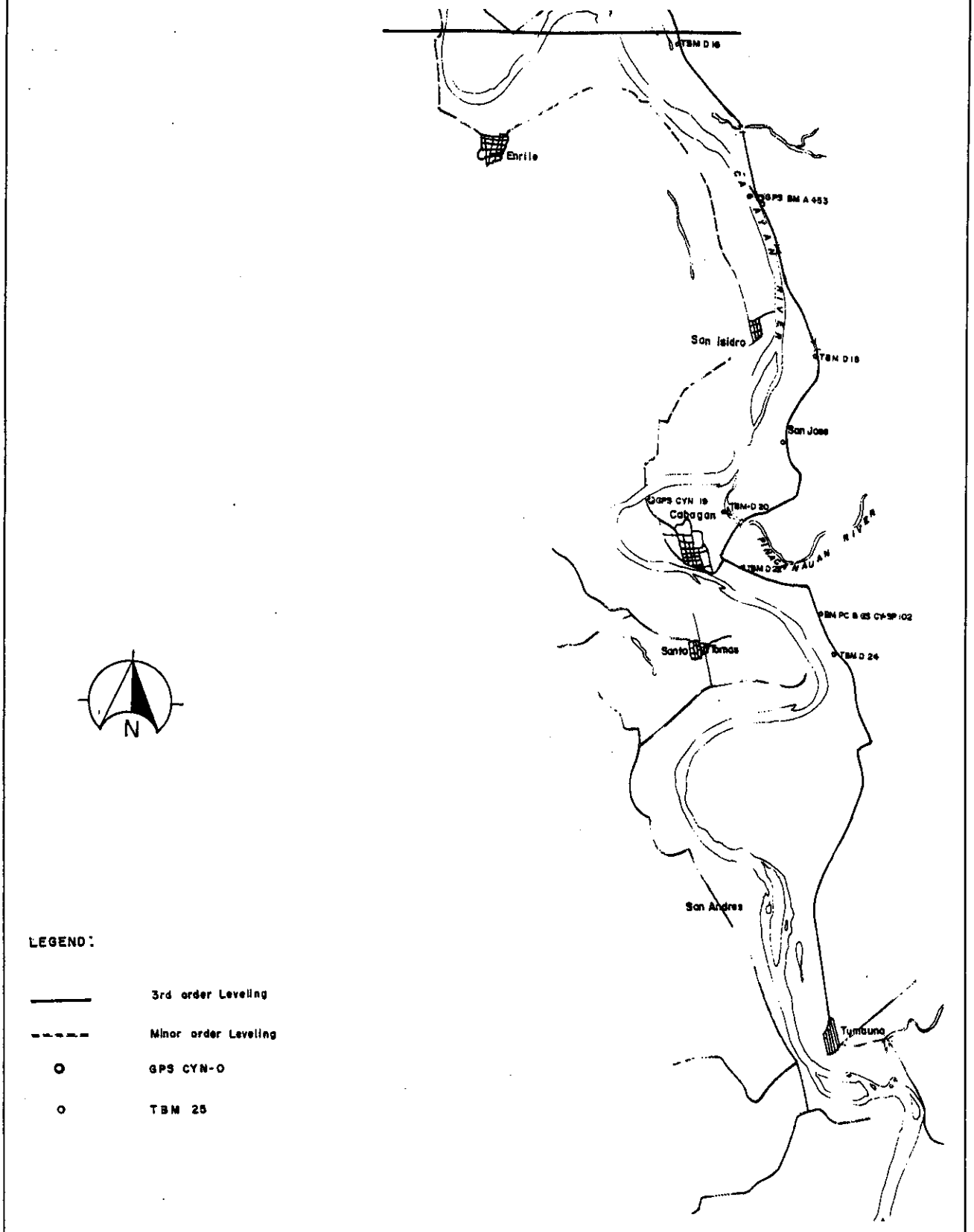
The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 1.1** Benchmark Location Map (1/3)
JAPAN INTERNATIONAL COOPERATION AGENCY	



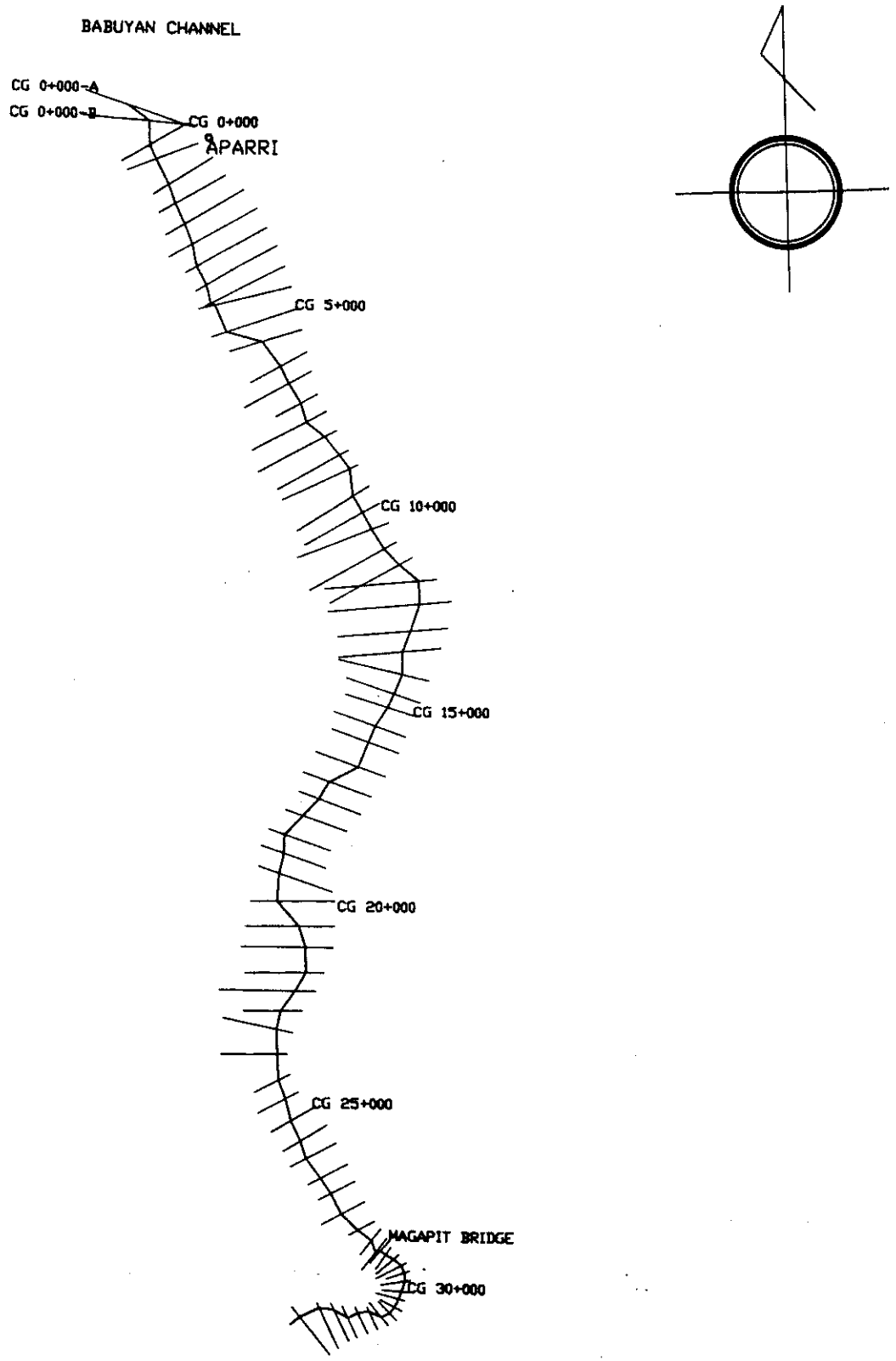
The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 1.1
Benchmark Location Map (2/3)



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 1.1 Benchmark Location Map (3/3)**
JAPAN INTERNATIONAL COOPERATION AGENCY	



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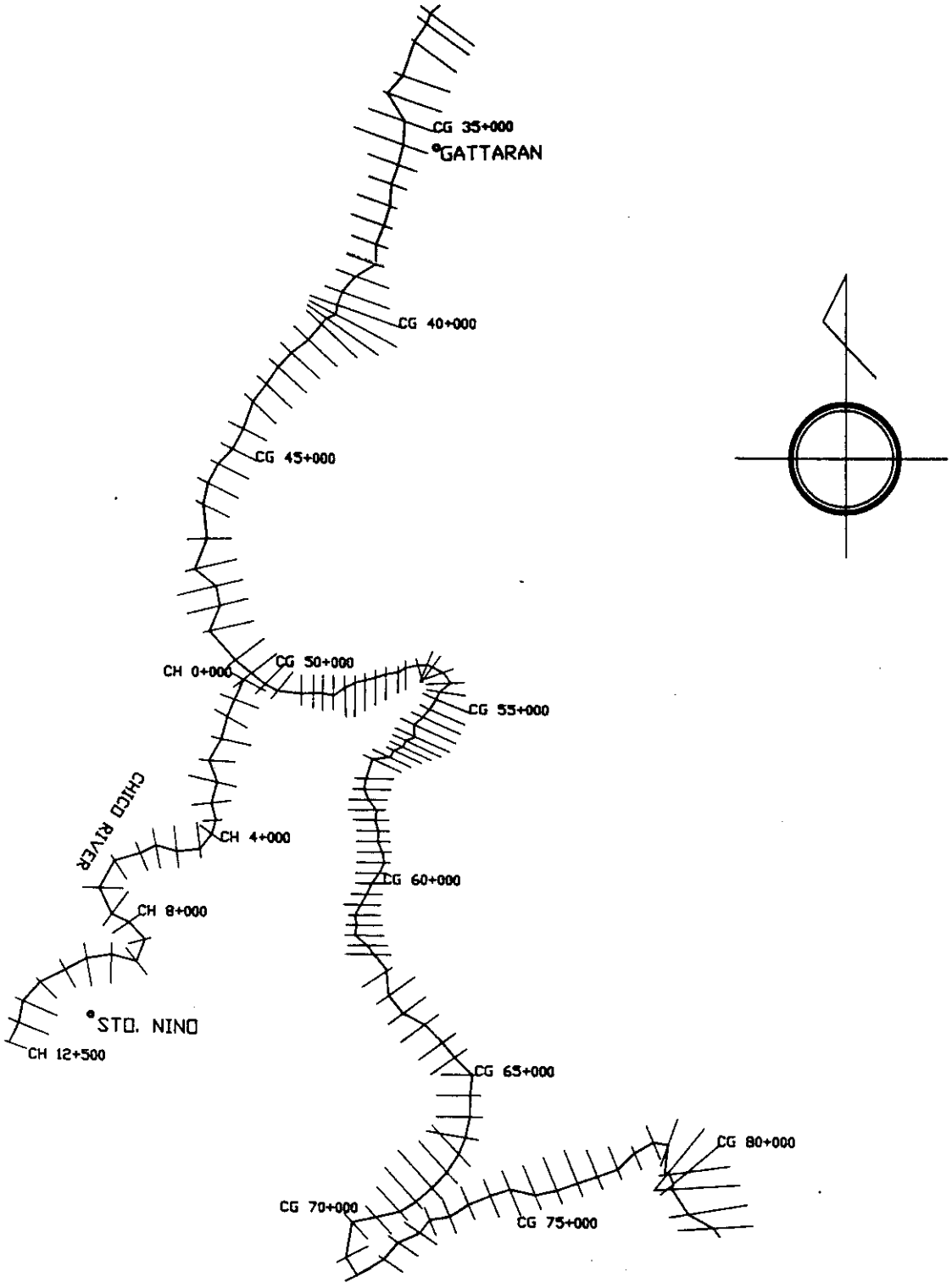
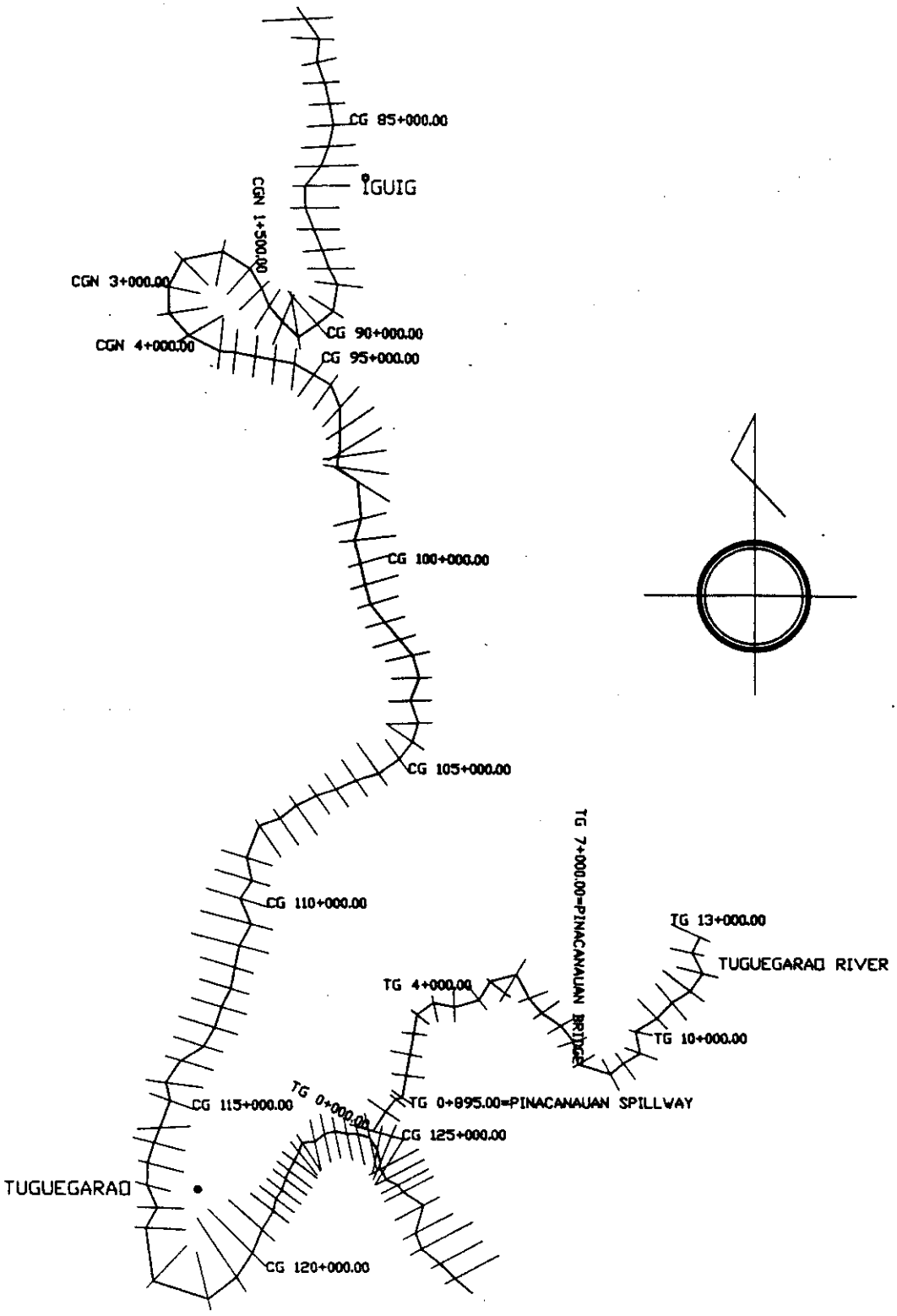
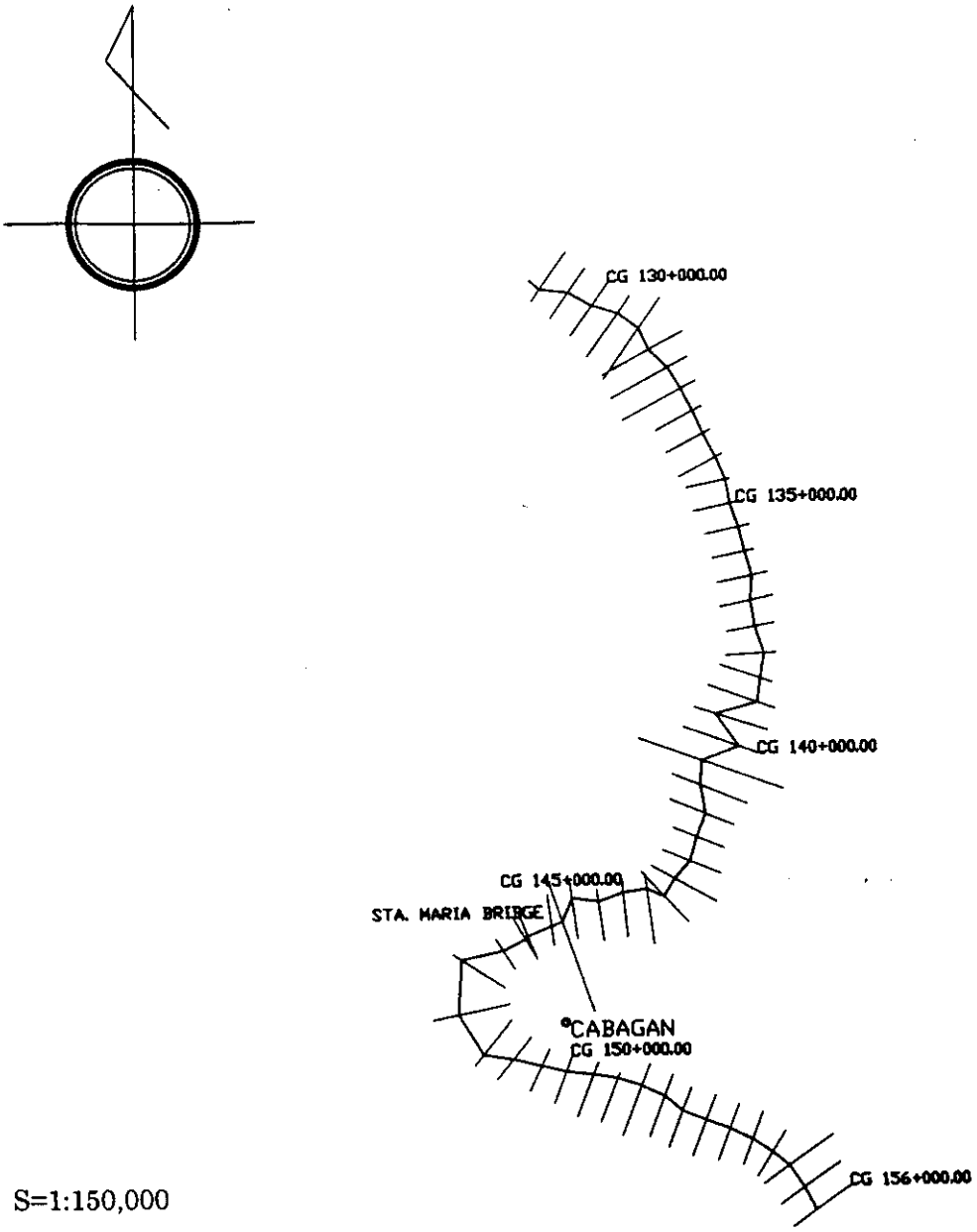
The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 1.2.1** Location Map of Cross Section (1/4)
JAPAN INTERNATIONAL COOPERATION AGENCY	



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 1.2.1** Location Map of Cross Section (2/4)
JAPAN INTERNATIONAL COOPERATION AGENCY	



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 1.2.1** Location Map of Cross Section (3/4)
JAPAN INTERNATIONAL COOPERATION AGENCY	



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 1.2.1** Location Map of Cross Section (4/4)
JAPAN INTERNATIONAL COOPERATION AGENCY	

PHOTO CENTER LOCATION MAP

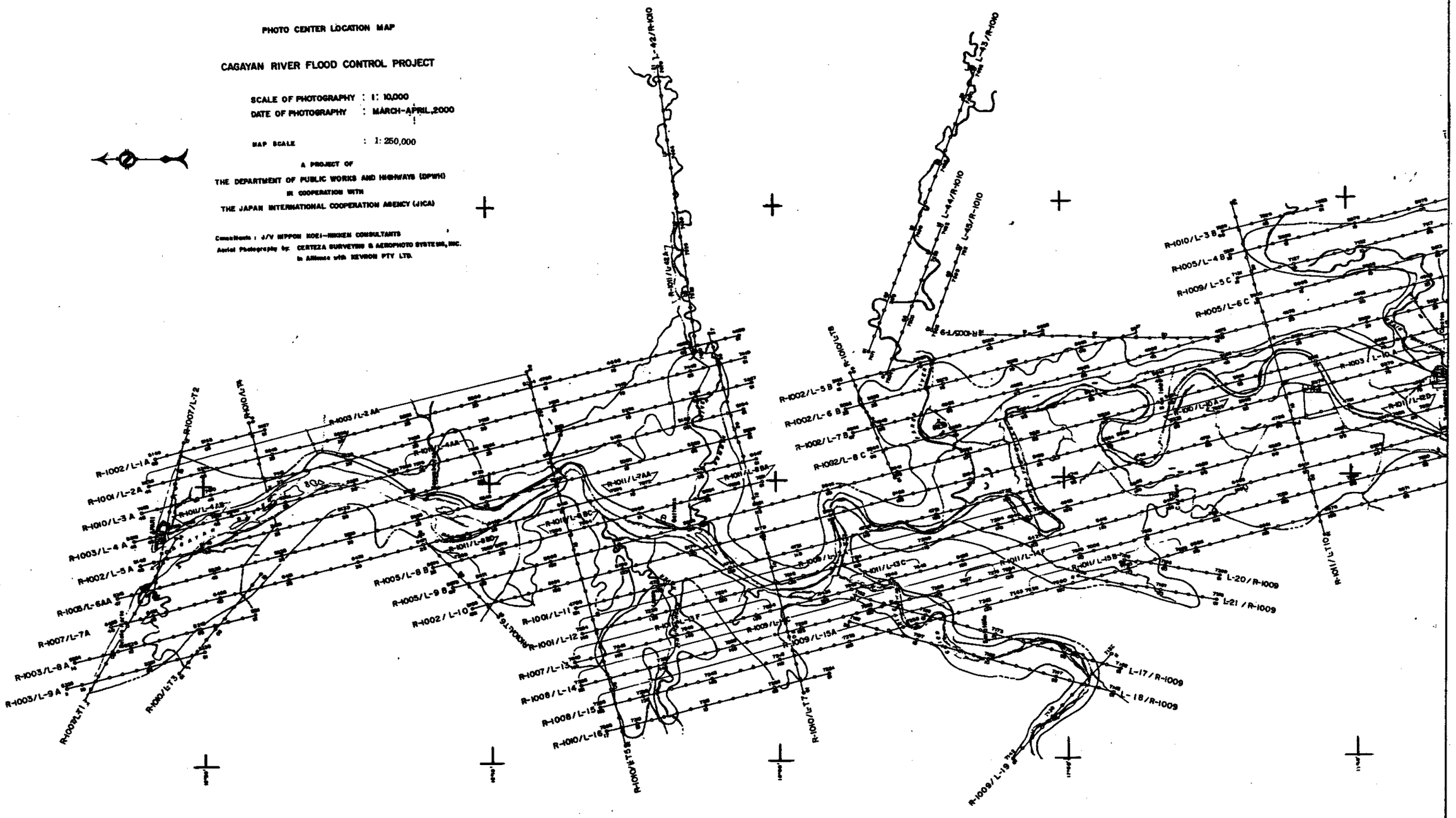
CAGAYAN RIVER FLOOD CONTROL PROJECT

SCALE OF PHOTOGRAPHY : 1: 10,000
DATE OF PHOTOGRAPHY : MARCH-APRIL,2000

MAP SCALE : 1: 250,000

A PROJECT OF
THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
IN COOPERATION WITH
THE JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Consultants : J/V NIPPON KOEI—NIKKEN CONSULTANTS
Aerial Photography by: CERTEZA SURVEYING & AEROPHOTO SYSTEMS, INC.
In Alliance with REVRON PTY LTD.



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 2.3.1 Flight Index Map (1/4)**
JAPAN INTERNATIONAL COOPERATION AGENCY	

PHOTO CENTER LOCATION MAP

CAGAYAN RIVER FLOOD CONTROL PROJECT

SCALE OF PHOTOGRAPHY : 1: 10,000
DATE OF PHOTOGRAPHY : MARCH-APRIL,2000

MAP SCALE : 1:250,000

A PROJECT OF
THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
IN COOPERATION WITH
THE JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Consultants : J/V NIPPON KOEI—NIKKEN CONSULTANTS
Aerial Photography by: CERTEZA SURVEYING & AEROPHOTO SYSTEMS, INC.
In Alliance with KEVRON PTY LTD.

The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 2.3.1 Flight Index Map (2/4)**
JAPAN INTERNATIONAL COOPERATION AGENCY	

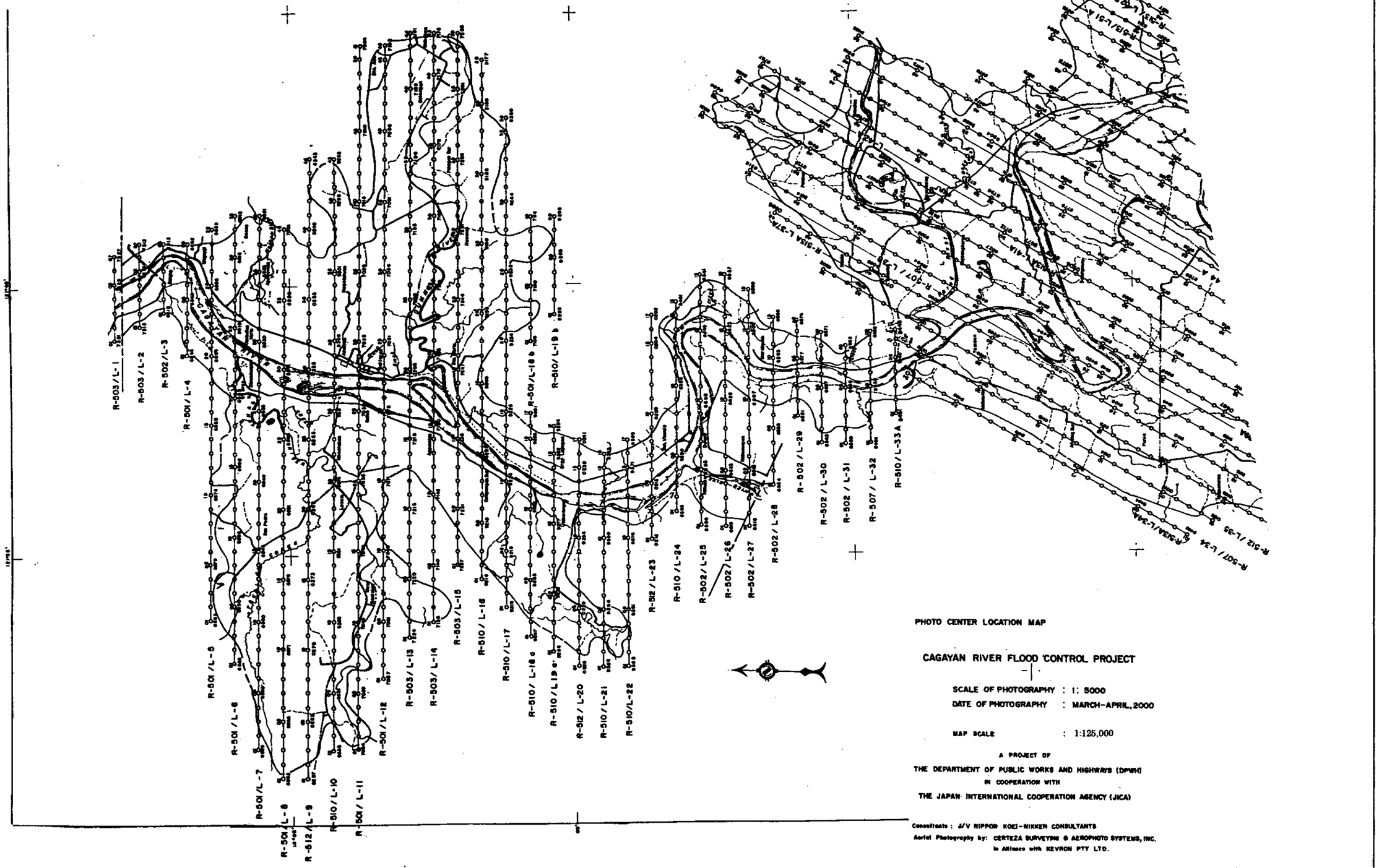


PHOTO CENTER LOCATION MAP

CAGAYAN RIVER FLOOD CONTROL PROJECT

SCALE OF PHOTOGRAPHY : 1: 5000
DATE OF PHOTOGRAPHY : MARCH-APRIL, 2000

MAP SCALE : 1:125,000

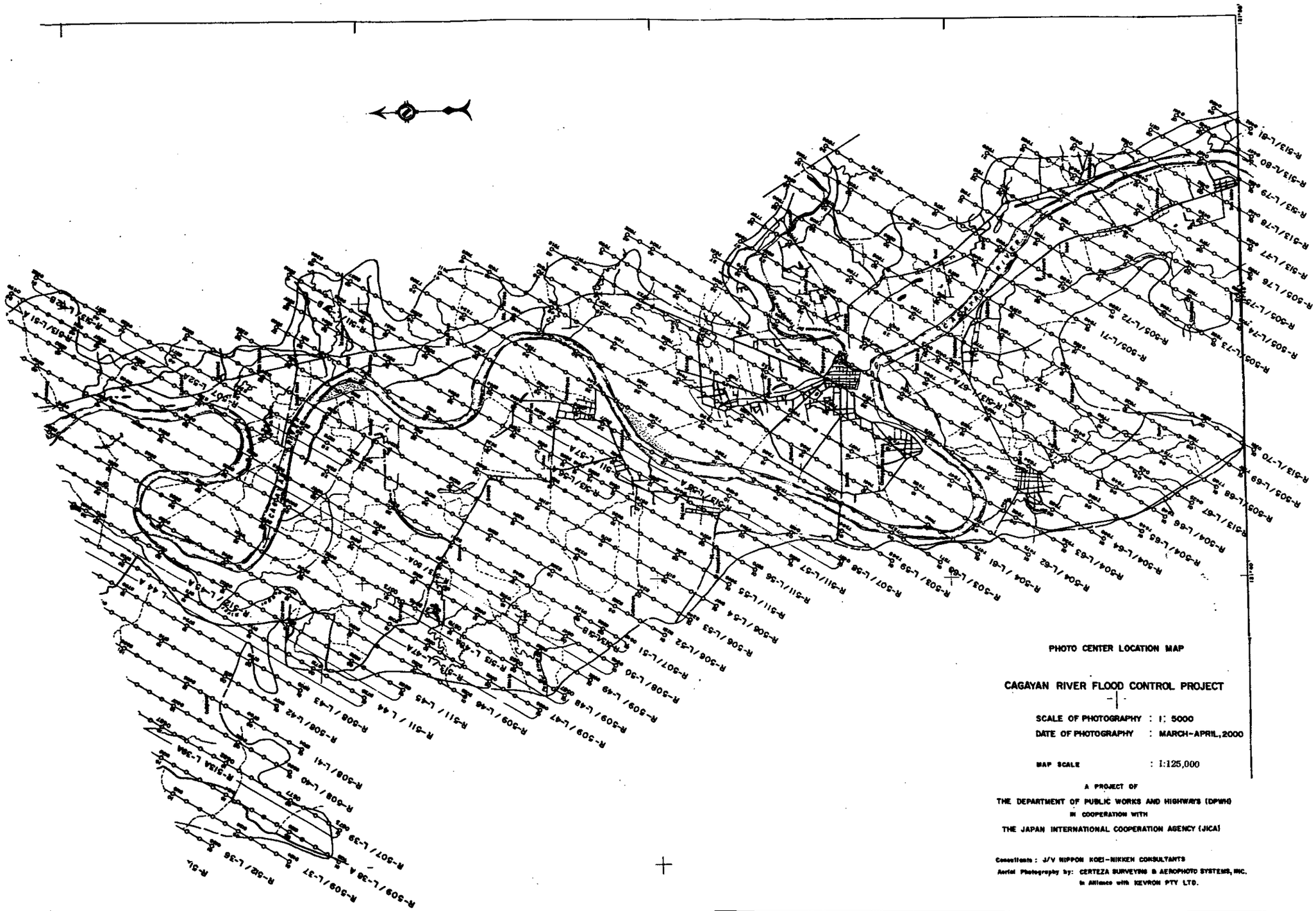
A PROJECT OF
THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
IN COOPERATION WITH
THE JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Consultants : J/V NIPPON KOEI-NIKKEN CONSULTANTS
Aerial Photography by: CERTEZA SURVEYING & AEROPHOTO SYSTEMS, INC.
In Alliance with KEVRON PTY LTD.

The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

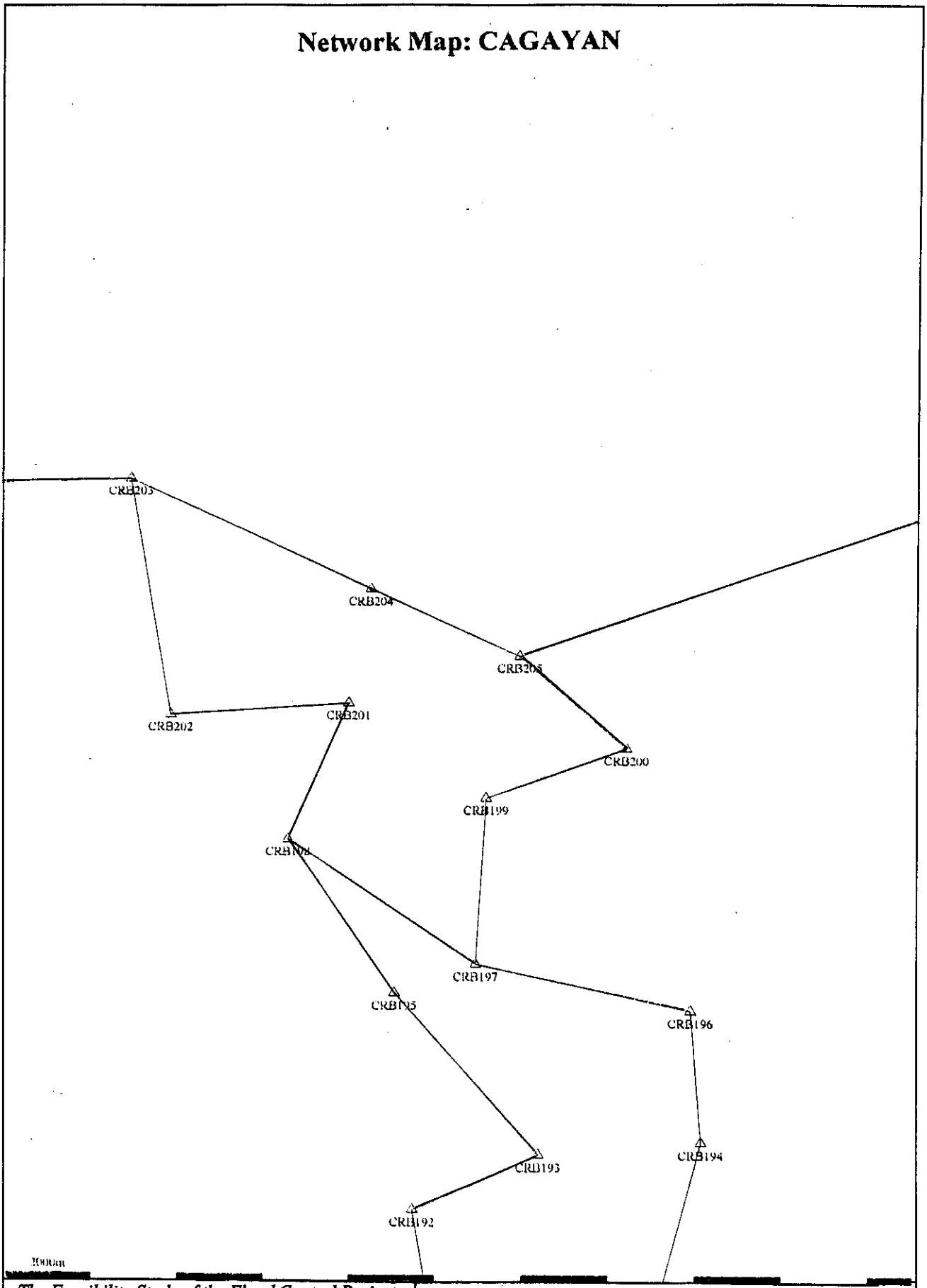
Figure 2.3.1
Flight Index Map (3/4)



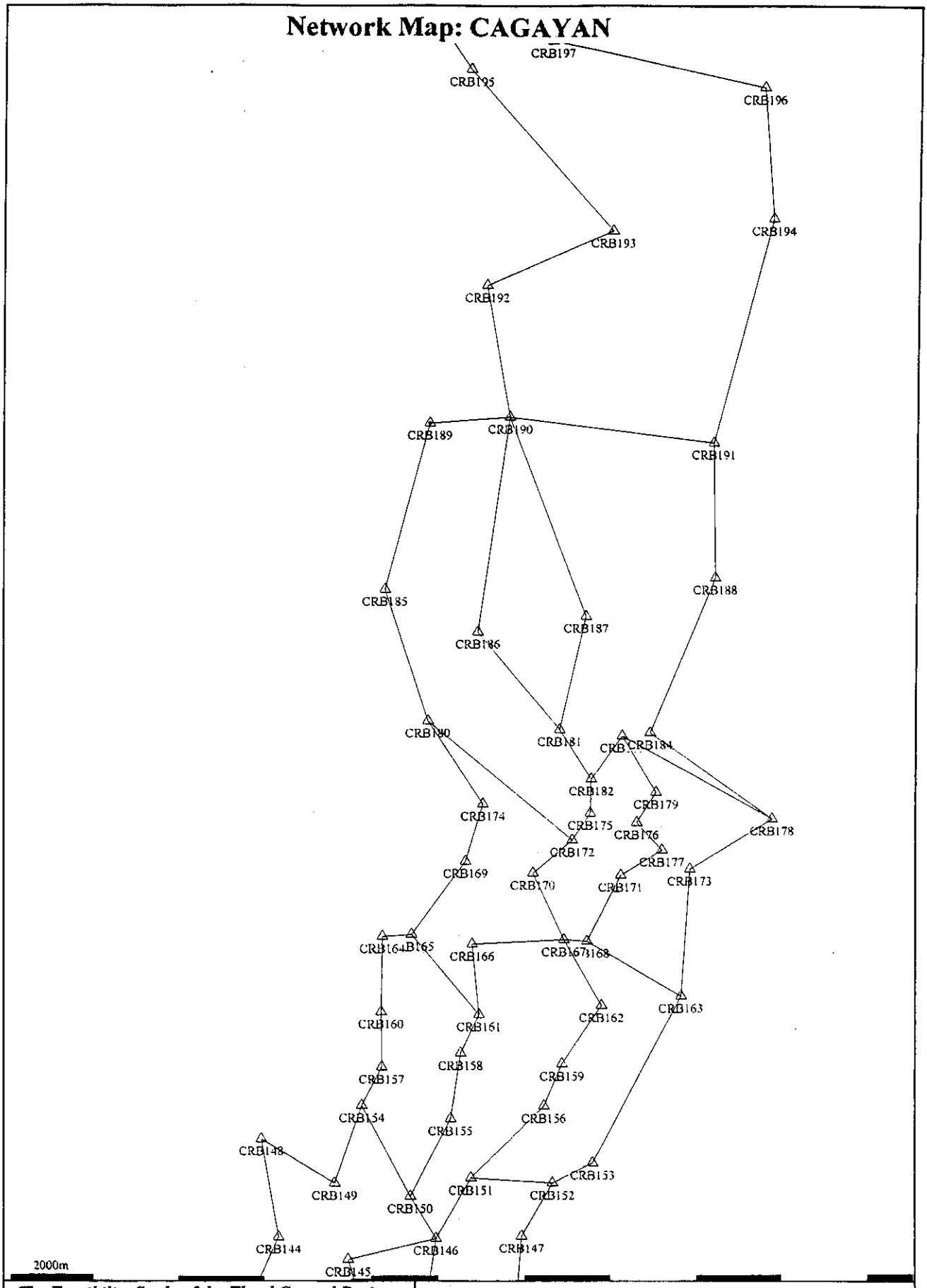
The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 2.3.1
Flight Index Map (4/4)



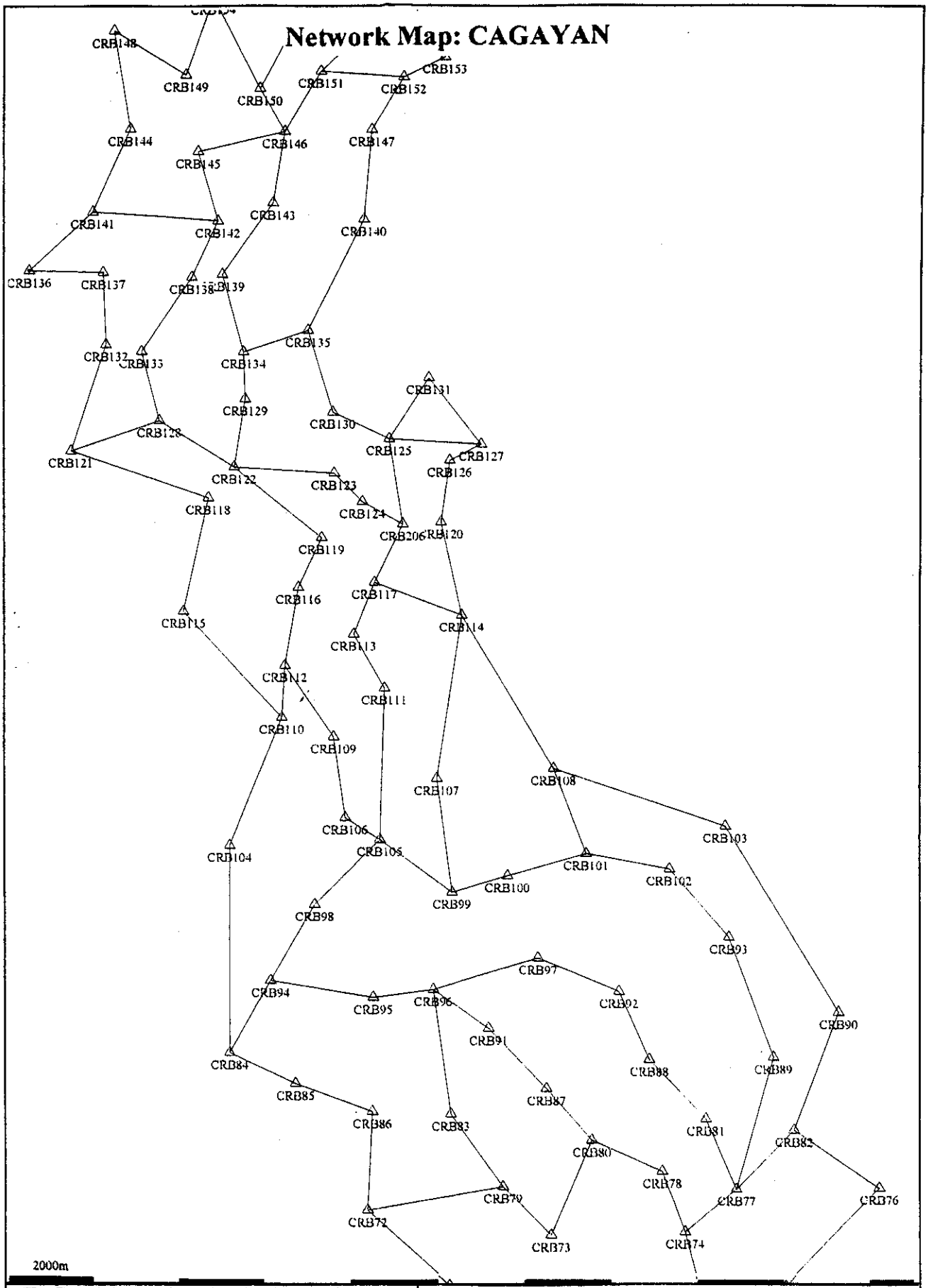
The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 3.3.1** GPS Observation Network (1/5)
JAPAN INTERNATIONAL COOPERATION AGENCY	



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

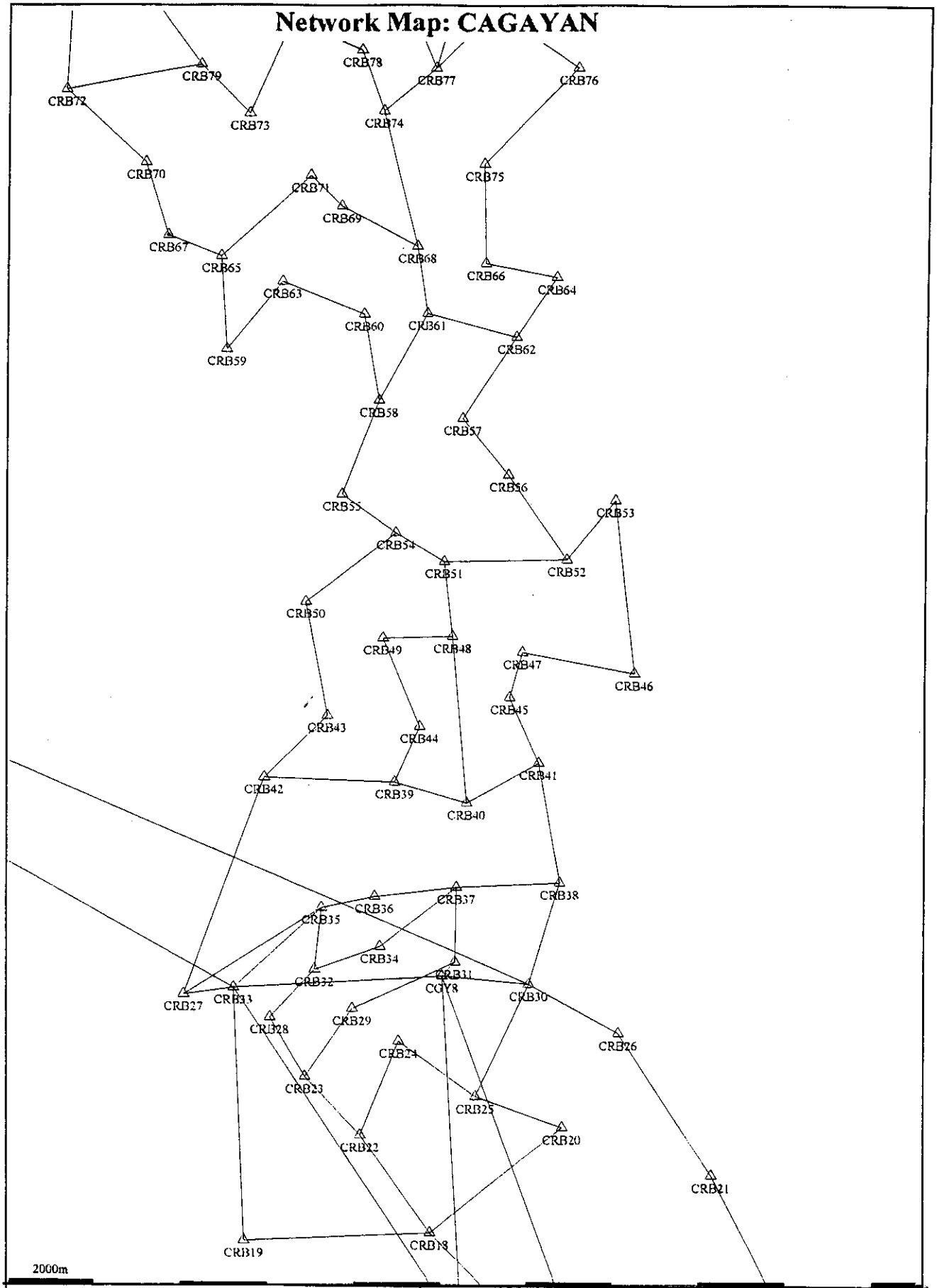
Figure 3.3.1
GPS Observation Network (2/5)



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

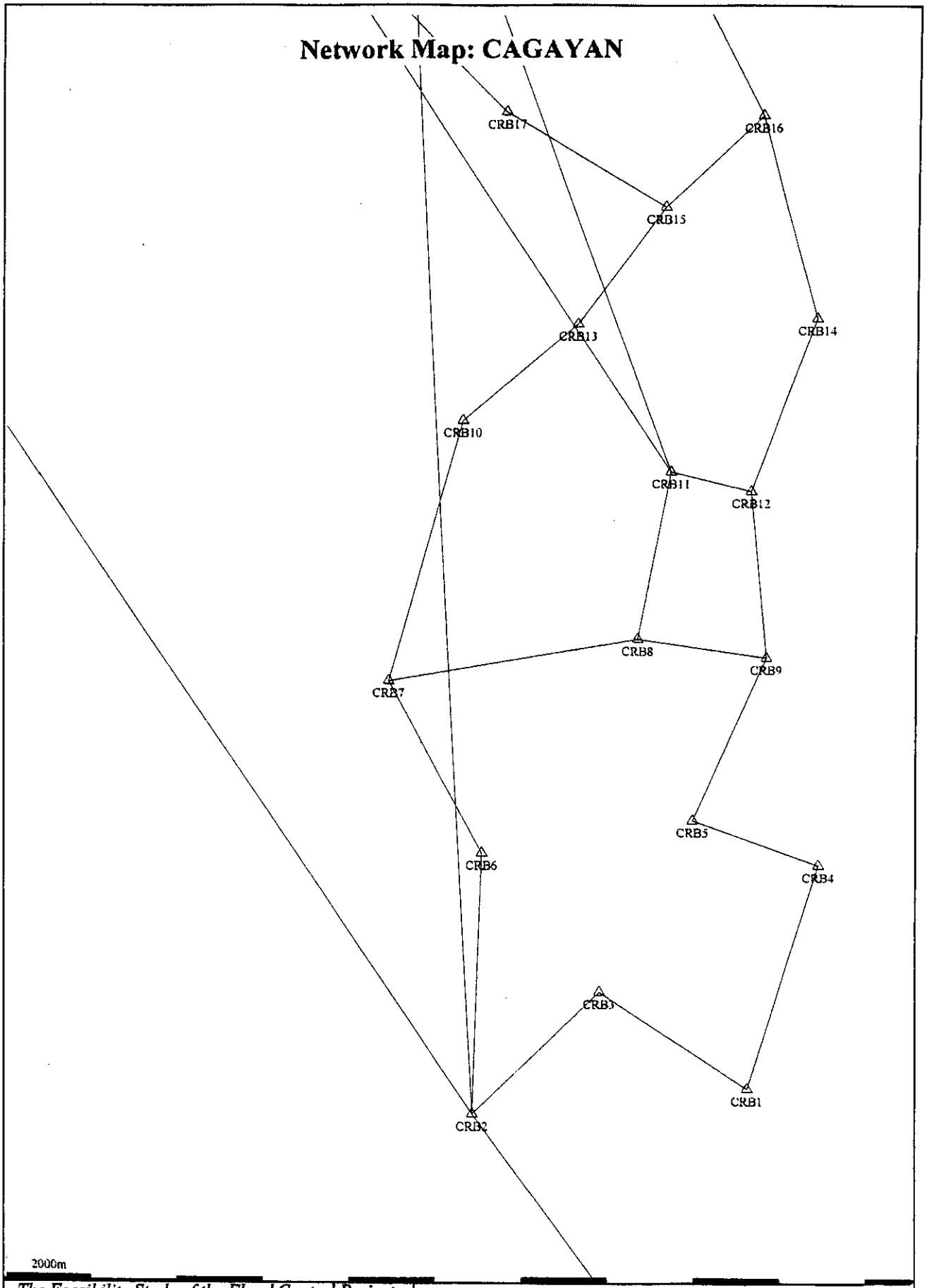
Figure 3.3.1
GPS Observation Network (3/5)



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

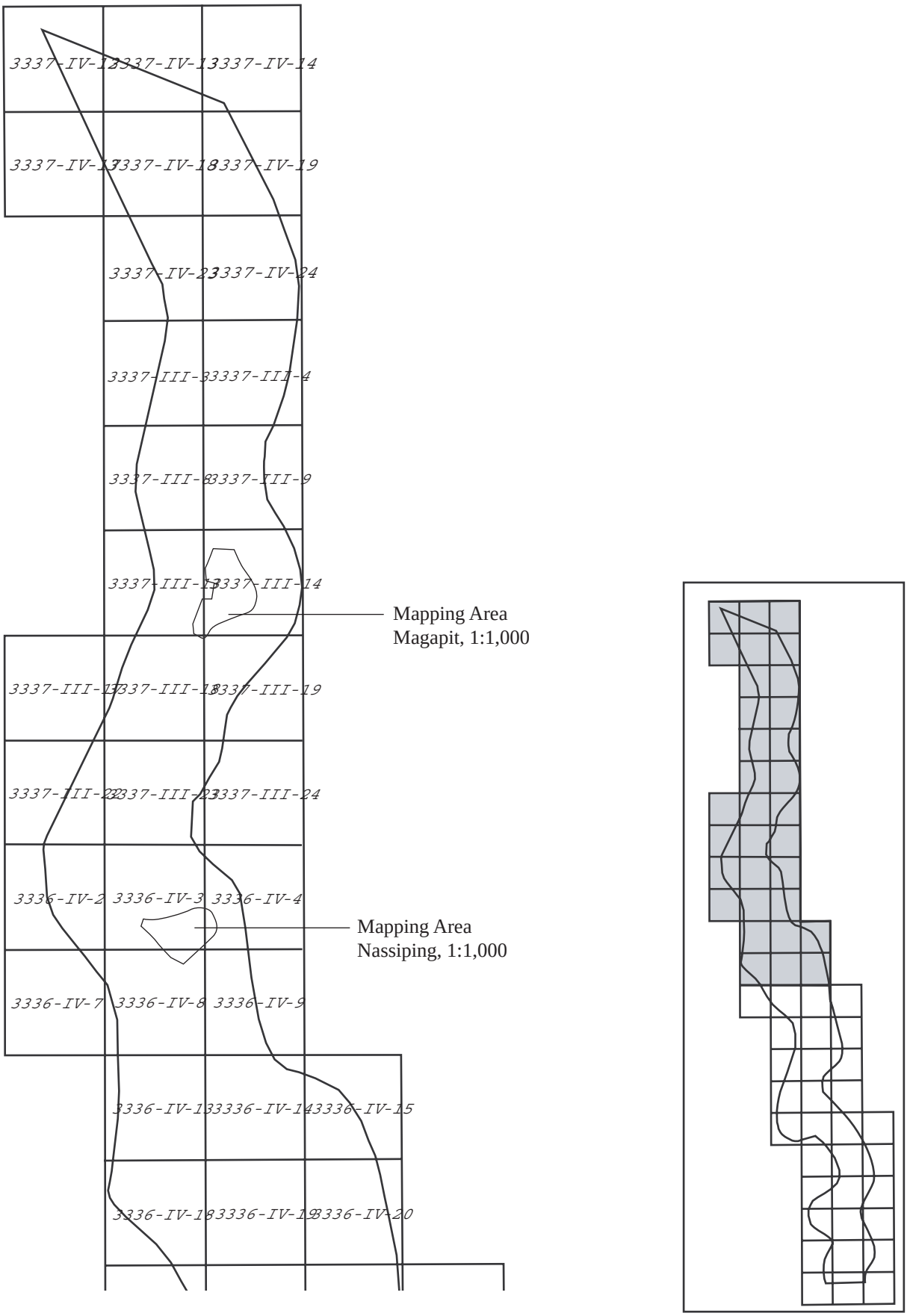
Figure 3.3.1
GPS Observation Network (4/5)



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 3.3.1
GPS Observation Network (5/5)

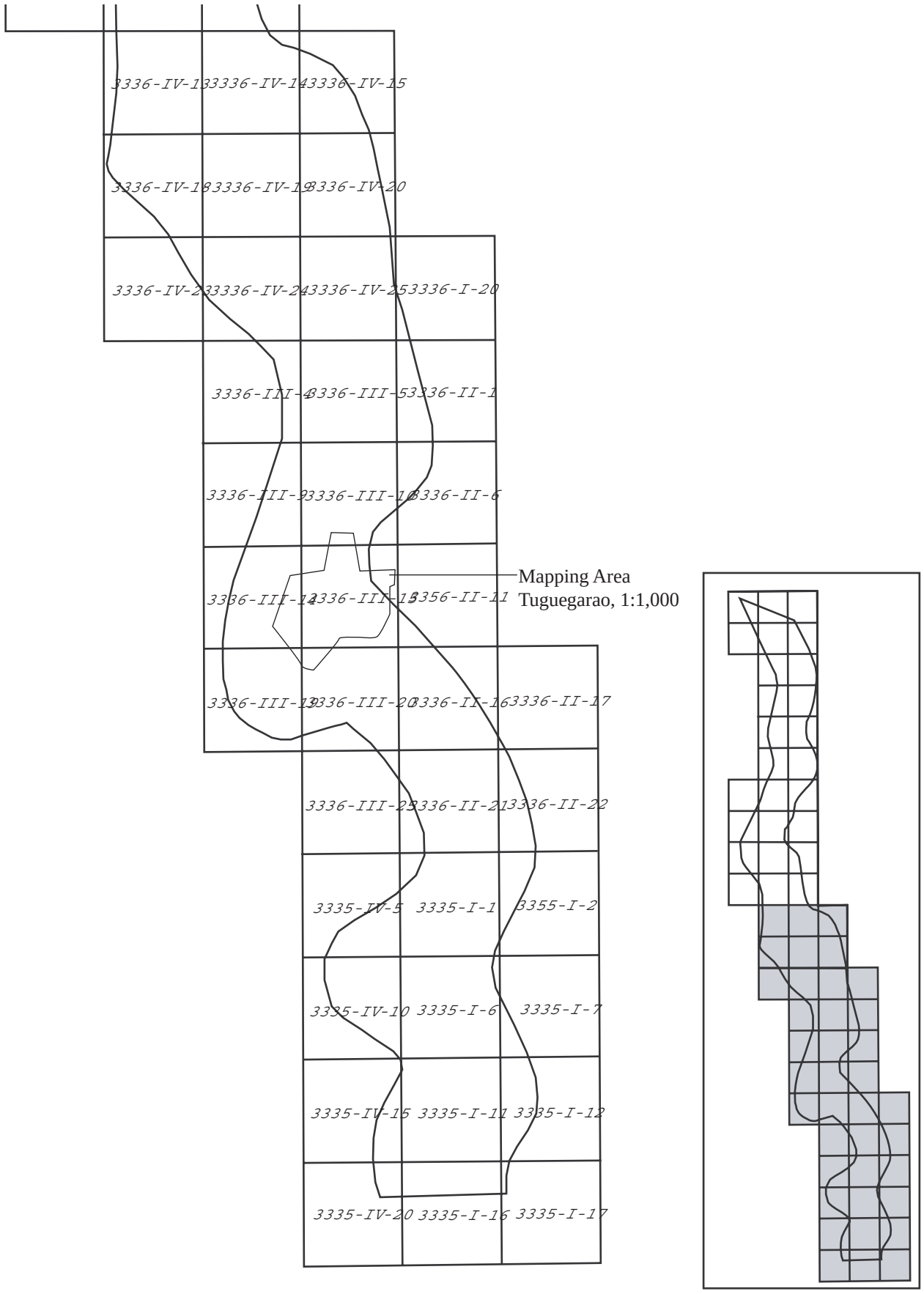


The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

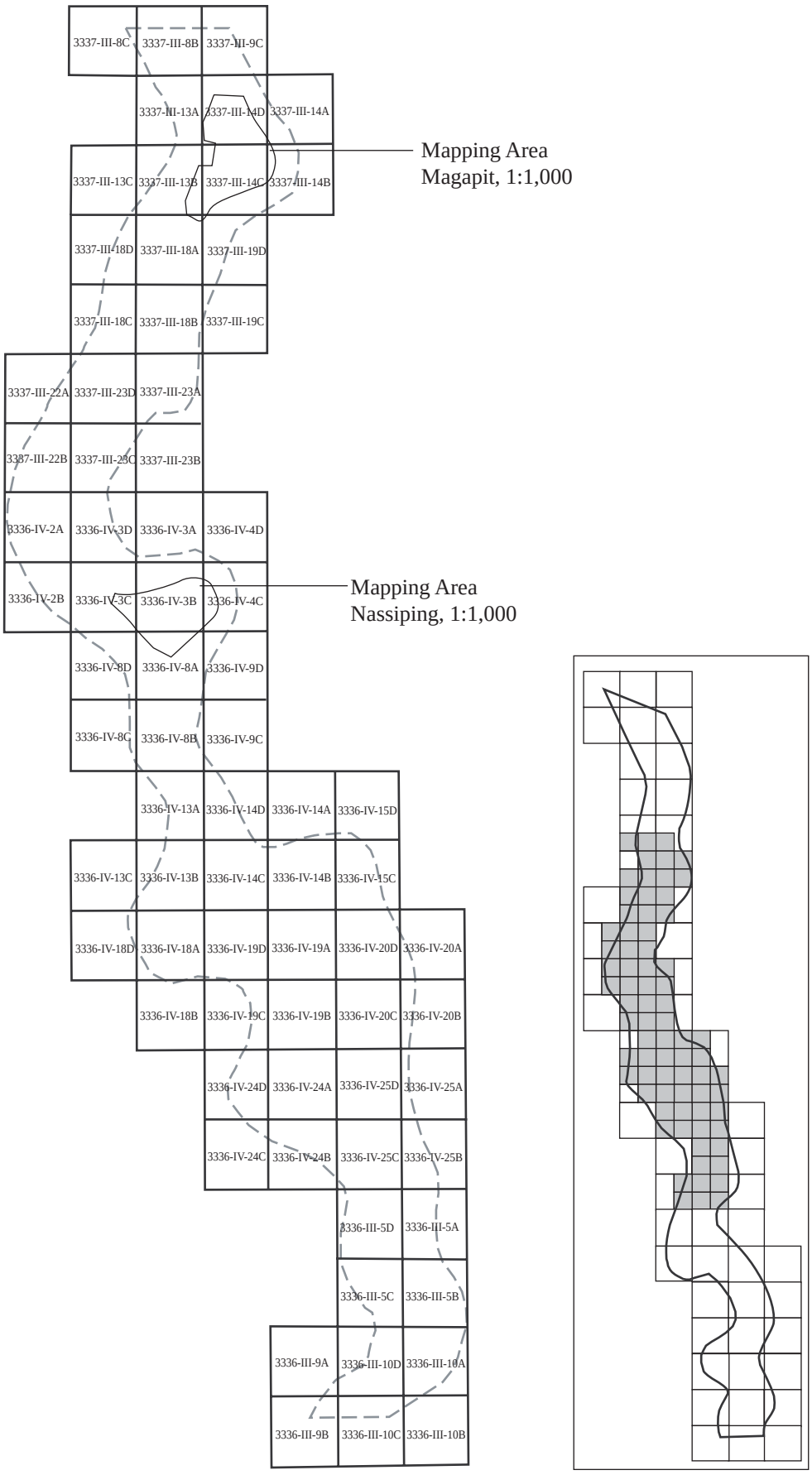
JAPAN INTERNATIONAL COOPERATION AGENCY

Figure 3.3.2

Cagayan 1:10,000 Map Index No.1



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines	**Figure 3.3.3**
JAPAN INTERNATIONAL COOPERATION AGENCY	**Cagayan 1:10,000 Map Index No.2**



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

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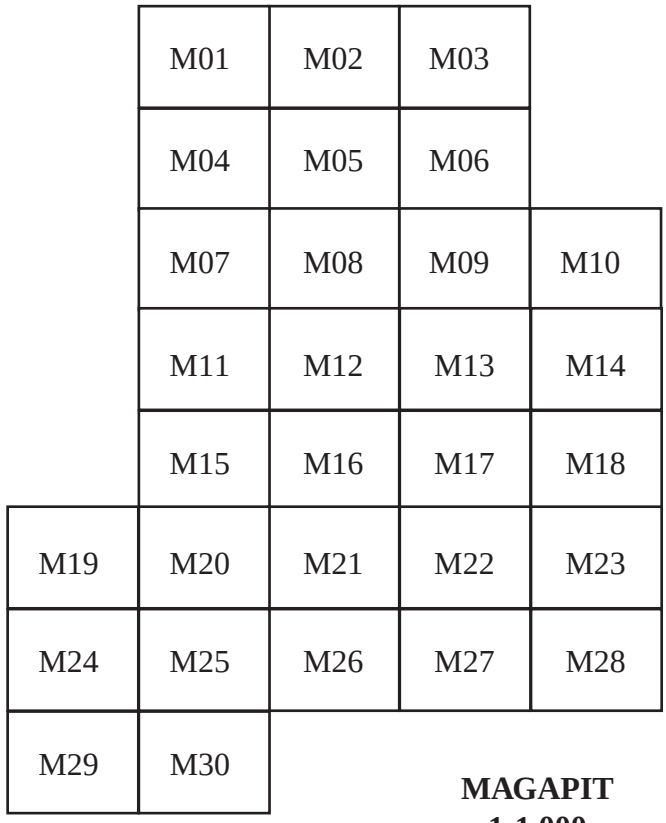
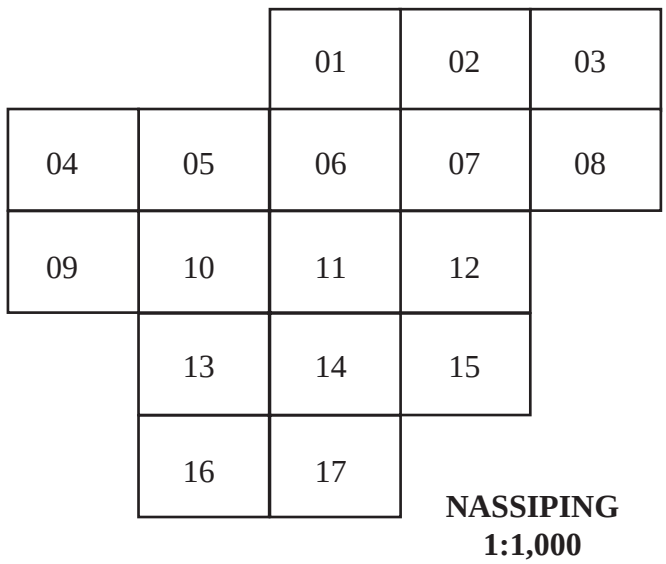
Figure 3.3.4

Cagayan 1:5,000 Map Index





The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

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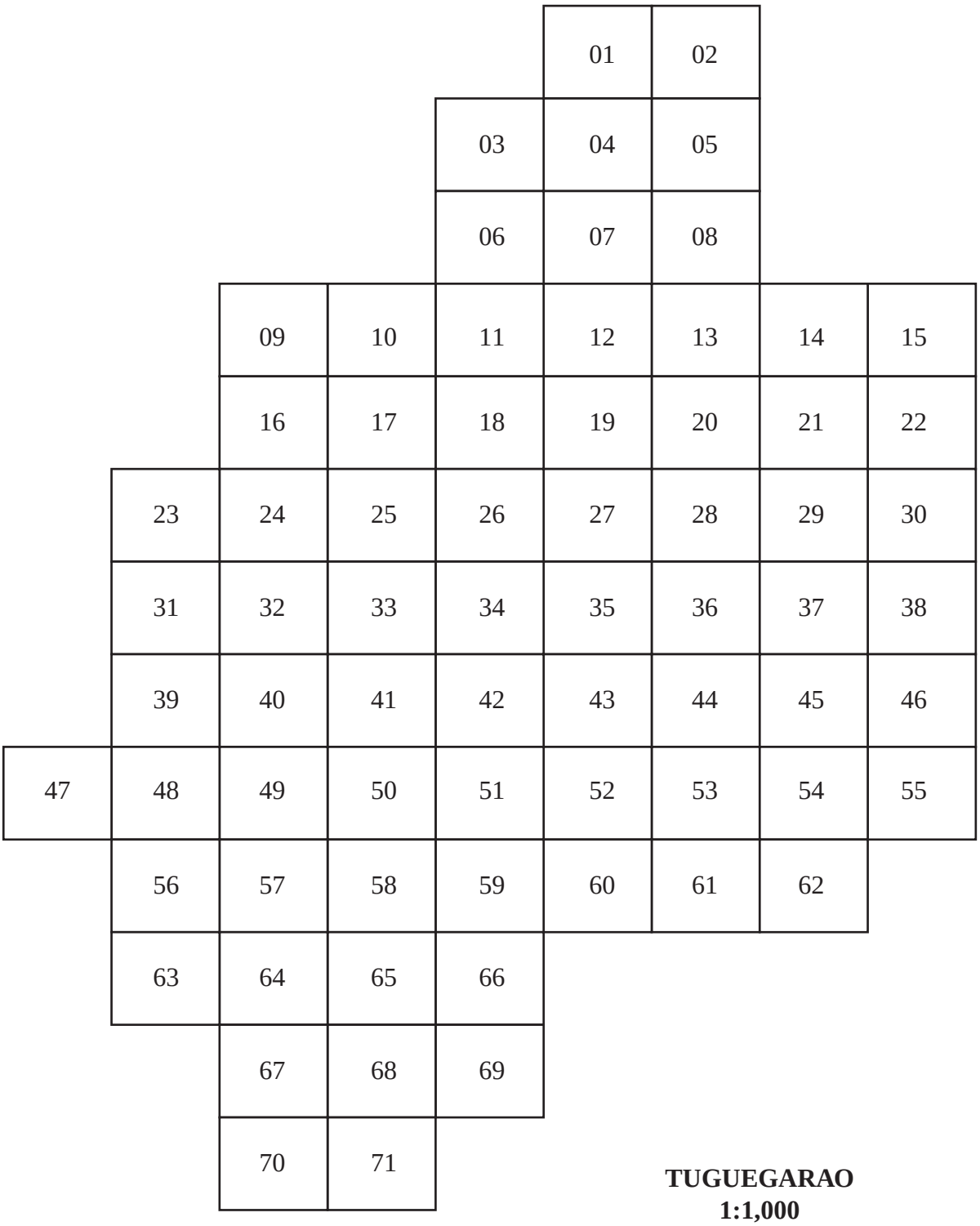
Figure 3.3.5
Magapit and Nassiping 1:1,000 Map Inex



The Feasibility Study of the Flood Control Project for the Lower Cagayan River in the Republic of the Philippines

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Figure 3.3.6
Tuguegarao 1:1,000 Map Index