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JAPAN INTERNATIONAL COOPERATION AGENCY

NATIONAL WATER RESOURCES BOARD
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
THE GOVERNMENT OF THE REPUBLIC OF THE PHILIPPINES

MASTER PLAN STUDY ON WATER RESOURCES MANAGEMENT IN THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

VOLUME III-1 SUPPORTING REPORT

Part-A : Socio-Economy
Part-B : Hydrology
Part-C : Groundwater Resources
Part-D : Dam and Related Facility Engineering

AUGUST 1998

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Composition of the Final Report

Volume I : Executive Summary

Volume II : Main Report

Volume III-1 :Supporting Report

Part – A : Socio-Economy

Part – B : Hydrology

Part – C : Groundwater Resources

Part – D : Dam and Related Facility Engineering

Volume III-2 :Supporting Report

Part – E : Municipal and Industrial Water Demand

Part – F : Agricultural Water Demand

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A1 Activities during Field Investigation

A1.1 First Field Investigation

A1.1.1 Data Collection

(1) Collected Data and Visited Offices

The socio-economic data collected during the first stage field investigation consist mainly of; i) statistical data and information, ii) maps and iii) development plan. The statistical data and information collected are classified into i) data on population, ii) data on agricultural production by crops, iii) industrial data and iv) data on gross domestic products (GDP) by sector. These data and information were collected for each region and province. Besides, the data on population of municipality were also collected during the field investigation. Concerning the maps, the administrative maps and land use maps on a scale of 1 to 250,000 were procured from the concerned agencies. The development plans gathered comprise the national and regional ones.

The socio-economic data and information were collected mainly from the following governmental agencies:

- National Statistical and Coordination Board (NSCB)
- National Economic Development Authority (NEDA)
- Bureau of Soil and Water Management (BSWM)
- Department of Agriculture (DA)
- Bureau of Agricultural Statistics (BAS)
- National Food Authority (NFA)
- National Statistical Office (NSO)
- Philippine Economic Zone Authority (PEZA)
- Department of Trade and Industry (DTI)
- Department of Tourism (DOT)
- Department of Education, Culture and Sports (DECS)
- Department of Health (DOH)
- Parks & Wildlife Bureau (PAWB)
- National Irrigation Administration (NIA)
- Department of Energy (DOE)
- National Power Corporation (NPC)
- National Electrification Administration
- National Mapping & Resource Information Authority (NAMRIA)

(2) Availability of Data

During the first field investigation, the useful data and information were collected from the aforesaid governmental agencies as much as possible. On the other hand, the following points are noted in relation to the availability of the socio-economic data:

i) Availability of socio-economic data for new administrative regions
During the recent five years, two new regions were created. These are ARMM and CARAGA. The socio-economic data on these regions have not yet been completely consolidated as compared with those on other regions.

ii) Accumulation of socio-economic data in the central office in Manila
In this study, the socio-economic data need to be collected with the coverage of the whole country as well as other disciplines. It was found that some of the socio-economic data required for the socio-economic study were not obtainable from the central office in Metro Manila. It was informed that they were kept by the regional offices only. It is hoped that the essential socio-economic data be preserved in the central offices in Manila as much as possible.

A1.1.2 Setting Up of Socio-Economic Framework

During the first stage field investigation, the socio-economic study was carried out placing a focus on set-up of the future socio-economic framework with regard to population, employment and GDP. These frameworks constitute the fundamental data to project the future water demand.

(1) Population Projection

The population projection was made for the total population of the Philippines, regional and provincial population based on the results of projection made by NSO. On the other hand, the Study Team made the population projection for each of the water resources regions and major river basins. In the course of the projection works, the Study Team elaborated to classify the population of administrative region, provinces and municipalities into that in each water resources region and major river basin, since the administrative boundaries do not necessarily coincide with those of the water resources regions. Besides, the urban and rural population was projected for each of the water resources regions and major river basins.

(2) Employment Projection

The number of employment was projected by region, province and water resources region and major river basin on the basis of NEDA's development plan. The results of the projection were adopted to forecast GVA of total industrial sector and manufacturing industry by water resources and major river basin.

(3) Projection of GDP

The GDP for the period until the target year 2025 was projected for each of the administrative regions and water use sectors and sub-sectors. As for the agricultural sector, the GVA was forecast for each crop. Likewise, that for the manufacturing industry was forecast by kind of manufacture. Thereafter, the GDP or GVA was broken down into those for the water resources regions and major river basins. The projection of GDP was also made based on the NEDA's National Medium-Term Development Plan (1997 to 2001), Long-Term Development Plan (2001 to 2025) and Regional Medium-Term Development Plans (1993 to 1998). The national medium and long term development plans were finaiized in Mach 1998. But this study could not incorporate these final plans in time, since the substantial study works were completed by March 1998 as scheduled. In this study, therefore, the future GDP growth rates were determined based on the national development plans provided by NEDA during the first stage field investigation in 1997. Consequently, the high economic growth scenario in this study is almost the same level as the low economic growth scenario of Plan 21st as NEDA's finalized plans. Thus, the economic growth rates adopted in this study are reasonable in comparison with those in the NEDA's final plans.

A1.2 Second Field Investigation

A1.2.1 Data Collection

During the second field investigation, data collection was carried out with regard to additional socio-economic condition, data for economic analysis for the proposed projects for the Master Plan and preparatory survey for social analysis. The collected data and visited agencies are as follows;

i) NSO
- Imports statistics for construction materials (1976-1996)
- Provincial profile (Benguet)
- Provincial profile (Quezon)
- The consumer price index in the Philippines (1995)
- National government finance (1991-1993)
- Monthly bulletin of statistics, October 1997

ii) NSCB
- Philippine statistical yearbook (1997)
- Boundary maps of Barangay related to study area of the Master Plan

iii) Northern and Southern Cultural Community Center
- Directory of indigenous peoples in the Philippines
- Population statistics of indigenous peoples

iv) NPC
- Kw value and kwh value for power generation by diesel plant

v) Bureau of Medical Service, Department of Health
- Number of hospital by category and by region

vi) Department of Education, Culture and Sports
- Number of school and school enrollment by level and by region

vii) Bureau of Agricultural Statistics, Department of Agriculture
- Farm gate price and production cost of major crops

viii) Manila Water Company, Inc.
- Water rate of Metro Manila

ix) NWRB
- Water rate of LWUA by water district

A1.2.2 Additional Study for Socio-Economic Condition

The additional study was conducted for socio-economic conditions. The items of the socio-economic condition studied were : (i) government finance, (ii) foreign trade, (iii) balance of payment, (iv) external debt, (v) peso to US dollar rate. More detailed study was carried out in the second home office work in Japan.

A1.2.3 Preliminary Investigation for Social Environmental Impact Assessment

The preliminary study for social impact was performed for (i) on-going and (ii) the proposed

projects for the Master Plan. The simplified method was adopted with reference to the Guideline for Social Analysis prepared by JICA. The preliminary study focused on number of inhabitants and households in dam reservoir area, land use, positive and negative benefit. Particularly, relatively detailed survey was conducted for the number of population and households by using boundary maps of Barangay.

A1.2.4 Field Investigation for Economic Analysis

Economic analysis was going to be carried out in the second home office work in order to decide the priority projects for the proposed projects in the Master Plan. With regard to the economic analysis, the data collection and preliminary analysis were performed for (i) farm gate price and production cost for major crops, (ii) conversion of construction cost for on-going projects and proposed projects for the Master Plan to present price level, (iii) benefit to be accrued from the proposed projects.

A2 Present Condition

A2.1 Population

A2.1.1 Nation

During 35 years from 1960 to 1995, the total population of the Philippines has increased from 27.1 million in 1960 to 68.6 million in 1995 which means 2.53 times at average annual growth rate of 2.7%. The high growth rate of 3.9% is observed during the period from 1960 to 1970 and the lowest growth rate of 1.0% is recorded during the period from 1970 to 1975. After 1970, the population increased with the rates of more than 2.0% but the annual average growth rate has slightly decreased from 2.7% in the period from 1975 to 1980 to 2.3% from 1990 to 1995 as shown in Table A-1.

A2.1.2 Region

During the latest five years from 1990 to 1995, Southern Tagalog (Region IV) has increased at the highest annual average growth rate (AAGR) of 3.5% followed by National Capital Region (NCR), Central Mindanao (XII), and Southern Mindanao (XI). On the contrary, Ilocos (I) and Western Visayas (VI) have increased at the lowest AAGR followed by Cagayan Valley (II), Central Visayas (VII) and CAR.

The population of Southern Tagalog (IV) of 9.9 million occupies the highest share of 14.5% of the national population. NCR, 13.8%. Central Luzon (III), 10.1% and Western Visayas (VI), 8.4%, follow Southern Tagalog. CAR has the least population of 1.3 million (1.8%) followed by CARAGA, 2.8%, ARMM, 3.0%, and Central Mindanao (XII) , 3.4%.

During 5 years from 1990 to 1995, the shares of population have continuously inflated in NCR, Southern Tagalog (IV), Southern Mindanao (XI) and Central Mindanao (XII). However that of CAR, Cagayan Valley (II), Bicol (V), Western Visayas (VI), Central Visayas (VII), Eastern Visayas (VIII) have decreased in the same period. This tendency in the shares of population might imply the concentration of population into the regions with large population. The summary is shown in the following table:

(Unit: 1,000 persons)

Year	Administrative Region																Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	CARAGA	
1990	7,948	1,146	3,551	2,341	6,199	8,263	3,910	5,393	4,594	3,055	2,460	2,197	4,007	2,033	1,837	1,763	60,698
1995	9,454	1,255	3,804	2,536	6,933	9,941	4,325	5,727	5,015	3,367	2,795	2,483	4,604	2,360	2,021	1,942	68,612
AAGR(%)	3.31	1.72	1.30	1.51	2.12	3.53	1.91	1.30	1.66	1.84	2.42	2.32	2.64	2.84	1.81	1.93	2.32

A2.2 Labor Market

A2.2.1 Nation

In 1995, the ratios of employed household population of 15 years old and over in agriculture and non-agriculture are 44.1% and 55.9% respectively. The underemployment is estimated to be 19.8% of those employed.

Total labor force has increased from 18.5 million in 1982 to 28.0 million in 1995 at the annual average growth rate of 3.3%. Labor force participation rate has increased by 5.5% during thirteen years from 60.1% to 65.6%. The ratio of employed labor force of all labor force has increased slightly from 90.2% in 1982 to 91.6% in 1995 while the one of unemployed labor force has decreased slightly from 9.4% to 8.4%. In 1995, the employed labor force is

composed of agriculture , 11.3 million (44.1%), industry, 4.0 million (15.6%) and service, 10.4 million (40.3%). The agricultural sector still occupies the highest share and the share has decreased slightly from 44.8% in 1989. This indicates that the agricultural sector has still the significant importance in the Philippines.

(1995)

Sector	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
- Projected household population of 15 years old and over (1,000)	6,164	815	2,464	1,741	3,355	5,918	2,961	3,872	3,263	2,267	1,739	2,583	3,081	1,363	1,169	42,720
- Labor force participation rate (%)	60.0	71.2	64.7	71.3	62.8	65.3	68.9	65.8	65.5	68.0	63.5	69.3	69.8	70.5	57.3	65.6
- Employment rate(%)	94.2	93.8	92.3	97.3	91.0	91.0	93.4	91.3	94.1	94.4	93.4	94.5	92.8	94.7	99.4	91.6
- Unemployment rate(%)	15.8	6.2	7.7	2.7	9.0	9.0	6.6	8.9	8.9	5.9	6.6	5.5	7.2	5.3	0.6	8.4

According to the Updated Medium-Term Philippine Development Plan (UMTPDP), 1996-1998, the Philippines' labor market is to be improved due to recovery of the national economy. The labor force grew at an average of 2.6% for the period from 1993 to 95. An annual average of 697,000 entrants joined the labor force. Likewise, majority of the labor force is rural-based, which entails the need to create more jobs in this area. Labor demand, on the other hand, has been on the uptrend as more productive and better quality jobs are being generated. Close to about two million jobs were created during the assessment period from 1993 to 1995. The number of workers in higher paid and better quality jobs increased by an average of 3.7% in the last three years. This consequently raised the share of wage and salary workers to total employment from 44.2% in 1993 to 46.2% in 1995. Meanwhile, the number of unpaid family workers declined significantly in 1995 (1.6%). Furthermore, the recovery of the industry and the services sectors led to higher job creation in 1994 and 1995, generating 503,000 and 784,000 new jobs in industry and services, respectively. However employment generation was insufficient to absorb the growing labor force. In 1995, about nine jobs were created for every 10 entrants.

A2.2.2 Region

In 1995, the highest employment ratio for agriculture is recorded by ARMM of 76.3% followed by Cagayan Valley (II) of 66.2% and CAR of 64.2%. On the contrary, the lowest ratio is figured by NCR of 1.5% which is far less than the national average of 44.1%, followed by Southern Tagalog (IV) of 34.8% and Central Visayas (VII) of 42.7% respectively.

Southern Mindanao (XI) indicates the highest underemployment ratio in 1995 of 37.7% which has increased from 26.0% in 1985. Secondly highest rate is attained by Bicol (V) of 35.2% followed by Central Mindanao (XII) of 30.8%.

Labor force participation rate of Cagayan Valley (II) has increased from 66.4% in 1985 to 71.3% in 1995 at the highest ratio followed by CAR of 71.2% and Southern Mindanao (XI) of 69.8%. The lowest ratio is brought by ARMM of 57.3% followed by NCR of 60.0% and Central Luzon (III) of 62.8% respectively. In spite of its lowest labor participation ratio, ARMM registered the highest employment rate of 99.4% in 1995 followed by Cagayan Valley (II) of 97.3% and Central Mindanao (XII) at 94.7%. The ratio of NCR is the lowest at 84.2%. It implies that the least labor force is effectively employed in ARMM but the less labor force is not effectively activated in NCR.

In ARMM, the employment in agricultural sector is prominent. About 508 thousand out of all employed labor force of 666 thousand or 76.3% are engaged in agricultural sector in 1995.

The lowest ratio is accrued by NCR at 1.5%. In NCR, 26.8% of employed labor is engaged in industrial sector, followed by Cagayan Valley (II) at 23.4% and Central Luzon (III) at 20.7%. The lowest ratio resulted in ARMM and Cagayan Valley (II), 6.5%.

NCR is characterized by service sector at the highest rate of employed labor of 71.7% which is far more than 42.8% of Central Luzon (III), secondly highest. On the contrary, the lowest ratio is 17.2% in ARMM. The summary for share by sector in 1995 is shown in the following table:

(1995) (Unit: %)

Sector	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
- Agriculture	1.5	64.2	51.6	66.2	36.5	34.8	51.7	52.6	42.7	59.5	54.5	52.9	50.5	62.3	76.3	44.1
- Industry	26.8	9.7	13.5	6.5	20.7	23.4	13.2	10.8	19.5	7.5	8.4	12.6	13.1	6.8	6.5	10.8
- Service	71.7	26.1	34.9	27.3	42.8	41.8	35.1	36.6	37.8	33.0	37.1	34.5	36.4	30.9	17.2	45.1

A2.3 GDP and GNP

A2.3.1 Nation

(1) Overview

During the past eleven years from 1985 to 1996, gross domestic product (GDP) has grown from 571,883 million pesos to 848,451 million pesos at the annual average growth rate (AAGR) of 3.7% at constant 1985 prices as shown in Table A-2. Per capita GDP has increased from 10,461 pesos in 1985 to 27,130 pesos in 1995 or 2.6 times at the AAGR of 10.0% at current prices. The respective per capita GDP at constant 1985 prices are 10,461 pesos and 11,434 pesos. But it has decreased from 1991 to 1993 as shown in Table A-3.

NEDA assessed the recent economic situation and prepared report of UMTPDP for the period from 1993 to 1995 which is in the beginning half of the Medium-Term Philippine Development Plan (MTPDP) with the targeted period from 1993 to 1998 as follows;

Economic recovery was attained in 1993 and sustained throughout 1994 and 1995. The adoption of market-friendly reforms firmed up the conditions for sustained growth. The government further pursued stabilization-cum-structural adjustment measures anchored on the plan objectives of attaining: (a) a sustained and broad-based growth of output and employment; (b) price stability; and (c) a sound balance of payments position.

The economy staged a strong recovery from the recession of 1991-92. Gross national product (GNP) expanded by 2.1% in 1993. This growth was achieved notwithstanding the serious power problem which plagued the country during the period. The unexpected acceleration in GNP was partly due to the recovery of domestic production which, as measured by gross domestic product (GDP), expanded by 2.1% as shown in Table A-4. The agriculture and services sectors made up for the slump in industrial production, particularly in manufacturing, which was badly hit by the power crisis.

The economic growth accelerated in 1994 by the resolution of the power supply problem. GDP expanded to 4.4% as targeted. Strong domestic production, together with substantial inflows of income from remittances of overseas contract workers, raised GNP growth to 5.3% in real terms, exceeding the 3.5 - 4.5% target in the Medium Term Development Plan (1993 to 1998).

The GDP has grown by 4.8% despite the emergence of several external and domestic

difficulties. Significant net factor income flows from abroad coupled with robust domestic production increased GNP growth to 5.5%, keeping in stride with the planned 4.0-6.5% growth for the year.

The exports and investments have pushed up the economic growth, which promoted the economy to recovery in 1993 through 1994. Exports in 1993 grew by 6.2% from the 4.3% in 1992. With the recovery of the country's trading partners, the volume of exports grew by a robust 19.8% in 1994. A deceleration in the export of nonfactor services, however, weighed down total exports in 1995, falling short of the 14.5-16.0% target. Total exports, nevertheless, continued to grow at a double-digit pace led by merchandise exports, rising by 16.2% in 1995 from 15.2% in 1994. Nontraditional products, namely electronics and components, holiday decor, furniture, seaweeds and marble were among the major export winners during the period, accounting for about 88.0% of exported goods in 1995. The increase in exports could partly be attributed to the incentives granted to exporters, such as increased access to cheaper loans and full retention of their export receipts which compensated for their losses from the exchange rate appreciation.

The government's commitment to structural reforms and its success in maintaining macro economics stability, meanwhile, bolstered investments by 8.6% in 1994. This is within the 8.3-9.3% target for the period, and slightly higher than the 7.9% growth in 1993.

To finance these investments, the economy relied mostly on gross domestic savings, which increased from 18.1% of GNP in 1993 to 19.0% in 1994. Foreign savings consequently declined to 2.6% of GNP in 1995 from 4.5% in 1994 and 5.4% in 1993.

With the increase in average annual incomes, higher demand from newly-created establishments, as well as increased availability of products and services, consumer spending steadily inched up to 3.8% in 1995 from 3.0% in 1993, while staying within plan targets.

(2) Sectoral Performance

It is assessed in UMTPDP for sectoral performance that the growing confidence in the economy and the implementation of market-friendly policies led to improved performance of all production sectors, except agriculture. Industry, which was adversely affected by the power crisis in 1993, rebounded in 1994. Growth was sustained and was well within the 5.2-7.9% target for 1995. Services, on the other hand, performed consistently within target from 1993 through 1995, keeping pace with industrial expansion. Despite the government's efforts to assist the agriculture sector, output suffered in 1995 as a result of adverse weather conditions such as the prolonged dry spell and the severe typhoons.

Agri-industrial restructuring and development were vigorously pursued during the period, trade and investments policies were liberalized in tandem with the deregulation of the financial system, acceleration of privatization, and enhanced competition in the provision and operation of public utilities. Some of the significant trade and investment reforms implemented include, among others: (a) the reduction in the level and spread of tariff rates; (b) the elimination of the remaining quantitative restrictions on imports subject to administrative discretion; (c) the country's accession to the World Trade Organization (WTO) under GATT; (d) the issuance of the First Regular Foreign Investment Negative List which further liberalized foreign investments; (e) the financial restructuring and strengthening of the Central Bank; (f) the liberalization of the entry of foreign banks; (g) the reduction in the minimum reserve requirement of banks; (h) the sale of big-ticket items such as Petron and Meralco shares; and (i) the enactment of the expanded (BOT) law.

Meanwhile, more business-ready investment sites were developed in different areas of the country. Of the 14 Regional Agri-Industrial Growth Centers (RGCs) identified in the Plan, four have been operating for some time while seven feasibility studies and one pre-feasibility study for various sites were completed in 1994. Further in 1995, a special economic zone was established in Zamboanga City while two additional RGCs were developed in Cagayan.

Agriculture

During the period from 1985 to 1996, gross value added (the same meaning as of gross domestic product) of the combined agriculture, fishery and forestry sector has grown from 140,554 million pesos to 178,143 million pesos at the AAGR of 2.2%. The share of agricultural sector shows the decrease from 24.6% to 20.1% during the same period. GVA of agricultural sector in 1996 showed higher AAGR by 2.97% than the ones from 1993 to 1994 as shown in Tables A-2 and A-4.

Industry

The GVA of industrial sector has increased from 200,548 million pesos in 1985 to 302,482 million pesos in 1996 at the AAGR of 3.8% and recorded a growth of 1.7% in 1993 by recovering from the crippling power crisis in 1992, and reached a peak of 7.2% in 1995. The share of industrial sector has slightly decreased from 35.1% to 35.7% during the same period. The assessment in the UMTPDP reported that the industry performance has been well within the target of 5.2-7.9% in the Plan, as strong market fundamentals and the implementation of crucial reforms boosted confidence, leading to higher investments in the sector. The slight reduction of growth ratio is found from 7.2% in 1995 to 6.1% in 1996 as shown in Tables A-2 and A-4. The more detailed assessment for the period from 1993 to 1995 was carried out by sub-sector as follows.

(i) Manufacturing Sector

The expansion continually moved on an upward trend, buoyed by the recovery of the export sector and substantial capital infusions which built up production capacities. From 0.8% increase in output in 1993, manufacturing expanded at a heftier pace of 5.0% and 6.8% in 1994 and 1995, respectively as shown in Table A-5. Growth was broad-based with all major industry groups, except for tobacco manufacturing, recording positive growth as of 1995. Manufacturing accounted for 71.3% of total industrial production.

(ii) Utilities Sector

The utilities sector recovered from the power crisis experienced in 1992. Massive investments in power-related infrastructure projects effectively resuscitated the sector, which grew from 2.9% in 1993 to 13.8% in 1994 and 13.0% in 1995. The target range set for the sector for each period was surpassed.

(iii) Mining and Quarrying Sector

The mining and quarrying sector started to regain lost ground. From a meager growth of 0.7% in 1993 and a construction of 7.0% in 1994, the industry grew by 5.9% in 1995. A combination of factors which includes the higher demand from the construction sector, favorable world metal prices and the passage of the Mining Act, notwithstanding the poor performance of the oil sector, accounted for the turnaround. Furthermore, the subsector's recovery sets it back on track with the plan target for 1995.

The tourism industry performed considerably well. Visitor arrivals steadily increased from

1.4 million in 1993 to 1.8 million in 1995, posting an average growth rate of 15.2% over the three-year period. Correspondingly, tourist receipts grew by an average of 14.0% during the same period.

Services

The services sector has increased at the AAGR of 4.3% during eleven years from 1985 to 1996 which is the highest growth rate of all sectors. The share of services sector has grown from 40.4% to 43.3% during the same period. It seems to have continued to keep pace with domestic production. With output growing, services increased from 2.5% in 1993 to 4.9% in 1995, well within planned targets. NEDA made the assessment that growth in the financial services sector, in particular, was attributed to the liberalization of the banking sector, the rise in demand for credit and the reduction in intermediation cost. Meanwhile, other services subsectors also made significant gains with the liberalization of the shipping industry and innovations introduced in the area telecommunications. In 1996, GVA of services sector have grown by the AAGR of 6.0% which is higher than the ones of any other previous years after 1991 as shown in Tables A-2 and A-5.

A2.3.2 Region

Comparing the gross regional domestic product (GRDP) at constant 1985 prices, CAR has increased from 13,549 million pesos in 1990 to 17,638 million pesos in 1996 at the AAGR of 4.5%. Particularly it grew by 8.8% from 1993 to 1994. Secondly high growth is shown by Central Luzon (III) followed by Southern Tagalog (IV) and Western Visayas (VI). On the other hand, Central Mindanao (XII) decreased by 1% as shown in Table A-6.

In 1996, the largest share of 30.3% of GRDP of all regions is occupied by NCR followed by Southern Tagalog (IV) of 15.7%, Central Luzon (III) of 9.8%, Western Visayas (VI) of 7.2%, Central Visayas(VI) and Southern Mindanao (XI) of 6.6%. The summary is shown in the following table:

(Unit: Million Pesos)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
1985	221,753	13,549	21,869	15,548	68,250	109,509	21,687	50,747	47,193	17,322	21,132	37,009	50,014	24,959	-	720,691
1996	25,686	17,638	25,356	17,007	83,149	133,323	24,459	61,286	56,108	20,081	22,325	43,003	56,301	23,548	8,392	848,452
AAGR(%)	2.45	4.49	2.35	1.51	3.35	3.31	2.05	3.19	2.93	2.49	0.92	2.49	1.97	-0.97	-	2.76

The per capita GRDP at current prices of NCR of 67,894 pesos in 1995 is the highest level of all regions followed by CAR, Southern Tagalog (IV), Northern Mindanao (X) and Southern Mindanao (XI). The lowest level is accrued by ARMM of 8,630 pesos which less than one-seventh of NCR. The summary is shown in the following table:

(Unit: Pesos)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
1990	43,593	17,608	9,246	9,601	14,966	19,225	7,276	13,337	15,331	8,413	9,760	15,248	17,229	12,553	-	17,522
1995	67,894	29,166	14,451	15,170	22,083	28,303	12,433	21,906	23,557	14,206	18,047	24,605	24,164	21,989	8,630	27,131
AAGR(%)	9.27	10.62	9.34	9.58	8.09	8.04	11.31	10.43	8.91	11.05	13.05	10.04	7.00	11.34	-	9.14

The highest AAGR for per capita GRDP at current prices can be observed for Western Mindanao (IX) of 13.1% recording increase from 9,760 pesos in 1990 to 18,047 pesos in 1995 followed by Central Mindanao (XII), Bicol (V) and Eastern Visayas .

At constant 1985 prices, NCR is also ranked at the largest per capita GRDP of all regions of 26,355 pesos in 1995 followed by Southern Tagalog (IV), Central Luzon (III) and Southern Mindanao (XI) of 10,281 pesos. ARMM is again ranked at the lowest level of per capita GRDP. The summary is shown in the following table:

(Unit: Pesos)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
1990	27,810	11,772	6,222	6,292	11,112	13,511	4,942	8,047	10,224	5,155	6,614	10,262	11,554	8,484	-	11,322
1995	26,355	12,603	5,959	6,076	10,937	13,024	5,238	9,460	9,958	5,403	7,474	10,158	10,281	9,234	3,795	11,434
AAGR(%)	-1.01	1.37	-0.86	-0.70	-0.32	-0.73	1.17	1.12	-0.45	1.28	2.47	-0.20	-2.31	1.71	-	0.50

A2.4 Family Income and Expenditures

A2.4.1 Nation

The total families of the Philippines have increased from 9.9 million in 1985 to 12.8 million in 1994 at the AAGR of 2.80%. During this period the average income has increased from 31,052 pesos to 83,161 pesos at the AAGR of 11.57% and average expenditures and savings have increased at the AAGRs of 10.81% and 15.65% respectively.

On the other hand, the ratio of average expenditures to average income has reduced from 87% to 81%, but the ratio of savings to average income has increased from 13% to 19% as shown in Tables A-7 and A-8. The increase of savings means the increase of investment and economic expansion.

The eradication of the poverty of the Filipinos has been the one of the most important task to be tackled by the Government. It is significant to review the current situation of poverty. The country's per capita threshold continued to increase from the level of 3,744 pesos in 1985 to a high level of 8,885 pesos in 1994 at the AAGR of 10.1%. On a three-period growth comparison, the highest growth rate of 15.2% was registered for the period from 1988 to 1991 and the least growth of 6.76% was recorded for the period from 1991 to 1994. The magnitude of poor families increased from 4,355,052 in 1985 to 4,531,170 in 1994 declining from 4,780,865 in 1991 at the AAGR of -1.77%. The poverty incidence of families declined from 44.2% in 1985 to 35.5% in 1994, reflecting an annual decrease of 2.4%. The decline in poverty incidence was brought about by higher average family/household income which annually expanded by 11.6% for the same period. However, it must be noted that the magnitude of poor family grew by 176,118 from 1985 to 1994 as shown in Tables A-9 and A-10.

A2.4.2 Region

The most families live in NCR, 1.8 million in 1994 reflecting mostly dense population followed by Central Luzon (III), 1.3 million and Western Visayas (VI), 1.1 million. The least families live in ARMM, 361 thousand. For average income, the richer regions in 1994 can be listed up for NCR, 173,599 pesos at the AAGR of 13.13% during the period from 1985 to 1994, Central Luzon (III), 94,092 pesos at the AAGR of 10.34%, Southern Tagalog (IV), 87,627 pesos at the AAGR of 12.69%. On the contrary, the poorer regions are Eastern Visayas (VIII), 49,912 pesos at the AAGR of 12.16% ARMM, 51,304 pesos and Bicol (V), 54,167 pesos at the AAGR of 11.57%.

Looking at average expenditures, more expending regions are basically belonging to the richer regions like NCR, Central Luzon (III) Southern Tagalog (IV) and Ilocos (I). The highest

ratio of average expenditures to average income was attained by Western Visayas (VI), 90%, in 1994 followed by Western Mindanao (IX), 86%, Southern Mindanao (XI), 84% respectively. It is remarkable that this ratio of VI and IX have increased slightly since 1985 in spite of decrease of the ratio for the Philippines. On the other hand, lower ratios can be observed for Eastern Visayas (VIII), 75%, ARMM, 76%, and Cagayan Valley, 77% respectively. The ratio of average expenditures to average income and the one of savings to average income have the relation of trade off. Rapid growth of ratio of savings to average income was accrued by Eastern Visayas (VIII) as 9.92% from 1985 to 1995, Central Mindanao (XII) as 9.71% and Central Luzon (III) respectively as shown in Tables A-7 and A-8.

Turning to the regional poverty situation, NCR recorded the highest poverty threshold in 1994 at 11,230 pesos followed by CAR at 10,853 pesos, Ilocos (I) at 10,022 pesos, Central Luzon (III) at 9,757 pesos and Southern Tgalog (IV) at 9,537 peso. On the other hand, the least recorded poverty thresholds was attained by Central Visayas (VII) at 6,425 peso and Eastern Visaya (VIII) at 6,444 pesos.

Southern Tagalog (IV) recorded the highest magnitude of poor families by 51,4527 in 1994 at the negative AAGR of -0.22% from 524,839 in 1985, followed by Western Visayas (VI), 487,794, and Bicol (V), 483,954. The lowest magnitude is recorded by CAR as 122,942, Cagayan Valley (II) as 185,708 and NCR as 141,671 in 1994 respectively.

The regions with higher incidence of poor families include ARMM of 60.0% followed by Bicol (V) of 55.1% and Central Mindanao (XII) of 54.7% while the regions with lower incidence of poor families are NCR of 8.0% followed by Central Luzon (III) of 25.2% and Southern Tagalog (IV) of 29.7%. NCR, Southern Tagalog (IV), Western Visayas (VI), Central Visayas (VII) and Eastern Visayas (VIII) have continuously declined their incidences of poor families during the period from 1985 to 1994 as shown in Tables A-9 and A-10.

A2.5 Price Level and Inflation

A2.5.1 Nation

Prudent fiscal and monetary management dampened the price effects of a rice-supply shock to keep inflation in check in 1995. Following the normalization of rice supply, the economy entered a low level of inflation regime starting September 1996. From September up to December, the inflation rate averaged 4.8%. But because of the overhang from the rice price shocks that kept the inflation rate steep from January to August, the average annual inflation rate for 1996 ended up at 8.4%.

The nation's annual inflation rate moderated from 8.9% in 1988 to 8.4% in 1996. The consumer price index (CPI) of all items raised up to 2.27 times during this period and the annual average inflation rate during this period recorded by 10.8%. All the components included in the consumer basket, except for the food, beverages and tobacco group, registered lower annual inflation rates with miscellaneous items and fuel, light and water posting the large drops. The property boom, however, jacked up the prices of construction materials and rents, inflation rate of the housing and repairs index.

In 1997, inflation rate seems to have been more stable. The average inflation rate during period from January to June was only 3.5%. But after June, the depreciation of peso to US$ dollar has begun and the peso to US$ rate hiked drastically and still kept the peso to

US$ of around 40 peso in 1998. This depreciation of peso will influence to push up inflation rate in near future.

A2.5.2 Region

Most of the regions had lower inflation rates in 1995 compared to 1994, with only four regions, namely, Bicol (V), 10.6%, Eastern Visayas (VII), 9.8%, Western Visayas (VI), 9.2% and Cagayan Valley (II), 6.5% posting higher inflation rates. Except in region V, which was hit by strong typhoons during the year, inflation rates were also kept at single-digit in all of the regions.

The highest annual average inflation rate is registered by NCR, 12.49% during seven years from 1988 to 1995 followed by Central Visayas (V), 11.91% and ARMM, 11.79% while the lowest one was recorded by Southern Mindanao (XI), 9.26%, Cagayan Valley (II), 10.34% and Central Mindanao (XII), 10.54% as shown in Table A-11.

A2.6 Education

Schools have been played important role as educational organization to level up the intelligence of the Filipinos and are one of the water consuming public facilities. Because water is consumed for many kinds of use for drinking and cooking for students and workers including teachers in schools, then it is very significant to study the current situation of schools.

A2.6.1 Nation

(1) Number of Schools

Total number of schools in the Philippines increased from 41,863 in 1985 to 52,442 in 1995 at the AAGR of 2.28%. The dominant share of 82.3% is occupied by public schools of 43,160 and residuals share of 17.7% is occupied by private schools of 9,282 in 1995. But it is remarkable that the AAGR of private schools in total is 6.09% while the one of public schools is only 1.63%. This indicates that the role of private schools in education have become important year by year. By educational level, the most rapid growth in total number of schools is attained by pre-school of 11.79% followed by tertiary of 8.60% while the slowest growth is recorded by elementary of 1.18% followed by secondary of 1.55%. This describes that the rate of enrollment of younger generation increased reflecting raising up income level of their parents and grading up of educational level has been progressed to get high income position after graduation.

The number of schools per 100,000 population in 1995 is 7.9 for total, 6.5 for public and 1.4 for private respectively. By level of education, the highest level is indicated by elementary of 5.5 followed by pre-school of 5.2 and secondary of 0.9 as shown in Table A-12.

(2) Number of School Enrollments

Total number of school enrollments except tertiary in the Philippines increased from 12.6 million in 1986 to 16.8 million in 1996 at the AAGR of 3.38%. The dominant share of 85% is also occupied by public schools of 14.6 million and residuals share of 15.0% is occupied by private schools of 2.6 million in 1996. By educational level, the most rapid growth in total number of school enrollments is accrued by pre-school of 10.5% followed by secondary of 4.3% and elementary of 2.9%. This fact describes the same phenomenon as the one of the

number of schools.

The most number of school enrollments per 100 population in 1995 is registered by public for 21.0 which is 86% in 24.5 for total, while the private is only 3.5. By level of education, the highest level is obtained also by elementary of 16.6 followed by secondary of 7.2 and tertiary of 0.7 as shown in Table A-13.

A2.6.2 Region

(1) Number of Schools

The most number of schools in total of pre-school, elementary and secondary is occupied by Southern Tagalog (IV) of 7,096 (14.20%) in 1995 followed by Western Visayas (VI) of 4,213 (8.43%), Bicol (V) of 3,953 (7.91%). The least number of schools is owned by CAR as 1,609 (3.22%). It should be noted that NCR has the highest share of private schools by 21.46% (1,577) followed by Southern Tagalog (IV) by 19.40% (1,425). By educational level, Southern Tagalog is the highest rank for all levels of education in total. But NCR is ranked as the highest position for private of pre-school by 26.48% and also private of elementary school by 22.46%.

But comparing for the ratio of the number of schools to population, the different character can be seen. The largest number in total per 10,000 population is gained by CAR of 12.8, which has the least number of schools in total, followed by Eastern Visayas (VIII) of 11.7, CARAGA of 9.8. CAR has also the highest number of public school by 11.3% and NCR has the highest number of private school by 1.7 reflecting the highest number of private schools. Ilocos (I) has the biggest number of pre-school by 1.8 followed by Southern Tagalog (IV) by 1.6 and CAR by 1.3. CAR has the highest number of secondary school by 19.9 followed by Eastern Visayas (VIII) by 10.0. But all regions have less than one for private school of all levels of education as shown in Tables A-14 and A-16.

(2) Number of School Enrollments

The most number of school enrollments in total of pre-school, elementary and secondary is also occupied by Southern Tagalog (IV) of 2.4 million (14.53%) in 1995 followed by NCR of 2.0 million (12%), Western Visayas (VI) of 8.93%. The least number of schools is owned also by CAR as 325,000 (1.98%). NCR has the highest share also in enrollments of private schools by 25.33% (593 thousand) followed by Southern Tagalog (IV) by 17.79% (417 thousand). By educational level, Southern Tagalog (IV) is the highest rank not for all levels of education but for elementary school by 14.02% and secondary school by 15.11%. For pre-school, NCR can be ranked as the highest by 23.52%.

Southern Tagalog (IV) has the highest share for public elementary and secondary school and NCR has the highest share for private of all levels of education and it can be noted that its share of private elementary school is enormously high of 40.45%.

But comparing for the ratio of the number of school enrollments to population, there is no considerable difference among regions. The largest number in total per 100 population is realized by Bicol (V) of 26.3 followed by Western Visayas (VI) of 25.3, Northern Mindanao (X) of 25.0 and Central Mindanao (XII) of 25.0. Bicol (V) has also the highest number of public school by 24.1 and NCR has the highest number of private school by 6.3 reflecting the highest number of private school enrollments.

The ratio for pre-school in total are less than one except NCR by 1.1. For elementary, the highest ratio is registered by Bicol (V) of 19.1 and the lowest one is obtained by NCR of 12.2.

For secondary, Ilocos (I) has the biggest ratio of secondary by 8.6 followed by CAR of 8.0 as shown in Tables A-15 and A-17.

A2.7 Hospital

It goes without saying that hospital has indispensable public facilities for people's health and it consumes much water for many kinds of use for drinking, cooking, operating and so on for patients and workers including doctors and nurses. Then it is significant to study the current situation of hospitals in the Philippines for basic information of water demand of public use.

A2.7.1 Nation

Total number of hospitals recorded the slight decrease from 1,799 in 1985 to 1,700 at negative AAGR of -0.71% but increased from 1,571 in 1994. The number of public hospitals is 1,111 (65.4%) and the one of private is 589 (34.6%) respectively. There are many factors for saturated number of hospitals. But this tendency seems to have been basically caused by improvement of health condition of the Filipinos, merger of small scaled hospitals by introduction of high medical technology and natural weeding out by economic competition of market mechanism among hospitals. The ratios of number of hospitals per 100,000 population are 0.9 for public, 1.6 for private and 2.5 for total which is about one third of the one of the number of school in 1995 as shown in Table A-18.

A2.7.2 Region

The most number of hospitals are facilitated with Southern Tagalog (IV) by 249 (14.65%) followed by Southern Mindanao (XI) by 169 (9.94%), NCR by 168 (9.88%), and Central Luzon (III) by 159 (9.35%). The regions which have gone upward in spite of decrease performance of nation are only three regions like Central Luzon (III) at the AAGR of 2.39%, Bicol (V), 0.25% and Western Visayas (IX) , 0.16%. Other regions declined in number of hospitals. The highest decrease is recorded by Northern Mindanao (X) at the AAGR of -6.01% followed by Central Mindanao (XII), -4.80% and Cagayan Valley (II), -4.25% as shown in Table A-18.

A2.8 Government Finance

A2.8.1 Revenue

The cash balance of the Government finance has continued to be deficit since 1970 but turned to be surplus after 1994. The cash operations resulted in a 6.3 billion pesos surplus in 1996, 11.2 billion short of the programmed 17.5 billion peso. The surplus in 1996 was lower than the previous year's 11.1 billion peso as revenue grew by only 13.6% vis-à-vis the 15.4% growth expenditure. As shown in Table A-19, national government revenue increased from 68,961 mill peso in 1985 to 410,449 million peso in 1996. During this period, the revenue grew by six times approximately. In 1996, shares of tax revenue and non-tax revenue are 89.6% and 10.4% respectively. The share of tax revenue has increased year by year.

In 1996, improved collections by the Bureau of Internal Revenue (BIR) contributed to the 57.4 billion peso hike in tax revenues. Meanwhile, the slowdown in earnings from the government's privatization program caused largely the 8.1 billion peso decline in non-tax

revenues. This was mainly to the deferment in the sale of government shares in the Manila Electric Company (MERALCO) and the Food Terminal Inc. (FTI), among others. Judging from this historical performance, the share of tax revenue is expected to go up in future.

The share of tax revenues, almost 90%, is high level comparing with the one of Japanese government, 66.5% (28.8% is occupied by public bonds) in 1996. The government financial situation of the Philippines can be judged more sound than the one of Japanese government. But the financial basis of the tax revenues of the Philippines has been considered to be weak and the government is striving to prepare the comprehensive tax reform acts to strengthen the basis of tax revenues.

A2.8.2 Expenditure

According to government expenditure program in recent three years (1995 - 1997), it recorded the increase of 28% from 372,081 million peso to 476,170 million peso. In 1997, the social services has the biggest share of 32.8% of six sectors followed by economic service of 26.2%, general public service of 17.3% and interest payment of 15.6%. Among economic services, communication, roads and other transport section has the largest portion of 10.6% followed by agriculture, agrarian reform and natural resources of 6.6%. But water resources development and flood control accounts for as small as 1% in these three years and has grown from 3,940 million peso to 4,056 million peso in amounts as shown in Table A-20. We have not been informed enough why the portion of expenditure for water resources development and flood control is small than the one of transport section as the same character as infrastructure.

The shortages of electricity and water has not been solved completely. Particularly water shortages in major cities in the Philippines has been casting the serious problems to local inhabitants and manufacturing industry. The more financial investment to water resources development is indispensable for sustainable economic growth of the Philippines.

A2.9 Foreign Trade

A2.9.1 Total Trade

During thirty five years (1971- 1996), total trade in the Philippines on the basis of F.O.B value grew from 2,450 million US dollars to 52,970 million US dollars, indicating the increase of 22times and annual average growth of 13.1%. Except in 1973, import was more than export and its share grew from 51.5% to 61.2%. Then balance of trade registered the increase of deficits from 71.6 million peso to 11,884.4 million peso as shown in Table A-21 and Figure A-1.

A2.9.2 Exports

In ten commodity groups, manufactures has the largest portion and increased its share from 69.7% in 1990 to 83.3% in 1996. It is remarkable that electronics and electronic equipment/parts and telecommunication grew rapidly from 1,964 million US dollars to 9,990 million US dollars at annual average growth rate of 31.1% and account for almost 50% in total export. On the contrary, agricultural products declined its share less than 10%. During six years, rapidly grown commodities are (i) mangoes and banana in fruits and vegetables, (ii) natural rubber in other agro-based products, (iii) textile yarns/fabrics, travel goods and handbags, machinery and transport equipment, baby carriers, toys, games and

sporting goods other than electronic products in manufactures. During the same period, commodities which declined their exports amounts are (i) copra in coconut product, (ii) molasses in sugar and products, (iii) shrimp and prawns, and coffee, raw not roasted and seaweed dried in other agro-based products, (iv) plywood and veneer sheets in forest products, (v) copper concentrates, gold, iron ore agglomerates and chromium ore in mineral products and so on as shown in Table A-22.

A2.9.3 Imports

In five commodity groups, raw materials and intermediate goods have the largest portion of 44.15% in 1996 followed by capital goods of 32.9%, consumer goods of 10.6% and mineral fuels and lubricant of 9.4%. Most of raw materials and intermediate goods are occupied by semi-processed raw materials including animal, vegetable oils and fats, chemical, manufactured goods, embroideries and so on. During six years, most of commodities grew at more than 10% of annual average growth rate.

Since 1990, rice was imported in the years of 1990, 1993, 1995 and 1996. The most value of rice was imported in 1996 by 294 million peso which could be considered to be temporal phenomenon because of bad weather condition of drought. The government has targeted to keep self-sufficiency ratio of 100 per cent and this policy will continue in the future. Actually NIA has positive irrigation development plan to increase rice production. Then the import of rice will not increase and the export of rice will be realized in future.

The highest grown commodities in each commodity group are (i) telecommunication equipment and electric machines (37.9% of annual average growth rate) in capital goods, (ii) materials for electric equipment (29.1%) in raw materials and intermediate goods, (iii) coal and coke (14.4%) in mineral fuels and lubricant, (iv) home appliances (30.4%) in consumer goods, and (v) articles temporary imported and exported (29.4%) in special transactions. It is noticeable that the almost all commodities of imports grew in six years without drastic fluctuation unlike export as shown in Table A-23.

A2.10 Balance of Payment

As shown in Table A-24, during six years from 1990 to 1996, overall balance of payment changed from deficits of -93 million US dollars to surplus of 4,107 million US dollars at annual growth rate of 88% and realized the increase of 4,200 million US dollars in amounts.

A2.10.1 Current Account

Current account is composed of trade and transfers. During six years from 1900 to 1996, trade in net grew in deficits from 3,281 million US dollars to 4,503 million US dollars and the rate to GNP decreased negatively from -7.4% to -5.2%. Deficits is generated from goods in net (foreign trade balance). Transfer in net indicates slight decrease from 714 million US dollars to 589 million US dollars.

A2.10.2 Capital and Financial Account

Capital and financial account is composed of five elements : (i) medium and long-term loans, (ii) investment, (iii) change in the net foreign assets (NFA) of commercial banks, (iv) purchase of collateral, (v) short-term capital. Residents investments abroad have most

rapidly increased from 18 million US dollars in 1990 to 2,453 million US dollars in 1996 followed by short-term capital net from 19 million US dollars to 540 million US dollars. Net capital and financial account realized grew from 1,776 million US dollars to 8,609 million US dollars at annual growth rate of 30.1%. The net foreign investments reached 1,168 million US dollars in 1996 or 441 million US dollars below the 1995 of 1,609 million US dollars.

A2.10.3 Gross International Reserves

The substantial surplus in the country external transactions helped increase BSP(Central Bank of Philippines) total foreign assets or gross international reserves (GIR) including its reserve position in the IMF in 1996.

The level of international reserves reached 11,745 million US dollars or 51% higher than the end- 1995 level of 7,762 million US dollars. At this level, the BSP-GIR was equivalent to 3.1 month worth of imports of goods and services, including interest payment.

A2.11 External Debt

During the period from 1990 to 1996, external debt service burden increased from 3,547 million US dollars to 4,961 million US dollars at annual average growth rate of 5.8%. Principal indicates faster increase than interest. After 1992, principal exceeded interest and shares of principal and interest was 56.3% and 43.7% respectively in 1996 as shown in Table A-25.

As a whole, it is observed that external debt service burden has given less influence to the economy of the Philippines. According to comparison for selected external debt ratios (DSB), the best improvement ratio is considered to be gross international reserves to DSB, figuring out 57.7% in 1990 and 236.8% in 1996. The ratios of DSB to following items indicates the improvement by decrease of their figures as follows; to export of goods and services (27.2% to 12.5%), to export shipment (43.3% to 24.2%), and to GNP (8.1% to 5.7%), respectively.

A2.12 Peso Per US Dollar Rate

As shown in Table A-25 and Figure A-2, the past long range trend of the Philippines peso per US dollar recorded the increase of around 4 times of depreciation, changing from 7.440 in 1976 to 28.771 in 1997. Adversely US dollars indicates the strengthening and their rate to peso decreased from 0.134 to 0.035.

It is reported in the Annual Report of Central Bank of Philippines(1996) that peso was relatively stable in 1996. Trading within a relatively narrow band of 20 centavos during the year, it depreciated by only 1.9 percent. While relative stability in the exchange rate reflected the sound underlining macro-economic fundamentals, it was facilitated by BSP's swift response to discourage speculative activities in the market.

But after July in 1997, peso began to depreciate moderately and since December in 1998, higher depreciation of peso happened and peso to US dollar rate still remained more than 40 pesos during January. One of the main factors of this high depreciation of peso seems to be speculative behavior of investors and does not reflect the substantial economic change in the

Philippines. The future economic situation in the Philippines is necessary to be carefully observed.

A3 Development

A3.1 Medium-Term Development Plan

According to the Updated Medium-Term Philippine Development Plan (1996 to 1998) by NEDA, macro economic framework was set up as follows;

A3.1.1 Growth Prospect

(1) National Level

NEDA prospects that Gross National Product (GNP), in real terms, will grow by an average of 7.0-8.0% for the period from 1996 to 98 supported by strong investments and exports and Gross Domestic Product (GDP) is projected to increase to 7.6-8.3% in 1998 which will be led by industry and services, both of which are expected to benefit from the structural reforms in trade and investments as well as the liberalization of the various services sectors.

Investment is projected to rise from 21.8% of GNP in 1995 to 24.7% in 1998 with the increase coming largely from the private sector. Public investments are projected to reach 5.8% of GNP. These investments will be financed by the domestic sector whose savings are projected to increase from 19.2% of GNP in 1995 to 20.4% in 1998. Meanwhile, Public savings will increase from 3.1% of GNP in 1995 to 6.8% of GNP in 1998. The country is expected to be less dependent on foreign savings to finance investments. Hence, foreign savings are projected to average 4.3% of GNP during the period.

(2) Regional Level

At the regional level, majority of the regions are expected to grow at higher rates than the 7.3% of national average for the period from 1996 to 98. Region IV is expected to grow at the fastest rate during the plan period at 9.5%, followed by Region XI (8.7%). On the other hand, the regions which are expected to grow below the national average are: Region VIII (7.1%), Region IX (6.9%), Region XII and the Autonomous Region of Muslim Mindanao (ARMM) (6.6%), and Region V (6.5%). National Capital Region (NCR) will increase at the lowest Gross Regional Domestic Product of 4.8%.

The slower growth of the NCR will be realized by the sustained implementation of the government's decentralization policy. Among the strategies and programs to be undertaken along with this policy are: (a) the full implementation of the Local Government Code (LGC), which will enhance the financial and management capability of local government units (LGUs) to develop the resources within their areas; (b) the increase in government resources that will be channeled to poorer regions; (c) the continuing pursuit of poverty alleviation programs; and (d) the development of industrial and alternative urban centers.

The growth of Region IV will be accelrated by the expansion of economic activities in the Cavite-Laguna-Batangas-Rizal-Quezon (CALABARZON) areas. Meanwhile, Cordillera Administrative Region (CAR), which will grow by an 8.4% average, will benefit from the recovery of the mining sector and the continuing boom in the tourism industry. Region III will grow by 8.6%, on the average, during the plan period. Its economy will start to recover in 1997 from the persistent lahar-induced destruction which is an aftermath of the Mt. Pinatubo eruption. The established viability of Subic and Clark as economic zones will contribute significantly to the rapid rise in the growth rates of Region III, particularly in 1997 and 1998.

The Mindanao regions will experience significant increase in their economic output to the beneficial effect of the cross-border economic cooperates with Brunei, Indonesia, and

Malaysia under the auspices of the BIMP-East ASEAN Growth Area (EAGA). Region XI, which serves as the center of BIMP-EAGA business activities in Mindanao, will benefit from these initiatives, thus allowing it to attain the second highest average annual growth rate in GDP for the period from 1996 to 98.

A3.1.2 Prices, Monetary Management and Financial Resource Mobilization

The inflation rate is targeted to decline from 8.7% in 1996 to 5.5% in 1998. Rising liquidity levels, from P761.4 billion in 1995 to P1,495 billion in 1998, will not accelerate inflation but will contribute to increase financial resource. The rate of broad money to GNP will rise from 38.7% in 1995 to 51.0% in 1998.

In the next three years, policies and strategies will focus on the following:

- Reduction in financial intermediation costs
- Promotion of greater competition and efficiency in the banking system
- Development of the rural finance sector
- Mobilization of domestic savings
- Capital Market Development

A3.1.3 Fiscal Sector

The target for fiscal sector is to reduce the overall deficit of the public sector. Specifically, the consolidated public sector financial position (CPSFP) will improve from a deficit of 0.1% of GNP in 1995 to reach a balanced position by 1996 and to a surplus of about 0.2% of GNP in 1998. Public investment targets are expected to grow annually by 18.0%. For 1996, total investments in capital expenditures of NG and government-owned and-controlled corporations (GOCCs) will reach :108.3 billion. Total investments for the next three years will amount to P240 billion.

Policies and strategies in the next three years will focus on the following:

- Improving the efficiency of revenue collection
- Maintaining prudence in government spending
- Increasing capital outlays
- Improving the government financial management systems
- Improving the management of debt
- Further rationalizing the government corporate sector

A3.1.4 External Sector

The current account deficit will be at 4.3% of GNP by 1998. The exports are projected to grow by an average of 20.8% annually until 1998.

The focus of policies and strategies in the next three years will be the following:

- Continued adherence to market-determined exchange rates
- Pursue further foreign exchange liberalization
- Review the existing BSP rediscounting window in order to benefit a larger number of exporters.

- Rationalize monetary policy in a setting of liberalized trade in securities and national currencies.

A3.1.5 Labor and Employment Sector

The number of workers necessary to man the economy is targeted to grow from 26.5 million in 1996 to 28.5 million in 1998, or at an average annual growth rate of 3.6%. The unemployment rate is projected to decline between 6.9 to 7.6% in 1998.

From 42.3% in 1996, agriculture's share of workers will decline to 39.9% in 1998. But the number of employed in agriculture will continue to increase from 11.2 million in 1996 to 11.4 million at the end of the plan period.

The industrial sector will account for only 17.0% of the total employed. Employment in this sector is targeted to attain an average growth rate of 6.3%. At this rate, the sector is projected to employ an average of 4.7 million workers each year.

Almost 63.0% of the employment opportunities in the industrial sector will be in the manufacturing subsector. The construction subsector will be the next biggest employer. On the other hand, only 2.8% of employment opportunities in the industrial sector will be found in the utilities sector.The services sector will continue to be the second biggest employer of the economy. The sector will realize an increasing employment share from around 41.2% in 1996 to 42.7% in 1998.

Policies and strategies to generate more productive employment in the next three years will be supportive of the Comprehensive Employment Strategy Program (CESP) and the commitments forged among the executive and legislative branches of government, the private and business sectors, the nongovernment organizations and basic sectors during the National Employment Summit of September 1995. In pursuit of the objectives of the CESP, strategies will be focused on the implementation and monitoring of the specific action programs in the following sectors: (a) agriculture; (b) industry and services; (c) human resources development; (d) industrial relations; and (e) public sector employment.

A3.2 Long-Term Development Plan

In the Long-Term Development Plan provided by NEDA, the principle, vision and policies are presented. The socio-economic framework for the study was established reflecting the plan. The following is the outline of the Long-Term Development Plan related with the Study;

A3.2.1 Long-Term Development Vision

Rising up to the challenges set forth by the emerging global environment, by 2025, there would emerge a global Philippines possessing the following characteristics.

- mobile - his movements are not limited to the confines of the country. He moves a lot as a result of his global exposure.
- flexible - he adjusts very easily to various situations both domestically and internationally ; he is versatile.
- entrepreneurial - he is business-minded.
- has deep sense of nationalism - he is committed to the common good and not only his own good or the good of his own class.

- much more tolerant - he accepts and works within ethnic plurality of the Philippine society.

These visions will be formulated by the following achievements.

Economy

- Complete/Absolute Provision of Minimum Basic Needs
- Industrialized Status
- Strong and Broad Middle Class
- World Class, World Renowned and Highly Competitive Firms
- Wide Geographic Distribution of Industries and Economic Activities

Resource Development and Utilization

- Full Employment of Manpower Resources
- Sustainable Use of Renewable and Non-Renewable Resources
- Intensive and Extensive Application of Science and Technology

A3.2.2 Long-Term Development Issues

The following issues are listed up to attain the visions;

- Population Management
- Labor Market
- National Security
- Science and Technology
- Industrial Restructuring
- Institutional Development
- Environmental Management
- Physical Planning
- Energy Sufficiency
- Food Sufficiency

A4 Socio-Economic Framework for High Economic Growth

A4.1 Population

A4.1.1 Nation and Region

(1) Basic Condition

The latest Philippine census was conducted in 1995. And the base year for population projection was set at 1995. The population projected was for the years of 2000, 2005, 2010, 2015, 2020 and 2025.

(2) Method adopted

Total Population of Philippines

Total population of the Philippines is a control total for the regional population projection. The population during the period from 2000 to 2025 have already been projected and reviewed by the "Technical Committee On Population and Housing Statistics Technical Working Group On Population Projections" prepared by Technical Advisory Group and NSO Population Projections Unit with funding and assistance from the UNFPA-NSO PROJECT PKI/96/P01 strengthening the NSO in providing data for Local Planning and Development.

Technical Note No.1 documents the base population and the assumptions used in the 1995-based Philippine and regional population projections. The assumptions describes the future trends in the demographic processes of fertility, mortality, and migration required by the cohort-component method of population projection. The 1995 Population Census was used as the basis for these Philippine and regional projections.

The population projection conducted by NSO is based on three kinds of assumptions with regard to fertility, mortality and migration. The populations projected was figured out for three levels corresponding to these three varying assumptions (low, medium and high).

The methodology applied in the population projection by NSO is quite agreeable and the result of "medium level" projection was adopted to the study as a control total.

Population by Region

The result of "geometrical" regional population projection of medium level conducted by NSO up to year 2020 was applied to this study.

The outline of method applied by NSO is as follows:

- To project population by region on the basis of annual average growth rate during the period from 2015 to 2020.
- To accumulate population for all regions
- To adjust population for each region by total population of the Philippines as a control total projected in advance.

In the same manner the population by region for the year of 2025 was projected.

Population by Province

The population projection by province has not yet been figured out on the base of 1995 population census by NSO. And following procedure was applied to project provincial population.

- To estimate the average annual growth rate on the basis of 1990 population census

- To project population by province during the period from 1995 to 2020 applying provincial average annual growth rate.
- To accumulate population for all provinces
- To adjust population for each province by total population of region as a control total projected which has already conduced in the previous step.

Population by Municipality

The future population of municipality was assumed to increase by the same growth rate as the one of province.

A4.1.2 Population of the Study Area

(1) Classification of Population by Province and by Municipality/city into Water Resources Region and River Basin

There are cases where a municipality area extend more than two river basins. The population of these municipalities/cities were counted as the population of one river basin where their town proper or center of municipalities/cities are located. The area which is not belonging to any major river basins was categorized as "other area".

(2) Population by River Basin

Population by river basin was calculated by accumulation of population by province which belongs to each river basin. Population of municipality was not projected by river basin but by water resources region because the water districts are not actually classified by river basin but by water resources region of which boundary was assumed to be the same as the one of administrative boundary of municipality.

A4.1.3 Urban and Rural Population

The rates of urban and rural population by province were projected by taking account of the past trend based on the population census for the study area. The rates were applied to total population for each province so that the total urban and rural population by river basin was estimated by accumulation of urban and rural population by region and by province which belongs to each river basin.

A4.1.4 Results of Projection

(1) Total Population

The total population of the Philippines may increase from 68.3 million in 1995, which was estimated by NSO or 68.6 million in Sept. 1995 by population census, to 111.1 million in 2025 at annual average growth rate (AAGR) of 1.6%. But the AAGRs will decrease gradually from the period from 1995 to 2000 of 2.2% to the period from 2020 to 2025 of 1.1% as shown in Table A-27.

(2) Population by Region, Province and Municipality

The highest AAGR of 2.4% is expected for Southern Tagalog (Region IV) during thirty years from 1995 to 2025 followed by Southern Mindanao (Region XI), Northern Mindanao (Region X), and Western Mindanao (Region IX). On the contrary, NCR will increase at the lowest growth rate of 1.2% together with the progress of decentralization from central regions to local regions as shown in Table A-19 and Figure A-1. The share of Region IV will increase from 14.5% in 1995 to 17.9% in 2025 but the one of NCR will decrease from 13.8% in 1995 to 12.0% in 2025. The summary is shown in the following table:

(Unit : 1,000 persons)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
1995	9,421	1,249	3,792	2,526	6,907	9,904	4,309	5,757	4,908	3,357	2,782	3,938	5,053	2,318	2,008	68,345
2025	13,354	2,060	5,532	3,896	10,630	19,903	6,408	8,694	7,762	5,566	4,798	6,820	8,924	3,969	3,658	111,473
AAGR(%)	1.2	1.7	1.3	1.5	1.4	2.4	1.4	1.4	1.5	1.7	1.8	1.8	1.9	1.8	1.4	1.6

The detailed results of population projection by Province are shown in Table A-28.

(3) Population by Water Resources Region (WRR)

The water resources region (WRR) of Southern Mindanao (XII) will increase from 4.0 million in 1995 to 7.3 million in2025 at the highest growth rate of 2.0% per annum followed by Northern Mindanao (X) and Southern Tagalog (IV). Ilocos (I) will grow most slowly from 2.1 million to 3.1 million at the AAGR of 1.3% followed by Bicol (V) and Western Visaya (VI) as shown in Table A-29.

Southern Tagalog (VI) including NCR occupies the highest share of 28.1% in 1995 to 29.6% in 2025. Other regions which have high shares are Central Luzon (III) , 13.8% to 13.1% in 2025, Western Visayas (VI) from 9.2% to 8.4% and Southeastern Mindanao (XI), 7.15% to 7.17%. The least share in 1995 is occupied by Ilocos (I) of 3.1% which will decrease to 2.8% in 2025 followed by Ilocos (I) of 3.10% to 2.80%, Cagayan Valley (II) of 4.43% to 4.35%, Northern Mindanao (X) of 4.7% to 5.1% respectively. The summary is shown in the following table:

(Unit : 1,000 persons)

Year	No. and Name of Water Resources Region (WRR)												Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	2,129	3,038	9,457	19,500	4,325	6,302	4,489	3,367	4,041	3,237	4,905	4,020	68,611
2025	3,118	4,652	14,624	33,012	6,501	9,382	7,084	5,572	6,308	5,703	8,192	7,327	111,474
AAGR(%)	1.3	1.4	1.5	1.8	1.4	1.3	1.5	1.7	1.5	1.9	1.7	2.0	1.6

(4) Population by River Basin

The Abra river basin (WRR I) is projected to bring about the lowest growth rate of 1.0% per annum during the period from 1995 to 2025 among the major river basins. Its population will increase from 415 thousand to 564 thousand. Other regions which have the projected low growth rates are Laoag (WRR I) and Abulug (WRR II) as shown in Table A-29.

In 1995, Pasig Laguna de Bay (WRR IV) occupies the highest share of 19.1% (13.1 million) which will increase to 19.6% (21.8 million) in 2025 among the major river basins followed by Pampanga (WRR III), Mindanao (WRR XI) and Cagayan (WRR II). There are many river basins of which shares are less than 1.0%. They are Amnay Patrick (WRR IV), Abulug (WRR II), Laoag (WRR I), Abra (WRR I) and so on. The summary is shown in the following table:

(Unit : 1,000 persons)

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Bag-Hibungan (WRR VI)
1995	415	245	2,302	210	4,792	2,118	13,130	165	1,229	587	673
2025	564	340	3,580	302	7,406	3,233	21,822	302	2,042	889	992
AAGR(%)	1.0	1.1	1.5	1.2	1.5	1.4	1.7	2.0	1.7	1.4	1.3

Year	Major River Basin									Total
	Jalaur (WRR VI)	Agusan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	
1995	630	992	349	342	552	299	584	3,087	459	33,131
2025	951	2,215	630	613	1,090	607	866	5,631	714	51,753
AAGR(%)	1.4	2.8	2.0	2.0	2.3	2.4	1.3	2.0	1.6	1.7

(5) Urban and Rural Population

The results of projection for urban and rural population are shown in the Table A-29. The rate of urban population of the study area will increase from 51.0% in 1995 to 66.0% in 2025. The highly urbanized WRRs from 1995 to 2025 are predicted to be Southern Tagalog (IV) from 79.0% to 84.0%, Central Luzon (III), from 54.0% to 72.0%, Southwestern Mindanao (IX) from 34.0% to 66.0%, Central Visayas (VII) from 47.0% to 65.0%. Still less urbanized WRRs in 2025 are indicated by Cagayan Valley (II) of 25.0%, Bicol (V) of 37.0%, Eastern Visayas (VIII) of 41.0% and Ilocos (I) of 42.0%.

Highly urbanized river basins in 2025 will be Amnay Patrick (WRR IV) of 100%, the Pasig Laguna de Bay (WRR IV) of 99.0%. On the other hand, the river basins which are not so urbanized in 2025 are Abulug (WRR II) of 24.0%, Cagayan (WRR II) of 26.0%, Laoag (WRR I) of 29.0% and Abra (WRR I) of 30.0% respectively.

A4.2 Employment

A4.2.1 Method Adopted

(1) Total Employment

The national total employment in the Philippines was projected by applying the projected annual average growth rate (AAGR) for each five year period up to 2025. The AAGRs were fixed by taking into consideration of; (I) the past tendency of total employment after 1987, (ii) the Updated Medium-Development Plan (1996~1998) and (iii) the AAGRs of population especially for future.

(2) Employment by Sector

The employment by sector (agriculture, industry and service) was projected by setting up the AAGR for each five year period till 2025. The AAGRs were fixed by taking into consideration of ; (i) the past tendency of sectoral employment after 1987, (ii) the Updated Medium-Development Plan (1996~1998). The adjustment to finalize the projection was conducted (i) by comparison of the accumulated sectoral employment with the control total projected in the step of "A4.2.1.1" and (ii) by taking into account of the past tendency of structure in percentile for employment by sector.

(3) Employment by Sector and by Region

The employment by region for each sector was forecast by projecting the AAGR for each five year period up to 2025. The AAGRs were fixed by taking into consideration of the past tendency after 1987. The adjustment to finalize the projection was also conducted (i) through comparing the accumulated regional employment by sector with the total projected sectoral employment in the step of "A4.2.1.2" and (ii) by taking into account of the past tendency of structure in percentile for employment by sector.

(4) Employment by Sector and by Province

The employment by province for each sector was projected by setting up the AAGR for each five year period up to 2025. It was assumed that the AAGRs of each province were the same

as the ones of region. The result of projection for this employment by sector and by province was applied to classify the gross value added of industrial sector and service sector into water resources region and river basin.

A4.2.2 Results of Projection

The total employment of Philippines will increase from 26.1 million in 1995 to 49.3 million in 2025 at the AARG of 0.2%. The highest growth rate is expected to be industrial sector of 3.1% followed by service sector and agricultural sector. The share of agricultural sector will decrease from 43.6% in 1995 to 31.7% in 2025. On the contrary, industrial and service sectors will increase from 15.8% to 21.0% and from 40.6% to 47.3% respectively as shown in Table A-30.

The high growth for industry is projected for South Mindanao(XI), West Mindanao (IX) at the AAGR of 4.2%, Ilocos (I) and Central Luzon (III) of 4.1%. A considerable employment will be occupied by South Tagalog (XI) of 20.4% in 2025 which will increase from 19.8% in 1995, Central Luzon (III) from 13.4% to 18.0%. But the share of NCR will decrease from 19.3% in 1995 to 14.4% in 2025. Only six regions will increase their shares in 2025 and other regions will decrease their shares as shown in Table A-31. The summary is shown in the following table:

(Unit: 1,000 persons)

Year	Administrative Region															Total
			I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
	NCR	CAR	Ilocos	Cagayan Valley	Central Luzon	Southern Tagalog	Bicol	Western Visayas	Central Visayas	Eastern Visayas	Western Mindanao	Northern Mindanao	Southern Mindanao	Central Mindanao	ARMM	
1995	795	66	199	85	555	9,904	240	251	382	121	95	186	232	87	14	4,130
2025	1,492	95	669	121	1,865	2,111	531	555	1,143	200	323	206	788	166	20	10,343
AAGR(%)	2.11	1.19	4.12	1.19	4.12	3.21	2.68	2.68	3.72	1.69	4.16	1.19	4.16	2.19	1.19	3.11

In service sector, Western Mindanao (IX) will increase from 377 thousand in 1995 to 1,155 in 2025 at the highest AAGR of 3.8%. The regions following this are South Mindanao (XI). Lower growth is projected for CAR of 0.1%, ARMM of 0.4% and Central Mindanao (XII) of 0.9% respectively. The employment of service sector of NCR will continue to occupy the largest share of 21.5% in 1995 and 22.9% in 2025. Southern Tagalog (IV) from 13.4% to 13.8% and Western Visayas (VI) from 8.3% to 10.1% form the next highest group. Meanwhile the share of Central Luzon (III) will decrease from 10.6% to 9.0%. In 2025, the lowest share is accrued by CAR of 0.5% followed by ARMM of 0.6% and Central Mindanao (XII) of 1.6% respectively as shown in Table A-32. The summary is shown in the following table:

(Unit : 1,000 persons)

Year	Administrative Region															Total
			I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
	NCR	CAR	Ilocos	Cagayan Valley	Central Luzon	Southern Tagalog	Bicol	Western Visayas	Central Visayas	Eastern Visayas	Western Mindanao	Northern Mindanao	Southern Mindanao	Central Mindanao	ARMM	
1995	2,277	125	525	338	1,124	1,415	676	874	652	477	377	549	748	292	121	10,579
2025	5,344	127	1,333	699	2,106	3,203	1,657	2,355	941	828	1,155	952	2,072	582	136	23,291
AAGR(%)	2.58	0.05	3.16	2.45	2.12	2.76	3.03	3.36	1.18	1.86	3.80	1.85	3.46	0.90	0.40	2.67

A4.3 Gross Domestic Product

A4.3.1 Basic Condition

The projection of Gross Domestic Product was carried out for the years of 2000, 2005, 2010, 2015, 2020 and 2025. The projected GDP will be figured out in terms of 1985 constant prices.

A4.3.2 Method Adopted

A4.3.2.1 Total GDP

In the Interim Repoprt, total GDP of the Philippines during the target period was projected on the basis of low growth scenario of the annual average growth rate (AAGR) in the revised Medium-Term Development Plan (from 1997 to 2001) and the Long-Term Development Plan (from 2001 to 2025) which was tentatively prepared by Policy and Planning Staff of NEDA.

But in 1997, the rumor that the bubble economy in the Philippines will be broken down has been prevalent and actually the price index of stocks fell down rapidly on April. Furthermore, the depreciation of peso to US$ rate has begun since July following drastic depreciation of Thailand's Bahts to US$ rate and the rate is still fluctuating around 40 peso per dollar in 1998. Because of these unstable factors of the economy, NEDA has reviwed and revised the Long-Term Development Plan till 2025 and prepared the Medium-Term Development Plan during the period from 1999 to 2004. It is assumed that the AAGR of GDP will be modified downward for both high and low growth scenario.

The GDP growth rates set up in the Interim Report were adopted for the high economic growth scenario in this study. It is considered that the growth rates of GDP set up in the Interim Report can be applied for the high economic growth scenario, because 7.4% of the AAGR during 1995 to 2025 is rational as upper limit of GDP growth judging from the past high growth rates of GDP.

A4.3.2.2 Total GRDP

The total GRDP by region was projected under the control total, GDP. The process to project the GRDP is as follows;

- To set up the AAGR of each region by taking into consideration of the AAGRs in the past ten years during the period from 1985 and 1995, the revised Medium-Term Development Plan and the tentative Long-Term Development Plan
- To accumulate GRDP of all regions
- To adjust the accumulated GRDP of all regions to coincide with the total GDP as a control total
- To check balanced contribution rate of GRDP by region to the total GDP
- To re-adjust the AAGR of each region to make the contribution rate of each region balanced if there are some regions of which contribution rates are abnormally increased or decreased by taking account of past behavior of the contribution rate of GRDP by region.

A4.3.2.3 Total GDP by Sector

The total GDP is composed of three sectors such as agriculture, industry and services. Sectoral GDP is projected by basically the same methodology as the one of total GRDP as follows;

- To set up the AAGR of each sector by taking into consideration of the AAGRs in the past eleven years during the period from 1985 and 1996, the revised Medium-Term Development Plan and the tentative Long-Term Development Plan

- To accumulate GDP of all sectors

- To adjust the accumulated GDP of all sectors to coincide with the total GDP as a control total

- To check the contribution rate of GDP by sector to the total GDP whether it will keep good balance

- To re-adjust the AAGR of each sector to make the contribution rate of each sector balanced if there are some sectors of which contribution rates are exaggerated the past tendency of the sectoral contribution rate to GDP.

A4.3.2.4 Total GDP by Sub-Sector

Basically the same method as the one for sector was applied to project total GDP by sub sector.

A4.3.2.5 GRDP by Region and by Sector

The total GDP of sector and sub-sector was broken down into regions through the same method as the projection of the regional GRDP for all sectors mentioned above in "A4.3.2.2" and "A4.3.2.2".

A4.3.2.6 GRDP by Water Resources Region and by River Basin

The followings are the method of projection of the GRDP by sector and sub-sector, which are assumed to consume water relatively much to produce, and by water resources regions and major river basins after projection of total GRDP for all sectors by administrative/political region.

(1) Agricultural Sector

First of all, it should be noted that the GRDP by sector or sub-sector is figured out in terms of GVA (Gross Value Added) in regional accounts. Both terms of GRDP and GVA are substantially same meanings as technical terms according to the National Statistical Coordination Board (NSCB).

1) Total Sector

a. GVA by province

The GVA of agricultural sector in total by administrative region is broken down into provinces on the basis of ratio of total areas of agricultural areas, fish pond, grass land areas, woodland areas and wetland areas by province. The area of these lands in future is difficult to estimate. Then the current ratio of these lands is applied to the future projection of GVA.

b. GVA by water resources region and by river basin

At this stage of the study no available data could be collected for agricultural land, fish pond, grass land and forest by water resources regions and river basins. And the GRDP of agricultural sector in total by province is simply classified into water resources and river basins on the basis of the ratio of area of which province belongs to water resources regions and river basins.

2) Sub-Sector

Agricultural sector is divided into two sub-sectors like (i) Agricultural Industry and (ii) Forestry. Furthermore, (i) Agricultural Industry is divided into more detailed sub-sector like (i)-i Agriculture and (i)-ii Fishery. In this study, (ii) Forestry is not classified into the river

basin. Because forestry is not the industry to be objected for the water demand forecast.

a. Agriculture (in narrow meaning)

(a) Palay

a) GVA by province

The GVA of palay by administrative region is broken down into provinces by the ratio of total area of irrigated paddy, non-irrigated paddy and upland paddy by province. With regard to irrigation paddy area, the future development plan by NIA was adopted.

b) GVA by water resources region and by river basin

The GVA of palay by province is classified into water resources region and river basins on the basis of the ratio of area of which provinces belong to water resources regions and river basins by referring to irrigated area of development plan by NIA.

(b) Corn

a) GVA by province

The GVA of corn by administrative region is broken down into provinces by the ratio of area of corn cultivation by province. The current ratio of the corn cultivated area is applied to the future projection of GVA.

b) GVA by water resources region and by river basin

So far no available data has been collected for the area of corn by water resources region and river basin. And the GVA of corn by province is classified into water resources region and river basin on the basis of the ratio of area of which provinces belong to water resources regions and river basins

(c) Sugarcane

a) GVA by province

The GVA of sugarcane by administrative region is broken down into provinces by the ratio of the cultivated area of sugarcane by province. The current ratio of sugarcane area is applied to the future projection of GVA.

b) GVA by water resources region and by river basin

No available data of areas of sugarcane by water resources region and river basin has been collected for the time being. Consequently the GVA of sugarcane by province is classified into water resources region and river basin on the basis of the ratio of area of which provinces regions belong to water resources regions and river basins

(d) Livestock

a) GVA by province

The GVA of livestock by administrative region is broken down into provinces by the ratio of area of grassland by province. The current ratio of grassland area is applied to the future projection of GVA.

b) GVA by water resources region and by water basin

No available data could be collected for the area of grassland by water resources region and river basin. The GVA of livestock by province is classified into water resources region and river basin on the basis of the ratio of area of which provinces belong to water resources regions and river basins.

b. Fishery

(a) GVA by province

The GVA of fishery by administrative region is broken down into provinces by the ratio of area of fishpond by province. The current ratio of fishpond area is applied to the future projection of GVA.

(b) GVA by water resources region and by water basin

So far no available data could be collected for the area of fish pond by water resources region and river basin. The GVA of fishery by province is classified into water resources region and river basin on the basis of the ratio of area of which provinces belong to water resources regions and river basins.

(2) Industrial Sector

1) Total Sector

a. GVA by province

Industrial sector in total by administrative region is broken down into provinces on the basis of the ratio of total number of employment of industry by province. The future ratio of total number of employment of industry is applied to the projection of GVA on the basis of the result of projection of number of employment of industrial sector by province.

b. GVA by water resources region and by river basin

The GVA of industrial sector in total by province is classified into water resources regions and river basins on the basis of the ratio of area of which provinces belong to water resources regions and river basins.

2) Manufacturing

a. GVA by province

Among the various sub-sectors in industrial sector, the water is substantially consumed by manufacturing industry. Manufacturing industry is focused to break down into provinces for water demand forecast.

The GVA of manufacturing by province is broken down into provinces applying the ratio of total number of employment of industrial sector by province assuming the sub-sector of manufacture represents the industrial sector.

b. GVA by water resources region and by river basin

There is no available data of the total number of employment of industry by water resources region and river basin. The GVA of manufacturing by province is classified into water resources regions and river basins on the basis of the ratio of area of which provinces belong to water resources regions and river basins

(3) Service Sector in Total

The most of water is consumed in agricultural and industrial sector. The GVA of sub-sector in service sector is not projected in details but the GVA of service sector in total is estimated as follows.

1) GVA by Province

The GVA of service sector in total by administrative region is broken down into provinces on the basis of ratio of total number of employment of service sector by province. The future ratio of the number of employment of service sector projected is applied to the projection of GVA.

2) GVA by Water Resources Region and by River Basin

The GVA of service sector in total by province is classified into water resources regions and river basins on basis of the ratio of area of which provinces belong to water resources regions and river basins.

A4.3.3 Results of Projection

A4.3.3.1 GDP

Total GDP was assumed to increase from 803,450 million pesos in 1995 to 6,849,796 million pesos in 2025 at high AAGR of 7.4%. The sectoral growth is characterized that the highest growth rate is expected to be industrial sector of 8.7% followed by service sector of 7.2% and agricultural sector of 4.4% respectively. The highest AAGR of sub-sector in each sector is attained by construction of 10.8% in industrial sector, finance in service sector of 8.5% and livestock in agriculture of 6.3% respectively as shown in Table A-33. The summary is shown in the following table.

(Unit :Million Peso)

Sector/Subsector	1995	2025	AAGR
I Agriculture			
1. Agriculture Industry			
a. Agriculture			
Crops	93,092	338,791	4.40
Livestock	19,839	124,285	6.31
Poultry	16,056	89,791	5.91
Agricultural activities & services	8,632	27,530	3.94
Sub-total	137,619	580,396	4.91
b. Fishery	33,853	42,237	0.74
2. Forestry	1,527	900	-1.75
Sub-total	172,999	623,533	4.37
II Industry			
1. Mining & Quarrying	11,396	32,822	3.60
2. Manufacturing	203,271	2,164,717	8.20
3. Construction	44,492	1,007,310	10.96
4. Electricity, Gas & Water	26,060	229,647	7.52
Sub-Total	285,219	3,434,556	8.65
III Service			
1. Transportation, Communication and Storage	47,366	537,900	8.44
2. Trade	123,430	1,046,486	7.39
3. Finance	33,852	392,988	8.52
4. Ownership of Dwellings and Real Estate	43,765	166,258	4.55
5. Private Services	55,461	283,174	5.58
6. Government Services	41,358	364,810	7.53
Sub-Total	345,232	2,791,707	7.22
Total	803,450	6,849,796	7.40

The sectoral share will change during the period from 1995 to 2025. The share of agriculture is projected to decline from 21.5% to 9.1%. Meanwhile the share of industry will increase from 35.8% to 50.1%. The share of service may change slightly from 43.0% to 40.8%. It is remarkable that industrial sector will increase its share more than 50.0% in future as shown in Table A-34.

Concerning the agricultural sector, the highest AAGR is realized by corn of 5.9% during the

period from 1995 to 2025 followed by other crops of 4.9%, and banana of 4.4% respectively. Palay will increase from 28,190 million pesos in 1995 to 76,951 million pesos in 2025 at the AAGR of 3.4% and its share will be reduced from 31.3% to 22.7% as shown in Table A-35. The result of GVA production for manufacturing by industry group is shown in Table A-36.

Tables of A-37 and A-38 present the self-sufficiency ratios in future for major agricultural commodities. The production was estimated by conversion ratio from GVA forecast as framework to production. The conversion ratio was calculated by dividing the production by GVA by kind of commodity in 1995 and it was assumed that this ratio would be constant in the future. The results were based on the assumption that the structure of consumption in 1995 will be maintained. Three kinds of ratios were calculated. They are (i) ratio of production to consumption which means consumption for food of human being, (ii) ratio of production to total utilization and (iii) self-sufficiency ratio. These figures vary by the composition of utilization. For example, the most of rice will be used for foodstuff for people's consumption and other utilities like export, seeds, feeds and waste are relatively small amounts.

A4.3.3.2 GRDP

(1) GRDP by Region

The GRDP for all sectors are shown in the Table A-39. ARMM is expected to increase from 7,965 million pesos in 1995 to 116,147 million pesos in 2025 at the highest AAGR of 9.3 %, followed by Eastern Visayas (VIII) and Central Visayas (VII). The lowest growth ratio of 5.6 % is projected to take place in West Mindanao (IX).

NCR is projected to take the largest share of 29.5 % in 2025, followed by South Tagalog (IV) of 18.6 % and Central Luzon (III) of 9.3 %. The results of the projection are summarized shown in the following table:

(Unit : Million Pesos)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindana o	ARMM	
1995	240,121	16,762	24,021	16,485	78,383	126,303	23,520	58,227	52,680	19,374	21,599	41,758	54,200	22,052	7,965	803,450
2025	2,019,087	140,457	213,471	165,659	634,294	1,270,987	142,489	380,337	549,534	265,561	108,755	376,354	347,634	119,029	116,147	6,849,796
AAGR(%)	7.36	7.34	7.55	8.00	7.22	8.00	6.19	6.46	8.13	9.12	5.54	7.60	6.39	5.78	9.34	7.40

As for the per capita GRDP, ARMM is expected to grow at the highest AAGR as 7.9 % during the period from 1995 to 2025, followed by Eastern Visayas (VIII), Central Visayas (VII) and Cagayan Valleys (II). On the contrary, West Mindanao (IX) will go upward at the lowest AAGR of 3.7 %. NCR still will keep the highest level as 151,254 pesos, followed by Central Visayas (VII) and CAR as shown in Table A-40. The summary is shown in the following table:

(Unit. Pesos Per Capita)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
1995	25,399	13,345	6,316	6,500	11,306	12,704	5,437	10,029	10,597	5,756	7,725	10,561	10,682	9,344	3,941	11,710
2025	151,254	67,930	38,522	42,621	59,643	63,771	21,919	43,714	70,721	47,670	22,693	55,230	39,007	30,053	38,073	61,448
AAGR(%)	6.13	5.57	6.22	6.47	5.70	5.53	4.76	5.01	6.56	7.30	3.66	5.67	4.41	3.97	7.85	5.68

The detailed results of GVA by region and by sector are shown in the Tables A-41 to A-46

and Figures A-4 and A-6, respectively.

(2) GRDP by Water Resources Region and River Basin

1) GRDP in Agricultural Sector

During the period from 1995 to 2025, Cagayan Valley water resources region (WRR, II) will grow from 10,688 million pesos to 70,447 million pesos at the highest AAGR of 6.5% followed by Eastern Visayas (VIII), Ilocos (I) and Central Luzon (III). On the other hand, Southwestern Mindanao (IX) will increase at the lowest AAGR of 3.0% followed by Southeastern Mindanao (XI). Concerning the river basin, the Cagayan (WRR II) is predicted to increase from 7,865 million pesos to 54,088 million pesos at the highest AAGR by 6.6% followed by Abulug (WRR II) and Laoag (WRR I). The lowest growth is generated by Davao, Tagun-Libuganon and Buayan-Malungum (WRR XI) of 2.8%, respectively. The summary is shown in the following tables:

(Unit : Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	7,003	10,688	24,292	30,367	8,692	20,712	6,184	6,074	13,111	12,992	18,559	14,324	172,998
2025	36,456	70,447	93,945	112,138	25,374	70,934	15,191	33,905	31,776	46,427	46,891	40,051	623,535
AAGR(%)	5.65	6.49	4.61	4.45	3.64	4.19	3.04	5.90	2.99	4.34	3.14	3.49	4.37

(Unit : Million Pesos)

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)
1995	1,395	1,350	7,865	837	9,472	4,741	2,635	2,009	2,111	2,477	2,147
2025	6,789	7,194	54,088	4,767	32,241	20,968	9,702	7,420	6,162	8,659	7,431
AAGR(%)	5.42	5.74	6.64	5.99	4.28	5.08	4.45	4.45	3.64	4.26	4.23

Year	Major River Basin									
	Jalaur (WRR VI)	Aguasan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	Total
1995	1,541	6,554	1,399	1,314	2,493	1,092	1,417	11,780	779	65,104
2025	5,388	22,697	5,158	4,846	5,687	2,491	3,232	33,407	2,619	250,956
AAGR(%)	4.26	4.23	4.45	4.45	2.79	2.79	2.79	3.51	4.12	4.60

Most of WRR and river basin are projected not to change drastically their shares except Cagayan Valley (II) which will increase its share from 6.2% in 1995 to 11.3% in 2025. In 2025, the largest share occupied by Southern Tagalog (IV) of 18.0% followed by Central Luzon (III) of 15.1%, Western Visayas (VI) of 11.4% respectively as shown in Table A-44.

2) GVA in Industrial Sector

As shown in Table A-45, Eastern Visayas (VIII) will grow at the highest AAGR of 11.7% during the period from 1995 to 2025 followed by Cagayan Valley (II) and Northern Mindanao (X). Of all river basins, the Laoag river basin (WRR I) will increase at the highest AAGR of 11.3%. Cagayan (WRR II), Cagayan De Oro and Tagoloan (WRR X) are all high yielding river basins. The lowest growth rate is brought by Western Visayas (VI) for WRR and Abra (WRR I) for river basin. It is characterized that the growth rate of each WRR and river basin have no big difference. Most of AAGR are more than 7.0%. The summary is shown in the following tables:

(Unit : Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	5,955	3,809	40,579	154,293	5,081	14,685	14,962	6,741	4,954	9,803	14,247	10,023	285,222
2025	65,998	79,409	473,156	1,689,328	55,422	142,878	228,409	187,850	72,364	166,932	155,303	112,433	3,434,582
AAGR(%)	8.35	10.57	8.53	8.30	8.29	7.88	9.51	11.73	9.59	9.91	8.29	8.39	8.65

(Unit : Million Pesos)

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)
1995	1,108	207	2,678	325	26,110	6,846	125,965	232	1,340	1,127	1,658
2025	9,684	5,124	61,143	4,981	288,662	80,354	1,535,059	3,391	14,614	10,508	15,761
AAGR(%)	7.49	11.29	10.99	9.53	8.34	8.56	8.02	9.35	8.29	7.73	7.80

Year	Major River Basin								Total
	Jalaur (WRR VI)	Aguasan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	
1995	1,435	1,734	957	888	696	655	2,372	6,921	2,043	185,307
2025	13,471	27,658	16,519	15,333	6,641	6,252	22,638	80,317	22,013	1,5801.26
AAGR(%)	7.73	9.67	9.96	9.96	7.81	7.81	7.81	8.51	8.25	8.22

In 2025, the largest share of 49.2% is occupied by Southern Tagalog (IV) at slight decrease from 54.1% in 1995 followed by Central Luzon (III) of 13.8% and Central Visayas (VII) of 6.7% respectively. With regard to river basin, the largest share is occupied by Pasig Laguna Bay (WRR IX) sharing 37.1% followed by Pampanga (WRR III) of 8.4% and Mindanao (WRR XI) of 2.3% as shown in Table A-48. The over concentration of industry to Southern Tagalog (IV) including NCR can clearly be observed. The GVA in manufacturing has almost the same tendency.

3) GVA in Service Sector

With regard to water resources region, the highest growth ratio is yielded by Central Visayas (VII) of 7.9% and the lowest one is accrued by Bicol (V) of 6.3%. The GVA in service sector by river basin is compared and the highest one is obtained by Abra (WRR I) of 8.5% and the lowest is resulted in the Bicol (WRR V) of 6.3% respectively. The summary is shown in the following tables.

(Unit : Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	Total
1995	6,077	6,793	33,382	178,750	9,747	28,203	26,160	6,558	9,443	12,664	17,675	9,784	345,236
2025	53,132	54,790	246,363	1,468,693	61,693	214,450	257,927	43,806	66,518	105,684	148,037	70,523	2,791,715
AAGR(%)	7.50	7.21	6.89	7.27	6.34	7.00	7.93	6.53	6.72	7.33	7.34	6.81	7.22

(Unit : Million Pesos)

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)
1995	1,117	607	4,921	561	18,879	5,833	155,863	619	2,945	1,874	3,274
2025	12,937	3,884	36,097	5,513	137,741	46,994	1,265,999	5,478	18,637	13,759	24,413
AAGR(%)	8.51	6.36	6.87	7.91	6.85	7.20	7.23	7.54	6.34	6.87	6.93

Year	Major River Basin									Total
	Jalaur (WRR VI)	Aguasan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	
1995	2,842	2,635	1,207	1,205	1,413	997	3,014	7,019	1,152	217,977
2025	20,858	22,080	10,058	10,045	12,061	8,514	25,729	49,632	7,132	1,737,521
AAGR(%)	6.87	7.34	7.32	7.32	7.41	7.41	7.41	6.74	6.27	7.16

It is characterized that the concentration of GVA in service sector will be more progressed in the future than industrial sector. In 2025, the share of Southern Tagalong (IV) will increase its share from 51.8% in 1995 to 52.6% followed by Central Visayas (VII) of 9.2% and Central Luzon (III) of 8.8% respectively. With regard to river basin, Pasig Laguna Bay (WRR IV) will go up at the highest AAGR of 45.3% followed by Pampanga (WRR III) of 4.9%. The AAGRs of other WRRs and river basins are less than 2.0% as shown in Table A-46.

4) GRDP in All Sectors

The highest growth is projected for Eastern Visayas (VIII) of which GVA in all sectors will increase from 19,373 million pesos in 1995 to 265,561 million pesos in 2025 at the AAGR of 9.1% followed by Central Visayas (VII), Cagayan Valley (II), Southern Tagalog (IV) and Northern Mindanao (X). For river basins, the highest growth rate is generated by Cagayan (WRR II) of 7.9% followed by Pasig -Laguna Bay (WRR IV), Tagoloan (WRR X), Abulug (WRR II). The lowest growth is predited to be Bicol (V) of 6.2% for WRR and Amnay Patrick (WRR II) of 6.0% respectively. The summary is shown in the following tables.

(Unit : Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	19,034	21,381	98,254	363,410	23,520	63,599	47,307	19,373	27,508	35,459	50,481	34,130	803,456
2025	155,586	204,645	813,604	3,270,157	142,489	428,262	501,587	265,561	175,658	319,044	350,231	223,007	6,849,831
AAGR(%)	7.25	7.52	7.30	7.60	6.19	6.56	8.19	9.12	6.38	7.60	6.67	6.45	7.40

Year	Major River Basin											Total
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)	
1995	3,620	2,164	15,464	1,722	54,161	17,419	284,459	2,860	6,395	5,478	7,079	407,301
2025	29,430	16,181	151,298	15,284	458,615	148,316	2,550,750	16,290	39,413	32,925	47,604	3,505,106
AAGR(%)	7.23	6.94	7.90	7.55	7.38	7.40	7.59	5.93	6.25	6.16	6.56	7.38

Year	Major River Basin									Total
	Jalaur (WRR VI)	Agusan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	
1995	5,828	10,922	3,562	3,408	4,602	2,745	6,803	25,721	3,975	468,387
2025	39,717	72,425	31,735	30,241	24,389	17,257	51,509	163,356	31,763	3,968,591
AAGR(%)	6.61	6.51	7.56	7.55	5.72	6.32	6.99	6.36	7.17	7.38

There will be no drastic structural change in share by water resources region and by river basin. In 2025, 47.7% of GRDP in all sectors will be yielded by Southern Tagalog (IV) followed by Central Luzon (III) of 11.9%, Southwestern Mindanao (XI) of 7.7%, Central Visayas (VII) of 7.3% and Western Visayas (VI) of 6.3% respectively. The smallest share is occupied by Bicol (V) as 2.1%, Ilocos as 2.3% and Cagayan Valley (II) as 3.0% respectively. With regard to river basin, the highest share is occupied by Pasig-Laguna Bay (WRR IV) of 37.2% followed by Pampanga (WRR III) of 6.7%, Mindanao (WRR XI) of 2.4% and Cagayan (WRR II) as 2.2%. Most of other river basins occupy less than 1.0%.

Judging from the results of projection for GRDP by water resources region and by river basin, it is obvious that the most part of GVA in all sectors is concentrated into very limited water resources regions (III, IV, VII, VIII and X) and river basins (Pasig-Laguna Bay, Pampanga, Mindanao and Cagayan) as shown in Table A-47. It is strongly desired that the balanced development should be carried out through water resources regions and river basins.

5) GRDP Per Capita in All Sectors

The most rapid growth of GRDP per capita in all sectors can be observed for Eastern Visayas (VIII) which will increase from 5,754 pesos in 1995 to 47,660 pesos in 2025 at the AAGR of 7.3% followed by Central Visayas (VII), Cagayan Valley (II) and Ilocos (I). The slowest growth is attained by Southern Mindanao (XII) at the AAGR of 4.4%. The summary is shown in the following table:

(Unit : Peso Per Capita)

Year	No. and Name of Water Resources Region (WRR)											Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	8,030	7,038	10,390	18,830	5,438	10,092	10,538	5,754	6,807	10,954	10,290	8,400	11,710
2025	49,809	42,478	55,635	99,660	21,918	45,617	70,866	47,660	27,847	55,913	43,828	30,436	61,448
AAGR(%)	5.90	6.15	5.75	5.69	4.76	5.16	6.56	7.30	4.81	5.59	4.95	4.35	5.68

Comparing by river basin, the highest growth will emerge in Cagayan (WRR II) of 6.3%. Abulug (WRR II) and Abra (WRR I) are next to Cagayan. The lowest growth is accrued by Tagun-Libuganon (WRR XI). Agusan (WRR X) in the next lowest. The highest level is expected to be Pasig-Laguna Bay (WRR IV) of 116,889 pesos in 2025 which is 1.9 times of regional mean of 61,448 pesos. Secondly high leveled river basin is Pampanga (WRR III) of 61,925 pesos which is almost the same level of the regional mean as shown in Table A-48. All other basins are less than the level of regional mean. The summary is shown in the following table.

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Bog-Hilabangan (WRR VI)
1995	8,723	8,834	6,718	8,201	11,302	8,224	21,665	17,331	5,203	9,333	10,518
2025	52,151	47,593	42,262	50,609	61,925	45,876	116,889	53,939	19,589	37,036	41,958
AAGR(%)	6.14	5.77	6.32	6.25	5.83	5.90	5.78	3.86	4.52	4.70	5.19

Year	Major River Basin									Total
	Jalaur (WRR VI)	Agusan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungon (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	
1995	9,251	11,237	10,208	9,964	8,336	9,179	11,650	8,332	8,832	11,710
2025	41,763	32,698	50,373	49,305	22,375	28,430	59,584	29,010	44,486	61,448
AAGR(%)	5.15	3.62	5.47	5.47	3.35	3.84	5.59	4.25	5.54	5.68

A5 Socio-Economic Framework for Lower Economic Growth

A5.1 Purpose of Setting Up Lower Economic Growth

A5.1.1. Uncertainty of Economic Growth in Future

There are many uncertainties in the future caused by natural disaster such as drought, volcanic eruption, typhoon, and economic unstability by inflation and depreciation of currency, and so on. The Philippines has already been experienced some of them. But it is very difficult to predict accurately in advance how, where and when these incidents will happen. Then it is significant to set up the lower economic growth from the view point of the safety-side.

A5.1.2 Necessity of Taking Account of Sustainability

As already has been pointed many times and by many people till now, especially industrial development has serious influence to the environment. It must strictly be recognized that the natural resources are scarce and too rapid growth will cause shortage of rescues and contamination of environment. Then it is necessary to set up the sustainable development and economic growth by taking account of eliminating environmental destruction generated by high speed development as much as possible.

A5.1.3 Planning for Short-Term Water Resources Development

This factor is the most basic and direct purpose to set up the lower economic growth in this study. Generally speaking, it takes long time to complete to construct facilities for water resources development like dams and so on. But for the short-term development, the urgently required projects must be known. For this purpose, it is useful to set up lower economic growth because minimum and urgent needs for development on the basis of lower growth would be clean. Furthermore this minimum level of development will be smoothly led to the action plan from this study based on lower growth rate.

A5.2 Basic Assumption

A5.2.1 Medium-Term Growth

During the period from 1996 to 2000, the average annual growth ratio was set up by 6% in real price which is lower by 1.1% than the one of NEDA. To set up this growth rate, the following factors were taken into consideration.

- After 1992, the annual growth rate at 1985 constant prices has been increased from 0.34% in 1992 to 5.45% in 1996. Then after 1996, it can be expected the annual growth will be attained at least 6% in spite of recent devaluation of peso as shown in Figure A-7.

- International organization like ADB and PECC (Pacific Economic Cooperation Council) have forecast the economic growth rate of the Philippines economy a little bit lower level than the one of NEDA during the period from 1996 to 1998 as shown in Table A-49.

A5.2.2 Long-Term Growth

During the period from 2000 to 2025, the average annual growth rate was set up to reduce gradually by five year interval. The main elements to set up this growth rate are as follows;

- It is reported for long-term growth rate by the Institute of Asian Economy in Japan that the Asian countries' economy will be stabilized around 4% to 5% from the view point of sustainability. Because the recent economic growth in Asian countries seem to have been too high. From this point of view, there is some possibility that the speed of economic growth of the Philippines will be slower than 5% in the long-term.

- According to World Development Report, 1992 by World Bank, it is projected that the average annual growth rate of Asia and Pacific area including the Philippines will be 4.4% during the period from 1990 to 2030 as shown in Table A-50.

- Japan as the most developed country in Asia experienced the highest economic growth by 10.4% per annum in real price during the period of 1960's, but the growth speed has been slow down to 2.2% per annum during the period 1990's as shown in Figure A-8 and A-9. The same phenomenon can be observed for other developed countries.

By taking into account of these factors, the average annual economic growth rate in this study was set up by 5% during the period from 2000 to 2025 and 4.8% during the period from 1996 to 2025 as shown in Figure A-10.

A5.3 Projection

A5.3.1 Method Adopted

The GDP and GDP by sector, GRDP and GRDP by sector and GVA by water resources region and by river basin were forecast according to the same methodology as the one of high economic growth scenario.

A5.3.2 Results of Projection

A5.3.2.1 GDP

Total GDP was assumed to increase from 803,450 million pesos in 1995 to 3,212,920 million pesos in 2025 at the AAGR of 4.7%. The sectoral growth is characterized that the highest growth rate is expected to be industrial sector of 5.9% followed by service sector of 4.5% and agricultural sector of 1.8% respectively. The highest AAGRs of sub-sector in each sector are expected to be construction of 8.0% in industrial sector, finance in service sector of 5.8% and livestock in agriculture of 3.4% respectively as shown in Table A-51. The summary is shown in the following table of next page.

Concerning the agricultural sector, the highest AAGR is realized by corn of 2.7% during the period from 1995 to 2025 followed by other crops of 1.6%, and sugarcane and palay of 1.3% respectively. Palay will increase from 28,190 million pesos in 1995 to 41,844 million pesos in 2025 and its share will be reduced from 31.3% to 28.1% as shown in Table A-52. The result of projection of manufacturing industry for major commodities is shown in Table A-53.

(Unit: Million Pesos)

Sector/Subsector	1995	2025	AAGR(%) 1995-2025
I Agriculture			
1. Agriculture Industry			
a. Agriculture			
Crops	93,092	149,141	1.58
Livestock	19,839	54,712	3.44
Poultry	16,056	39,527	3.05
Agricultural activities &services	8,632	12,119	1.14
Sub-total	137,619	255,499	2.08
b. Fishery	33,853	36,071	0.21
2. Forestry	1,527	900	-1.75
Sub-total	172,999	292,470	1.77
II Industry			
1. Mining & Quarrying	11,396	21,983	2.21
2. Manufacturing	203,271	1,015,368	5.51
3. Construction	44,492	445,159	7.98
4. Electricity, Gas & Water	26,060	128,484	5.46
Sub-Total	285,219	1,610,990	5.94
III Service			
1. Transportation, Communication and Storage	47,366	252,442	5.74
2. Trade	123,430	490,717	4.71
3. Finance	33,852	185,089	5.83
4. Ownership of Dwellings and Real Estate	43,765	77,810	1.94
5. Private Services	55,461	132,622	2.95
6. Government Services	41,358	170,781	4.84
Sub-Total	345,232	1,309,459	4.54
Total	803,450	3,212,920	4.73

Tables A-54 and A-55 show the self-sufficiency ratios in future for major agricultural commodities. The production was estimated by conversion ratio from GVA forecast as framework to production. The same assumption as the one of high economic growth scenario was adopted. Tables A-60 and A-61 show the self-sufficiency ratios which were adjusted to the irrigation development plan.

A5.3.2.2 GRDP

(1) GRDP by Region

The GRDP for all sectors are shown in the Table A-56. Easern Visayas (VIII) is expected to increase from 19,734 million pesos in 1995 to 105,136 million pesos in 2025 at the highest AAGR of 5.8 %, followed by ARMM (III) and Central Visayas (VII). The lowest growth ratio of 3.2 % is projected to take place in West Mindanao (IX). The results of the projection summary are summarized in the following table:

(Unit : Million Pesos)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
1995	240,121	16,762	24,021	16,485	78,383	126,303	23,520	58,227	52,680	19,314	21,599	41,758	54,200	22,052	7,965	803,450
2025	992,538	67,343	92,205	66,562	306,992	575,454	70,932	186,129	246,848	105,136	55,830	168,575	171,873	64,724	41,789	3,212,920
AAGR(%)	4.84	4.74	4.59	4.76	4.66	5.18	3.75	3.95	5.28	5.80	3.22	4.76	3.92	3.65	5.68	4.73

As for the per capita GRDP, ARMM will grow at the highest AAGR as 4.2 % for the period from 1995 to 2025, followed by Eastern Visayas (VIII) and Central Visayas (VII). NCR will still keep the highest level of 74,324 pesos. On the contrary, West Mindanao (IX) will grow at the lowest AAGR of 1.4 %, followed by Central Mindanao (XII) and Southern Mindanao (XI)

as shown in Table A-57. The summary is shown in the following table:

(Unit Peso Per Capita)

Year	Administrative Region															Total
	NCR	CAR	I Ilocos	II Cagayan Valley	III Central Luzon	IV Southern Tagalog	V Bicol	VI Western Visayas	VII Central Visayas	VIII Eastern Visayas	IX Western Mindanao	X Northern Mindanao	XI Southern Mindanao	XII Central Mindanao	ARMM	
1995	25,399	13,316	6,316	6,500	11,306	12,704	5,437	10,079	10,507	5,756	7,728	10,561	10,682	9,344	3,941	11,710
2025	74,324	32,549	16,668	17,087	28,858	28,913	10,912	21,408	31,802	18,889	11,639	24,719	19,259	16,309	13,669	28,823
AAGR(%)	3.64	3.02	3.29	3.27	3.18	2.78	2.35	2.54	3.76	4.04	1.37	2.88	1.98	1.87	4.23	3.05

The detailed results of GRDP by region and by sector are shown in the Tables A-58 to A-60.

(2) GRDP by Water Resources Region and River Basin

1) GVA in Agricultural Sector

During the period from 1995 to 2025, Cagayan Valley (II) will grow from 10,688 million pesos to 33,043 million pesos at the highest AAGR of 3.8% followed by Eastern Visayas, Ilocos (I) and Central Luzon (III). On the other hand, Southwestern Mindanao (IX) will increase at the lowest AAGR of 0.43% followed by Southeastern Mindanao (XI). Concerning the river basin, the Cagayan (WRR II) is predicted to increase from 7,865 million pesos to 25,356 million pesos at the highest AAGR by 4.0% followed by Abulug (WRR I) and Laoag (WRR I). The lowest growth is predicted to be Davao, Tagun-Libuganon and Buayan-Malungum as shown in Table A-61. The summary is shown in the following tables:

(Unit : Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	7,003	10,688	24,292	30,367	8,692	20,782	6,184	6,074	13,111	12,992	18,559	14,324	172,998
2025	17,100	33,043	44,065	52,598	14,902	33,272	7,125	15,903	14,904	21,777	21,995	18,786	292,470
AAGR(%)	3.02	3.83	2.00	1.55	1.05	1.59	0.47	3.26	0.43	1.74	0.57	0.91	1.77

(Unit : Million Pesos)

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)
1995	1,395	1,359	7,865	837	9,872	4,741	2,631	2,003	2,011	2,477	2,147
2025	3,184	3,374	25,356	2,245	15,123	9,835	4,551	3,480	2,890	4,061	3,485
AAGR(%)	2.79	3.10	3.98	3.34	1.68	2.46	1.84	1.85	1.05	1.66	1.63

Year	Major River Basin									Total
	Jalaur (WRR VI)	Aguasan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagun-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindinao (WRR XII)	Agus (WRR XII)	
1995	1,541	6,554	1,399	1,314	2,493	1,092	1,417	11,780	779	65,104
2025	2,523	10,641	2,419	2,273	2,667	1,168	1,516	15,669	1,228	117,692
AAGR(%)	1.66	1.63	1.84	1.84	0.23	0.22	0.23	0.96	1.53	1.99

2) GVA in Industrial Sector

Eastern Visayas (VIII) will grow most rapidly at AAGR of 9.0% during the period from 1995 to 2025 followed by Cagayan Valley (II) and Northern Mindanao (X). Of all river basins, the Laoag river basin (WRR I) will increase at the highest AAGR of 8.5%. The Cagayan (WRR II) and the Cagayan De Oro and (WRR X) Tagoloan are all high yielding river basins. The lowest growth rate is brought by Western Visayas (VI) of 5.2% for WRR and Abra (WRR I) of 4.8% for river basin as shown in Table A-62. It is characterized that the growth rates of each WRR and river basin have no big difference. Most of AAGR are more than 5.0%. The summary is shown in the following tables:

(Unit : Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	Total
1995	5,955	3,899	40,579	154,293	5,081	14,685	14,562	6,741	4,954	9,803	14,247	10,023	285,222
2025	30,956	37,247	221,953	792,379	25,996	67,017	107,163	88,111	36,288	78,300	72,845	52,737	1,610,992
AAGR(%)	5.65	7.81	5.83	5.61	5.59	5.39	6.78	8.95	6.85	7.17	5.59	5.69	5.92

(Unit : Million Pesos)

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)
1995	1,108	207	2,678	325	26,810	6,845	125,955	232	1,340	1,127	1,658
2025	4,543	2,403	28,679	2,338	135,397	37,690	598,066	1,591	6,855	4,939	7,393
AAGR(%)	4.82	8.52	8.22	6.80	5.64	5.85	5.33	6.63	5.59	5.04	5.11

Year	Major River Basin									Total
	Jalaur (WRR VI)	Aguasan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	
1995	1,445	1,734	957	858	696	655	7,372	6,921	2,043	185,307
2025	6,319	12,973	7,748	7,192	3,815	2,932	10,618	37,673	10,325	928,779
AAGR(%)	5.04	6.94	7.22	7.22	5.12	5.12	5.12	5.81	5.55	5.52

3) GVA in Service Sector

With regard to WRR, the highest growth ratio is yielded by Central Visayas (VII) of 5.2% and the lowest one is indicated by Bicol (V) as 3.7%. The GVA in service sector by river basin is compared and the highest one is attained by Abra (WRR I) of 5.8% and the lowest is resulted in Bicol (WRR V) of 3.7% respectively as shown in Table A-63. The summary is shown in the following tables.

(Unit: Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	Total
1995	6,077	6,793	33,382	178,750	9,747	28,203	26,160	6,558	9,433	12,664	17,675	9,784	345,236
2025	24,922	25,699	115,604	688,893	28,937	100,588	120,581	20,547	31,200	49,571	69,437	33,079	1,309,458
AAGR(%)	4.82	4.54	4.23	4.60	3.69	4.33	5.24	3.88	4.06	4.65	4.67	4.14	4.54

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Amnay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)
1995	1,117	607	4,921	561	18,879	5,833	155,863	619	2,945	1,874	3,274
2025	6,077	1,812	16,931	2,585	64,594	22,043	593,815	2,570	8,742	6,454	11,451
AAGR(%)	5.81	3.71	4.20	5.23	4.19	4.53	4.56	4.86	3.69	4.21	4.26

Year	Major River Basin									Total
	Jalaur (WRR VI)	Aguasan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungun (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	
1995	2,842	2,635	1,207	1,205	1,413	993	3,014	7,019	1,152	217,937
2025	9,783	10,357	4,718	4,712	5,657	3,994	12,068	23,250	3,345	814,959
AAGR(%)	4.21	4.67	4.65	4.65	4.73	4.73	4.73	4.08	3.62	4.49

4) GRDP in All Sectors

The highest growth is projected for Eastern Visayas (VIII) of which GRDP in all sectors will increase from 19,373 million pesos in 1995 to 124,561 million pesos in 2025 at the AAGR of 6.4% followed by Central Visayas (VII), Cagayan Valley (II), Southern Tagalog (IV) and Northern Mindanao (XI). For river basins, the highest growth rate will be attained by Cagayan (WRR II) of 5.21% followed by Pasig -Laguna Bay (WRR IV), Tagoloan (WRR X), Abulug (WRR II). The lowest growth is predicted to be Bicol (WRR V) and Amnay Patrick

(WRR II) as shown in Table A-64. The summary is shown in the following tables:

(Unit : Million Pesos)

Year	No. and Name of Water Resources Region (WRR)												Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	19,034	21,381	98,254	363,410	23,520	63,599	47,307	19,373	27,508	35,459	50,481	34,130	803,456
2025	72,978	95,989	381,621	1,533,870	66,835	200,877	235,270	124,561	82,392	149,643	164,276	104,602	3,212,919
AAGR(%)	4.58	5.13	4.63	4.92	3.54	3.91	5.49	6.40	3.72	4.93	4.01	3.80	4.73

(Unit : Million Pesos)

Year	Major River Basin										
	Abra (WRR I)	Lacag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Ambay-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Ilog-Hilabangan (WRR VI)
1995	3,620	2,164	15,464	1,722	54,161	17,419	284,459	2,850	6,395	5,478	7,079
2025	13,804	7,590	70,963	7,169	215,114	69,565	1,496,432	7,641	18,487	15,444	22,329
AAGR(%)	4.56	4.27	5.21	4.87	4.70	4.72	4.90	3.33	3.60	3.52	3.90

Year	Major River Basin									
	Jalaur (WRR VI)	Agusan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungan (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	Total
1995	5,823	10,922	3,562	3,408	4,602	2,745	6,803	25,721	3,975	468,387
2025	18,629	33,971	14,585	14,177	11,439	8,094	24,203	76,622	14,898	1,861,463
AAGR(%)	3.95	3.85	4.85	4.87	3.08	3.67	4.32	3.71	4.50	4.71

Judging from the results of projection for GRDP by water resources region and by river basin, the same character as the one based on NEDA's development plan is observed. It is obvious that the most part of GRDP in all sectors is concentrated into very limited water resource regions (III, IV, VII, VIII and X) and river basins (Pasig-Laguna Bay, Pampanga, Mindanao and Cagayan). It is strongly desired that the balanced development should be carried out through water resource regions and river basins.

5) GRDP Per Capita in All Sectors

The most rapid growth of GRDP per capita in all sectors can be observed for Eastern Visayas (VIII) which will increase from 5,754 pesos in 1995 to 22,355 pesos in 2025 at the AAGR of 4.6% followed by Central Visayas (VII), Cagayan Valley (II) and Ilocos (I). The slowest growth will be obtained by Southern Mindanao (XII) at a AAGR of 1.8%. The summary is shown in the following table:

(Unit : Peso Per Capita)

Year	No. and Name of Water Resources Region (WRR)												Total
	WRR I Ilocos	WRR II Cagayan Valley	WRR III Central Luzon	WRR IV Southern Tagalog	WRR V Bicol	WRR VI Western Visayas	WRR VII Central Visayas	WRR VIII Eastern Visayas	WRR IX Southwestern Mindanao	WRR X Northern Mindanao	WRR XI Southeastern Mindanao	WRR XII Southern Mindanao	
1995	8,940	7,038	10,300	18,830	5,438	10,092	10,538	5,754	6,809	10,954	10,290	8,400	11,710
2025	23,405	19,783	26,096	46,464	10,283	21,411	33,211	22,355	13,062	26,240	20,558	14,276	28,822
AAGR(%)	3.26	3.51	3.12	3.06	2.15	2.54	3.90	4.63	2.20	2.95	2.33	1.75	3.05

Comparing by river basin, the highest growth will emerge in Cagayan (WRR II) of 3.7% (6,718 pesos to 19,823 pesos). Abulug (WRR II) and Abra (WRR I) are next to Cagayan. The lowest growth is recorded by Tagun-Libuganon (WRR XI) of 0.8%. Agusan (WRR X) in the next lowest. The highest level will be registered by Pasig-Laguna Bay (WRR IV) of 54,827 pesos in 2025 which is 1.9 times of regional mean of 28,822 pesos. Secondly high leveled river basin is Pampanga (WRR III) which is almost the same level of the regional mean. All other basins are less than the level of regional mean as shown in Table A-65. The summary is shown in the following table:

(Unit : Peso Per Capita)

Year	Major River Basin										
	Abra (WRR I)	Laoag (WRR I)	Cagayan (WRR II)	Abulug (WRR II)	Pampanga (WRR III)	Agno (WRR III)	Pasig-Laguna Bay (WRR IV)	Ambuy-Patrick (WRR IV)	Bicol (WRR V)	Panay (WRR VI)	Neg-Hilabangan (WRR VI)
1995	8,723	8,834	6,718	8,201	13,302	8,224	21,665	17,331	5,203	9,333	10,518
2025	24,476	22,323	19,823	23,738	29,046	21,518	54,827	25,360	9,188	17,372	22,509
AAGR(%)	3.50	3.14	3.67	3.61	3.20	3.26	3.14	1.27	1.91	2.09	2.57

Year	Major River Basin									
	Jalaur (WRR VI)	Aguasan (WRR X)	Tagoloan (WRR X)	Cagayan De Oro (WRR X)	Tagum-Libuganon (WRR XI)	Buayan-Malungon (WRR XI)	Davao (WRR XI)	Mindanao (WRR XII)	Agus (WRR XII)	Total
1995	9,251	11,237	10,208	9,954	8,336	9,179	11,650	8,332	8,832	11,710
2025	19,589	15,337	23,628	23,126	10,495	13,335	27,948	13,607	20,856	28,872
AAGR(%)	2.53	1.04	2.84	2.55	0.77	1.25	2.96	1.65	2.91	3.05

A6 Preliminary Study for Social Environmental Impact

A6.1 Definition, Purpose and Role of Social Analysis

A preliminary study on the social impact of the proposed schemes was conducted in the second field investigation. Social analysis is to analyze the demographic characteristics, social organization and culture in the local inhabitants in the study area. In other words, social impact assessment is to evaluate not only negative impact but also positive impact accrued from the project development.

The role of social analysis is summarized into the following seven points:

i) Specify local inhabitants to be affected by the project
ii) Prepare the method to cope with the conceivable social risk which improve the feasibility of project
iii) Heighten the possibility of receptivity for the project and improve possibility of realization of benefit
iv) Make possible an equal distribution of benefit accrued from the project
v) Minimize the negative socio-cultural impact towards local society
vi) Improve the sustainability of the project
vii) Identify social effects as a part of social evaluation

A6.2 Methodology Adopted

In line with the characteristics of the Master Planning, social analysis in this study was carried out for the major items as discussed below.

A6.2.1 On-Going/Promising Projects

With regard to On-Going/Promising Projects, the survey sheets were prepared for the following items and filled the sheets by reviewing the study reports.

- Name of project and purpose of development
- Name of region, province, municipality and river basin
- Local inhabitants as beneficiaries and land use in the study area
- Main agricultural production in the study area
- Historical and cultural heritage and public facilities
- Socio-economic situation of inhabitants to be resetted from reservoir area
- Contents of social benefit

A6.2.2 Proposed Projects for the Master Plan

With regard to the proposed projects for the Master Plan, the number of population and household and land use by category for the dam reservoir area were surveyed. The inhabitants in the dam reservoir area will be seriously affected by dam construction. The number of population and household were estimated by the following process;

- Measure dam reservoir area on topographic maps at a scale of 1 to 50,000
- Identify the name of municipality and Barangay belonging to dam reservoir area
- Divide the population of Barangay by the ratio of area encompassing reservoir area and other

area

Land use was estimated by percentage of area by category for the reservoir area using the topographic maps at a scale of 1 to 50,000. The category of land use is: (i) agriculture, (ii) grass/shrub, (iii) woodland, (iv) brushwood, (v) brushwood with coconut, (vi) barren land, (vii) others.

A6.3 On-Going/Promising Projects

A6.3.1 Inhabitants in the Reservoir Area

The seven study reports among studied 18, mention clearly the number of inhabitants and reservoir areas as follows;

- Agbulu-Hydroelectric Project: 6,700 (77,300 ha)
- Magat River Project: 500 (200 ha)
- Maasim Water Resources Development Project: 1,500 (not available)
- Pulangui III Multipurpose Dam Project: 35,000 (7,662 ha)

The land use of reservoir area is mentioned only on two projects in those study reports as follows;

- Agubulu-Hydroelectric Project
  Agriculture (27,828 ha), Woodland (34,012 ha), Others (15,460 ha)
- Magat River Development Project
  Agriculture (565 ha), Grass/Shrub (3,127 ha), Woodland (568 ha), Others (15,460 ha)

A6.3.2 Positive Benefit of the Projects

The major positive benefit gained from the projects are summarized as follows:

Water Supply for Public Water
- Utilization of potential of water supply
- Growth of medium and small scale industries
- Assure groundwater supply for municipal use
- Improve water allocation

Irrigation
- Increase in agricultural crop production
- Contribute to self-sufficiency of staple food

Hydropower Generation
- Relief energy
- Re-establish of the earning capacity of project beneficiaries
- Supplement existing power supply

Flood Control
- Improve navigability in the downstream reach of the dam
- Alleviate damage from flood of flood prone area which is a center of agricultural production and economic activities
- Inland fishery benefit

Integrated(Common) Benefit
- Increase of employment opportunity
- Correction of income inequality
- Increase of income during construction period
- Improve transport network
- Pollution abatement
- Enhance wildlife conservation, recreation and tourism

A6.3.3 Negative Benefit of Projects

Negative benefit induced from the projects are not clearly specified for each purpose of development unlike positive benefit. Then negative benefit was categorized into two items with regard to: (i) dam construction and (ii) integrated negative benefit. Major negative benefits generated from the projects are summarized as follows:

Dam Construction
- Resettlement of local inhabitants
- Inundation as a consequence of water impoundment,
- Reduction of esthetic value of the region,
- Inundation of several marble quarries operating,
- Inundation of spring which is the source of domestic water,
- Relocation of existing facilities, and
- Removal of natural vegetative cover of the reservoir and the area for concrete structure.

Integrated(Common) Benefit
- Negative impact on the ecological system notably on the terrestrial and aquatic ecologies,
- Unfavorable repercussion on the overall environment, and
- Adverse environmental impacts to stream and air pollution.

The purpose and contents of benefit by project are shown in Tables A-66 to A-68.

A6.3.4 Indigenous People

Some of the previous study reports indicate the existence of the indigenous people in the reservoir area. The name of indigenous people and the number of people and family by project are as follows;

- Agubulu Hydroelectric Project
  Isnag : 6,700 (1,000 families)
- Abuan Hydropower Project
  Aetas : 5 families; Ifugao : 5 families
- Casecnan Tranbasin Project (Phase II)
  Bugkalot (or Ilongot) : 5,000 (800~900 families)
- San Roque Dam Project
  Ibaloi : 3 families

The indigenous people as ethnic minorities are generally poor and their lands to live are very limited, mainly because their customs and culture are different from the ones of general people. In this context, dam construction may cause the serious problems on their life. It seems to be very difficult for them to move to other place from the places where they have

been accustomed to live long because of the reasons mentioned above. It is strongly desired that their damages will be minimized.

A6.4 Proposed Projects for the Master Plan

A6.4.1 Population and Household

The preliminary study was performed for eight dams, two reservoirs and three weirs. According to the study results, the most highly populated reservoir is located in the Tipolo dam of Bohol-Cebu Water Supply Project. The number of population and households are 1,746 and 329, respectively. The reservoir includes four Barangays of Tabak, Santa Fe, Magatangatan and Santo Nino, Municility Danao, Bohol Province with a total area of 15km^2. The secondly highly populated reservoir is Reservoir I, II and III of Laboy Small Scheme where population of 1,700 and household of 329 are inhabited in the reservoir area.

Other high populated dams are Kanan dam (859) for the Metro Manila water supply, Malubog dam (747) for the Metro Cebu water supply, Maasin dam (613) for the Metro Manila water supply, Pulanbato dam (206) for the Metro Cebu water supply.

The result of the preliminary study is shown in Table A-69.

A6.4.2 Land Use

The dams with a high ratio of agricultural area are Maasin dam (72%) and Tipolo dam (85%). Then most of inhabitants living in these areas are assumed to be farmers. When they must move to other places in occasion of dam construction, it is indispensable that the places they must move are suitable for their agricultural activities. It is desirable that they must be compensated rationally after the mutual consent with the Government.

The areas with high percentage of grass with shrub are reservoir area (70%) of Laboy Water Supply Project and Malubog dam (70%). The inhabitants living these areas seem to be engaged in other sectors than agriculture. It is necessary to survey their occupations and level of income in detail to select the most suitable places where they should move.

It appears that Kanan dam, Bayabas dam and reservoir areas and weir site of Kaliwa Water Conveyance Project are mostly occupied by woodland. The reservoir areas of Pulanbato dam and Laboy dam seem to consist wholly of barren land. In the successive feasibility study, it is also necessary to clarify their occupations and level of income in detail to select the most suitable places where they might move.

A7 Economic Evaluation for Priority Water Supply Schemes

A7.1 Basic Conditions

In this master plan study, the economic evaluation was carried out for the proposed water supply projects for the major cities, for which the preliminary design and cost estimate were carried out at a master plan study level. Concerning the storage type dam projects planned to meet the future water demand on a basis of major river basin, it is noted that a prefeasibility and/or feasibility study was made in the previous studies. The following basic conditions were adopted for the economic evaluation of the proposed water supply projects:

(i) All the proposed facilities are completed before the year 2025 and the period for economic evaluation includes the implementation period of construction and project life. The evaluation period is taken at 50 years considering the durable life of the proposed civil structures and those adopted in other similar projects in the Philippines.

(ii) Project benefit is estimated in accordance with the increasing water demand up to 2025.

(iii) The following currency exchange rates in July 1997 are adopted:

US$1.00 = 27.6679 Pesos

1.00 Peso=4.165 yen

The following matters were taken into consideration in determining the currency exchange rates;

a. The latest year of price index for domestic construction materials is 1997. Then, basic year for present price for domestic construction materials was set up at 1997.

b. The year of currency exchange rate for foreign currency portion must coincide with the one for local currency portion. Then, currency exchange rate was adopted for July 1997 as the middle month of the year.

A7.2 Economic Benefit

A7.2.1 Water Resources Development Plan

Public Water Supply

For municipal and industrial water as public water, water supply plans do not contain construction cost of distribution system then the benefit corresponding to construction cost for distribution system should be deducted from total benefit accrued from the water supply project. The total benefit of each water supply project was estimated based the affordability to pay. This affordability to pay was derived from water consumption per household by taking account of water leakage and water tariff for each water district except Metro Manila. MWSS was privatized in 1997 so that at present the water supply systems of the service area are being operated by the two companies, namely Maynilad Water Services, Inc. and Manila Water Co. Inc.

On the other hand, new water tariff rates imposed by these two companies are extremely lower than the previous water tariff rates. It appears that these water rates do not necessaily reflect the appropriate market price of public water. It is predicted that their water tariff rates will be raised at least five times in the future taking into consideration that : i) it deems that the two companies could not maintain this low level of rates because their financial situation is already in deficits, ii) the five times of new water tariff rates is executable because the old

water tariff rates of MWSS is around four to five times of the new rates. It is considered that the water rates corresponding to five times of present water tariff rates would be affordable for water consumers of Metro Manila.

As for Metro Cebu and Baguio City, the water tariff rates of water districts are not categorized into those for municipal water and industrial water. In this study, the weighted affordability to pay was estimated in consideration of the weight of water demand of municipal and industry for each area. The weighted affordability to pay at a price level of July 1997 is estimated for each of Metro Manila, Metro Cebe and Baguio City as follows;

- Metro Manila	:	8.2 Peso/m^3 (0.296US$/$m^3$)
- Metro Cebu	:	15.9 Peso/m^3 (0.575 US$/$m^3$)
- Baguio City	:	13.5 Peso/m^3 (0.488 US$/$m^3$)

Irrigation Water Supply

The benefit for irrigation project is estimated based on the unit economic value of irrigation benefit expressed in Pesos per hectare, which is standardized with reference to those estimated and adopted in the previous irrigation projects in Philippines. In case of the existing rainfed irrigation area, the benefit for irrigation water supply is derived to be the difference of net values of rice between "with project" and "without project", which are derived by deducing market prices of production cost from farm gate. Concerning the new irrigation area, the annual benefit is derived deducting the annual cost for cultivation land from farm gate price of the products. In the economic evaluation, the Kanan-Umilay Transbasin project is expected to develop new irrigation areas in the downstream low-land area of about 20,000 ha with the surplus water in excess of the diverted water for municipal water supply to Metro Manila. The annual net irrigation benefits at a price level of July 1997 are measured based on the following standardized unit values:

- Annual gross benefit	: US$ 979/ha
- Annual production cost	: US$ 772/ha
- Economoic capital investment cost for irrigation project	: US$2,958/ha
- Annual O & M cost for irrigation facilities	: US$29.58/ha (1% of investment cost)

A7.2.2 Hydropower Generation

It is considered to be difficult to estimate directly the economic benefit of the hydropower project. In general, the economic benefit is estimated by means of the "alternative facility cost method", in which the economic benefit is replaced by the economic cost of the most competitive alternative thermal plant, because the cost of alternative facility will be saved when the project will be implemented. Thus, the economic benefit of hydropower project is composed of initial investment cost and annual O&M cost of the selected thermal power plant, whose unit costs are represented by kW value and kWh values, respectively.

In this study, a hypothetical diesel plant is selected as the most competitive alternative thermal plant to hydropower plant. Based on the data gathered from NPC on the constrction and O&M costs of diesel power plant, the kW and kWh values (capacity value or energy value) and KW value (power value) are determined to be 1,098.2 US$/kW and 0.0403 US$/kWh, respectively.

A7.3 Economic Cost

A7.3.1 Conversion to US$ Equivalent by Escalation Factor

Financial project costs in peso for the proposed projects in the Master Plan and on-going or promising projects were converted to US$ equivalent by price escalation factor according to the following procedure;

(1) Division of cost in peso into local currency portion by 40% and foreign currency portion by 60%, respectively.

(2) Local currency portion was converted to constant price at 1997 by escalation factor of weighted average in peso equivalent for three kinds of indices. These indices and their weight (%) are as follows;

- Wholesale price index of construction materials in Metro Manila (75%)
- Wholesale price of machinery and transport equipment in Metro Manila(10%)
- Average wages of construction workers in the Philippines (15%)

(3) The weighted average escalation factor of construction materials in peso equivalent for local currency portion was converted to US$ equivalent by peso to US$ rate at July 1997.

(4) Foreign currency portion in peso was converted US$ equivalent by peso to US$ rate at July 1997 and then converted to constant price at 1997 by inflation indices of manufactured exporters (MUV) by G-5 developed countries, which include France, Germany, Japan, UK and USA.

Price escalation factors for local currency portion and foreign currency portion are shown in Tables A-70 and A-71.

A7.3.2 Basic Assumptions

Financial project cost of proposed alternative projects in the Master Plan was converted to economic cost. The basic assumptions are as follows;

(1) Price contingency is excluded from financial cost and present price at 1998 was adopted.

(2) Transfer items are deducted from the financial cost. Transfer items are considered to be taxes like VAT (Value Added Tax), sales taxes and duties which are imposed on construction materials and equipment, usually including government subsidy and contractor profit. In this study, approximately 20% as taxes and duties were removed from the financial construction cost.

(3) Economic cost of land acquisition cost is derived from the land productivity foregone by the project or opportunity cost of land. But detailed data with regard to it has not been provided yet. Then the conversion ratio of land acquisition cost to its economic cost will be assumed.

A7.4 Economic Evaluation

The economic evaluation was carried out for each of the newly proposed projects with the

aforesaid procedures and assumptions. The economic viability of those projects were assessed in terms of an internal of rate return (IRR). The cash flow tables for calculating the IRR values are presented in Tables A-72 to A-80. The estimated IRR values for the proposed projects are summarized below:

Estimate Economic Internal Rate of Return (EIRR)

(i) Water Supply Project for Metro Manila

Name of Project	1.Kanan-Umiray Transbasin	2. Massim and Bayabas Dam	3. Kaliwa-Cogeo Water Supply	4. Pampanga-Novaliches Water Supply
EIRR	19.7	14.9	13.4	8.2

(ii) Water Supply Project for Metro Cebu

Name of Project	1. Malubog-Mananga Transbasin	2. Lusaran-Pulanbato Transbasin	3. Bohol-Cebu Water Supply
EIRR	12.9	12.5	11.1

(iii) Water Supply Project for Baguio

Name of Project	1. Laboy Dam	2. Laboy Weir and Ponds
EIRR	10.7	3.6

As for most of the proposed water supply projects, as seen in a table above, the IRR values are derived to be more than 12 %. On the other hand, it is noted that the IRR values of the water supply projects for Baguio City become smaller in comarison of those for other cities due to the high operation and maintenance cost, which is attributed mainly to the high electricity cost required for pumping-up of water.