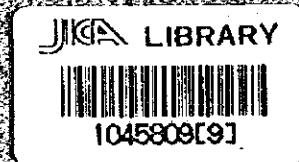


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THE REPUBLIC OF THE PHILIPPINES

**PLANNING REPORT
ON THE PASIG-POTRERO RIVER
FLOOD CONTROL AND SABO PROJECT**



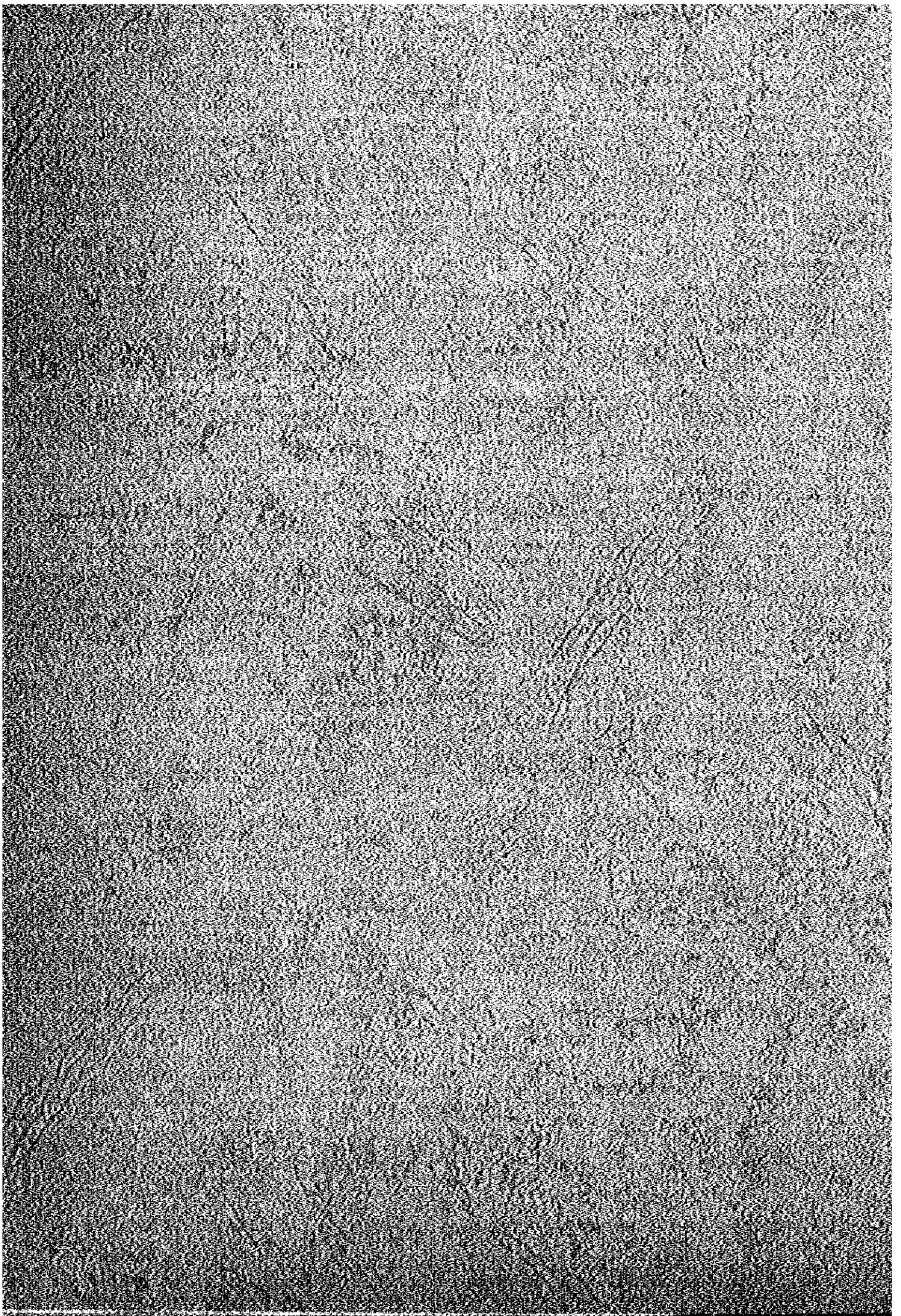
APPENDIX IV

NATIONAL AND REGIONAL SOCIO-ECONOMIC CONDITION
PRESENT CONDITION OF AGRICULTURE
PROSPECTIVE AGRICULTURAL DEVELOPMENT
FLOOD DAMAGES AND SAND SEDIMENTATION DAMAGE

SEPTEMBER 1978

JAPAN INTERNATIONAL COOPERATION AGENCY





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国際協力事業団	
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PLANNING REPORT
ON
THE PASIG-POTRERO RIVER FLOOD CONTROL AND SABO PROJECT

APPENDIX IV

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NATIONAL AND REGIONAL SOCIO-ECONOMIC CONDITION

I. NATIONAL AND REGIONAL SOCIO-ECONOMIC CONDITION

1.1 National Economic Background

1.1.1 Population and Area

The Republic of the Philippines consist of more than 7,000 islands with the total land of 298,000 km². Total population was estimated at 41.8 million in 1975. During 1960 to 1970, the population increased by 3.1% per annum, while it increased at relatively lower of 2.7% during 1970 - 1975. The population density was 140 persons per km² in 1975.

National Census and Statistics Office of the Philippines made projection of the population starting from 1975 census. The estimated population is around 50.3 million in 1980, 70.5 million in 1990 and attain 97.3 million in 2,000. During that period of 25 years the population is expected to grow by 3.3% per annum.

1.1.2 GNP and Economic Structure

The economy of the Philippines has grown very steadily during the decade and the Gross National Product (GNP) attained around P.77,628 million (US\$10,480 million equivalent). The GNP grew at an annual rate of 5.1% during 1966 - 1971, 6.6% during 1971 - 1976 and 6.1% for the last 1976 - 1977. Per-capita GNP is estimated at US\$240 in 1977.

Agriculture sector is still the largest sector in the economy dominating 30.4% of GNP. Industrial sector including mining and quarrying, manufacturing and construction shares 28.4%, in which manufacturing is the largest sub-sector with 19.4%. Service Sector shares 41.2% of GNP, in which transport, communication, storage and utilities gains 4.9%, commerce has a large share of 21.6% and other services shares 14.7%. During 1972 - 1977 period, the share of agricultural sector in GNP reduced to 30.4% from 32.3%, while that of industrial sector increased from 25.5% to 28.4%. Service sector maintained the share but slightly decreased by 1.0%.

In terms of the employment structure, about 54% of the labor force is absorbed in agriculture sector, while 15% of the labor force in industrial sector. About 31% of the labor force is working in service sector. As indicated in the share of employed personnel, agriculture sector is still the most important sector for absorbing the labor force. The high percentage of the share suggests that there are substantial under-employment in the sector. But the ratio would become higher if taking into account the existence of the under-employment in agricultural sector.

1.1.3 Agricultural Production

In terms of value added, agricultural crops including rice, corn, coconut, sugarcane, banana and other crops produced P24.3 billion with its share of 63 % in the total agricultural sector in 1976. As a single crop, rice produced P6.3 billion of gross value added, coconut P3.5 billion and sugarcane P2.8 billion. Livestock and fishery had share of 11 % having produced P4.4 billion. Fishery contributed to the agricultural sector by producing P6.5 billion with its share of 17 %, while forestry produced P3.3 billion with the share of 9 %.

According to the estimated figures, about 2,700 thousand tons of copra was produced in 1976. The harvested area of coconut trees was around 2,000 thousand ha. Production of copra were fluctuating affected partly by world market price and partly by natural conditions. From 1970 to 1972 its production increased from 1,400 thousand tons to 2,200 thousand tons. But the production dropped to 1,400 thousand tons in 1974. From 1975 copra production again increased very rapidly and attained the largest output during the past 7 years in 1976. The harvested area of coconut was steadily increasing from around 1,400 thousand ha in 1970 to 2,000 thousand ha in 1976. Most of the products were for foreign consumption. In 1976 about 85 % of the output was exported, while residual 15 % was consumed locally.

Sugarcane production is another important crop for export. Total production of sugar was 2,900 thousand tons on the planted area of 530 thousand ha. Since the production was also affected by world market price, it was fluctuating during 1970 to 1976. From 1970 to 1971, sugar produced grew up from 1,900 thousand tons to 2,100 thousand tons. After its drop to 1,800 thousand tons in 1972, the production again rose up to 2,400 thousand tons in 1974. From 1974 to 1975 the production decreased by 2 %, but increased by 20 % during 1975 - 1976.

Rice is the most important crop in the agricultural crops produced in the country. Total production of rice (in milled rice) was 3,800 thousand tons in 1976. The production has been increasing rather steadily during the past 10 years except the stagnation period around 1972-1973. Annual increase ratio of rice production was around 2 % for the period of 1966-1976. Despite of the steady increase of the rice production, it is not yet sufficient for domestic consumption. Imports of rice were ranging from 60 thousand tons to 620 thousand tons during the past 5 years. Corn production also increased very steadily during the past 10 years and attained 2,700 thousand tons in 1976. But the production is insufficient to meet the domestic demand. About 100 thousand tons of corn and 700 thousand tons of wheat were imported in 1976 for supplementing the shortage in cereals in domestic market.

1.1.4 Trade, Balance of Payment and Foreign Exchange Reserve

The total exports of the country in 1976 was US\$2,574 million. It grew at an annual growth rate of 23.5 % during 1972-1976 period. They consists of agricultural products, mineral products, manufactures and others. Agricultural commodities have been dominating among all the export goods. In 1976, US\$1,532 million or nearly 60 % of the total export value came from agricultural products. Manufactures accounted for 22.7 % and mineral products 17.6 %.

Coconut product is the leading article among all the agricultural exports. It accounted for about 35.4 % of the total agricultural exports in value in 1976. Sugar and sugar products came next with 29.8 % share. Forest products came in the third place with 20.2 % share, fruits and vegetables fourth place with 9.3 % share.

During 1979-1972, exports of agricultural products both in volume and value kept rather constant level. The exports value showed considerable increase from 1972 to 1973 and 1974. This rapid increase was mainly due to high inflation of food crops and raw materials caused by oil price increase. From 1975 the exports value of agricultural products dropped again. The exports of an another important products, mineral products, also followed the same trend as that of agricultural products Exports value by selected group during 1970-1976 period are shown in TABLE I-10. Exports by selected commodity group in volume for the same period are shown in TABLE I-11.

Total imports of the commodity in 1976 were US\$3,633 million, It increased at an average growth rate of 31 % during 1972-1976 period. Main components of the imports are raw materials and capital goods. In 1976 raw materials including mineral and fuels account for about 60 % of the total imports in value. Capital goods share 30 %, while consumer goods share the residual 10 %.

The import value for the whole items showed steady increased during 1970-1973 except the import value of raw materials and intermediate goods. But it jumped up double to US\$3,143 million in 1974 caused by the world inflation and stayed at a higher level during 1975-1976

Although the percentage of consumer goods out of total imports in value was not large, it increased constantly year by year. The imports of food and food preparations constitute about 50-60 % of the total consumer goods. Total imports of rice and corn were 55 thousand tons and 96 thousand tons respectively in 1976.

Imports of selected commodities in F.O.B. value are shown in TABLE I-12 for 1970-1976 period, Imports of selected commodities in terms of volume are shown in TABLE I-13 for the same period.

As shown in TABLE I-10 and TABLE I-12 exports and imports were roughly in balance in value during 1970-1972 period. In 1973, trade balance recorded a surplus. Since 1974, however, it was deteriorated and the deficit attained US\$1,059 million in 1976. The balance of payments recorded surplus during 1970 to 1974. It turned to a deficit from 1975 despite the huge non-monetary capital surplus. In 1975, deficits of the balance of payment attained US\$521 million.

Foreign exchange holdings of commercial banks recorded deficits from 1973 through 1976, the position of which was aggravated during the period. International reserves of the Central Bank on the other hand increased from about US\$1,037 million in December 1973 to about US\$1,642 million in December 1976. Total international reserves of the Central Bank and Commercial banks increased from about US\$876 million in December 1973 to about US\$1,124 million in December 1976. Detailed figures of the international reserves of the Central Bank together with the foreign exchange holdings of commercial banks is given in TABLE I-15.

1.1.5 Price Indexes

All the indexes indicates steady price increase during 1965 to 1977 except the extraordinary period of 1971-1974. During 1965 to 1970, wholesale prices increased at an annual rate of 6.6 %, while retail prices increased at 6.3 % per annum. Consumer prices went up with relatively lower ratio of 5.9 % per annum during the same period. Mainly due to quadruple price increase in oil price and the subsequent price increase in other commodities, all the price indexes showed the high increase during 1971 to 1974. During the period general wholesale prices increased at an annual rate of 28.4 %, retail prices went up at an annual rate of 21.5 % and consumer prices increased at 18.7 % per annum. After the extraordinary period, price trend was back to normal range. From 1974 to 1977, wholesale prices went up 6.2 % per annum retail prices increased at an annual rate of relatively high of 8.4 % and consumer prices were up at an annual rate of 7.4 %. Detailed trends of the wholesale prices, retail prices and consumer prices are presented in TABLE I-16 to TABLE I-18.

1.1.6 Government Budget

Revenue of the national government increased from P 17.2 billion in 1975 to P 21.7 billion in 1977. It increased at an annual rate of 12.3 %. Current expenditure also grew up from P 15.1 billion in 1975 to P 17.4 billion in 1977. Annual growth rate of the current expenditure is 7.3 % during the period. Current surplus which is the balance of the revenue and the current expenditure shows surplus for the past three years ranging from about two to four billion pesos. This is mainly due to high growth rate of the revenue, which increased more rapidly than GNP. The surplus became

available for financing capital expenditure. Capital expenditures rose rapidly from P 3.4 billion in 1975 to P 8.7 billion in 1977 as infrastructure investment rose from 1.8 % of GNP in 1975 to 3.6 % in 1977 and transfers of equity capital to government enterprises from 1.1 % to 2.0 %. Nearly 80 % of the increase in capital expenditures was accounted for by quickly rising infrastructure investment by the Department of Highways and the Department of Public Works, Transportation, and Communication. Of the capital transfers, about three quarters went to non-financial corporations to help finance infrastructure investments in power generation and distribution, irrigation development, and geothermal and oil exploration. The remaining one fourth of the capital transfers was allocated to government financial institutions for strengthening the equity base of the Philippine National Bank, the Development Bank of the Philippines, and the Land Bank. Local government expenditures also grew with the greater availability of revenues from the property tax. Dependence on transfers from the national government - in the form of internal revenue allotments, specific tax allotments, and special aids - was correspondingly held down in line with the policy of increasing the financial autonomy of provinces, cities, and municipalities.

1.1.7 Five-year Development Plan

(1) General background

Despite the foregoing achievements in the economic, social and political spheres, the economy continues to face the following urgent problems and challenges:

- (a) Inadequacy in basic needs in life, i.e., food, clothing, shelter and education;
- (b) Income inequality;
- (c) Unemployment and undevelopment;
- (d) Heavy pressure of a rapid population growth;
- (e) Balance of payments and price instability;
- (f) Energy constraint to the economy;
- (g) Environmental problems; and
- (h) Regional growth disparities.

Five-Year Development Plan for 1978-82 was programmed for the solution of the problems mentioned above in succession to the previous Four-Year Plan. It was drawn up within the context of a Ten-Year Plan, 1978-87, and a Long Term Plan for 2000. The development goals set in the Five-Year Plan are as follows.

- (a) Promotion of social development and social justice through:
 - Creation of productive employment opportunities;
 - reduction of income disparities;
 - improvement of the living standards of the poor; and
 - enrichment of social and cultural values.
 - (b) Attainment of self-sufficiency in food and greater self-sufficiency in energy;
 - (c) Attainment of a high and sustained economic growth;
 - (d) Maintenance of an acceptable price level and improvement in domestic resource mobilization and balance of payments position;
 - (e) Increased development of lagging regions especially rural areas;
 - (f) Improvement of habitat through development of human settlements and proper management of environment; and
 - (g) Maintenance of internal security and harmonious international relations.
- (2) Overall economic growth

Under the plan, real GNP (at 1972 prices) is targeted to grow by around 8 % annually during the next ten years, 1978-87. In the first five years, 1978-82, GNP will increase at an average annual rate of 7.7 %, 7.5 % per year in 1979 and 1980 respectively and 8.0 % per year both in 1981 and 1982. By 1982 GNP will reach a level of P 112,214 million.

Assuming that the population growth until 1987 is 2.9 % per annum, per-capita GNP is expected to grow annually by 5.0 %. In 1987, real per-capita GNP is targeted to reach P 2,752 which is nearly double that of the 1976 level of P 1,667. For the Five-Year Period, real per-capita GNP will stand at P 1,796 in 1978 and reach P 2,157 in 1982, which represents a growth rate of 4.7 % per year.

During the plan period some dramatic production shifts will occur within the economy as evidenced by the changes in relative contribution of each sector to total net domestic product. In 1978 and 1979, a major turning point in the economy will take place.

Agriculture and industry will have almost same shares of output to total net domestic product. After 1979, the share of the industry sector will exceed that of agriculture. Another economic turning point will become evident by 1987. The share of manufacturing to total net domestic product will match the share of agricultural output and industry as a whole will be the dominant sector in the economy.

By 1987, the output of agriculture, fishery and forestry will account for only 24.3 % of total net domestic output from its original 30.9 % share in 1976. The sector will expand at an average annual rate of 5.3 % from 1978 to 1987. For the first five years, the share of agriculture, fishery and forestry to total NDP will drop from 30.2 % in 1978 to about 27.5 % in 1982. The 1982 share represents a 3.4 % points drop from 1976 share of 30.9 %. However, total agricultural production will still increase at an average of 5.2 % per year from 1978 to 1982.

An acceleration in the growth of the industrial sector is targeted for Ten-Year Plan period. From a 10 % annual growth rate for the first five years, industry will rise further by 11.4 % annually in the next five years, representing an annual growth rate of 10.8 % for the 10-year period. For the Five-Year Plan period, the share of industry to NDP will increase from 29.1 % in 1978 to 31.8 % in 1982. Targeted growth rate of 10 % per annum is a marked rise from the 7.4 % annual growth rate of industry from 1973 to 1976.

In the industrial sector, a dynamic upturn is expected for the manufacturing. It is targeted to increase by 9.2 % yearly from 1978 to 1982, which is considerably higher than that of achievement 3.9 % during 1973-1976. The expansion in mining activities is reflected by an expected 8.5 % increase both in 1979 and 1980 and by 9.5 % up to 1982. To support the physical infrastructure needs of the economy, the construction sector is expected to post a 12 % growth rate in 1979 and 1980 and 12.5 % in 1981 and 1982. Likewise, the utilities sector is targeted to expand by 10.5 % in 1979 and 1980 and by 11 % up to 1982 to meet the energy requirement of an expanding economy.

From 1978 to 1987, the service sector is expected to grow by 7.4 % annually. Its share to NDP will range from 41 to 39 % during that period. The need for better transport, communication and storage facilities to sustain the growth effort is reflected in the expected 9.4 % average annual growth rate of the sector. Its share to NDP will increase from 4.2 % in 1978 to 4.5 % in 1982. The commerce sector will grow at a creditable rate of 7.7 % during the Five-Year period. Its share to NDP will be maintained at about 22 %. The share of other services will also be maintained at 14.4 % of NDP.

(3) Public investment program

(a) General trend

For attaining the economic and social objectives of the Plan investment program for providing the physical plan is formulated. Attention will be directed to building up of economic infrastructure to support agricultural modernization and the industrialization drive. Emphasis will also be given to the provision of mass-based social services to effect a more equitable distribution of the benefits of economic growth.

In 1978, government investment expenditure is programmed to account for 5.2 % of current GNP. At the end of the Plan period, this share will be 6.5 %. On the average, government investment will be growing at around 22 % per year from 1978 to 1982 reflecting the accelerated pace of the infrastructure program.

Public investment for the infrastructure program will increase from about P 14,954 million in 1978 to approximately P 25,494 in 1982 and P 55,608 million in 1987. In the infrastructure investment program, power and electrification will get the largest share of 36 % followed by water resources with 24 % share and transportation with 21 % share.

(b) Water resources development Program

For the five-year from 1978-1982 required investment for water resources development is estimated at P 22.4 billion, 43 % of which will come from foreign sources. The development program is prepared within the framework set by the following guidelines:

- 1) The proper development and optimum utilization of water resources for the multiple requirements of irrigation, domestic and municipal consumption, industrial use, power generation, fish production and recreational purpose;
- 2) The conservation of the water resources base and the institution of safe guards against its deterioration through the combined measures of flood control, drainage, surface water quality control, watershed management, and soil conservation;
- 3) The coordination of efforts with other sectoral activities, particularly agriculture and industry, in support of the regional planning strategy; and
- 4) The provision of adequate and good quality community water supply and the protection of public health through pollution abatement and control of waterborne diseases.

Out of the total amount for water resources development program, about P 2.6 billion or 12 % is allocated to flood control and drainage program. Since the changing patterns in human settlements, the varied incursion of economic activities on the natural land-water balance and heavy rains which generally occur during the months from June to November result in heavy floods in this country, the flood control and drainage program is given high priority.

In the plan, construction of protective structures and harnessing the flood flows for beneficial uses are considered to be the strategy. Thus, the traditional dikes, floodgates, and downstream flood ways will become more effective when complemented by impounding reservoirs and catch basins in the upper reaches of the rivers. Complementary programs for watershed management, erosion control, zoning and flood plain management are also considered to increase the effectiveness of the flood control and drainage program.

After implementing the flood control and drainage program, an incremental area of about 1.07 million ha is expected to benefit from flood and potential damages to the floodable areas will be reduced to 1.1 million ha by 1987 from the present 2.5 million ha. Total beneficiary population will increase to 13.7 million from the present eight million.

1.2 Regional Socio-Economic Background

1.2.1 Central Luzon

(1) General

Central Luzon is located in the central part of Luzon Island, bounded by the provinces of Pangasinan and Nueva Vizcaya on the north, Rizal and Manila Bay on the south, Aurora sub-province and Quezon province on the east and China Sea on the west.

Consisting of six (6) provinces (Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac and Zambales) and five (5) cities (Angeles, Cabanatuan, Olongapo, Palayan and San Jose), it has a total area of about 18,300 km², which amounts to 6.1% of the total area of the nation. About 46% of the land is classified as public forest, 33% cropland, 3% fishpond, 2% swampland and the residual 16% as others.

With the total population of 4,400 thousand (in 1975), Central Luzon is the country's second most populous region sharing a consistent one-tenth of the total national population. During the past five years from 1970 to 1975, it increased by 3.1% per annum which is relatively higher than national population growth of 2.7% per annum for the same period. The population density was 240 persons per square kilometer, which is almost twice that of the national level. Central Luzon is one of the highly urbanized regions of the country with 32% of its population classified as urbanites. The growth rate of urbanization is estimated at 4% during the past five years.

(2) Gross regional domestic product

Gross regional domestic product (GRDP) of Central Luzon was P6,222 million (US\$841 million) in 1976 (at 1972 prices). Compared with that figure in 1975, GRDP grew at a rate of 50% per annum, which is relatively lower than that of national level (6.7%). The share of the region in the gross national product was about 9% in 1976. Per-capita GRDP was P1,368 (US\$185), which is lower than the national level. During the past five years of 1972 to 1976, GRDP increased by 5.4% per annum on the average, while per-capita GRDP only by 2.0% per annum.

Agriculture sector including fishery and forestry is the region's largest economic sector, producing about 40% of the total regional product. Total sectoral value-added was P2,296 million in 1976. Industrial sector including the mining and quarrying, manufacturing and electricity, gas and water produced a value-added of P2,155 million and continues to be the second largest sector in the region producing 33% of GRDP. Commerce and service sector is another important sector in the regional economy producing about one-fourth of total regional output. The gross value-added was P1,495 million. About P216 million of the value-added was raised by transportation, storage and communication sector with its share of 3%. Compared with na-

tional economic structure, agriculture sector in the region is more important while commerce and services sector is still on the development stage.

Characteristics of the economic structure is also represented by the labor force absorption by the various sectors of the economy. Agriculture sector is the single, largest employer with 519,6 thousand or roughly equivalent to 41% of all employed workers. Service sector as a whole absorbs about 42% and industrial sector draws 17%. About 4% of the labor force is classified as unemployment.

As mentioned above, agricultural sector including fishery and forestry is the largest component of the economy. Out of the total agricultural production in the nation, the region shares about 14% for agricultural crops, 10% for livestock, 15% for poultry, 9% for fishery and 1% for forestry, in terms of the gross value added. As a single crop, about one fourth of the national rice production, or about one million ton of milled rice is harvested in the region, for which the Central Luzon is called granary of the Philippines.

(3) Five-year regional development plan

The development plan in the region for 1978-1982 is formulated to contend with the following problems or issues:

- a) the need to meet the requirement of an increasing population;
- b) the need to raise the current low output per worker and the family income;
- c) the limited area of farmlands and land reserves for crop production;
- d) increasing reliance on non-agricultural sectors especially industry;
- e) the necessity for the examination of the extent of education and training need for intensive agricultural development;
- f) the malnutrition problem; and
- g) the need for infrastructures to support development.

To answer the problems and issues mentioned above, several goals for the development in the region have been set as follows:

- a) the realization of an average annual economic growth rate of 8.5%;

- b) the intensification of production in agricultural lands and development of other natural resources;
- c) optimum industrialization of the region;
- d) the reduction of unemployment and underemployment;
- e) improvement in labor productivity and distribution of income;
- f) the promotion of social development consistent with the needs of a changing society and an industrializing economy; and
- g) the improvement of the nutritional needs of the regional population and the reduction of the annual growth rate of the population.

Under the principles mentioned above, targets of the Five-Year Development Plan is programmed as shown in the following table. For the years from 1978 to 1982, an average growth rate of 8.5% is aimed to lift the GRDP from P7,847.6 million in 1978 to P10,860.9 million in 1982. During the period, high annual growth rates are set both for industrial sector and service sector, while relatively low growth rate is applied for agriculture sector. Agriculture sector will be displaced by manufacturing as the regions prime sector. Although agriculture sector is expected to grow at an annual growth rate of 5.2%, its total share to total GRDP would be gradually reduced from 34.8% in 1978 to 30.8% in 1982. Manufacturing, on the other hand, which would share 29% of the GRDP by 1978 would get 32.2% by 1982 and become a leading sector in the economy. Industry sector in total including mining and quarrying, manufacturing, construction and electricity, gas and water will get around 40% of the GRDP by 1982. Transportation, communication and storage is expected to grow by 10.5% per annum, second highest growth rate among the sectors' in the period. Commerce and services would have growth rates of 9.1% and 8.6% respectively by 1982. In response to accelerated industrial development, service sector including transportation, storage and communication, commerce and services would share around 29% of GRDP in 1982.

1.2.2 Pampanga Province

(1) Topographical condition and climate

Pampanga province is located in Central Luzon Region (Region III). It is bounded on the north by the provinces of Tarlac and Nueva Ecija, on the east by the province of Bataan and on the west by the mountain ranges of Zambales.

Total land area of Pampanga is about 218 thousand ha or about

12% of the Central Luzon. It is divided into two political districts. The first district which is composed of nine towns with an area of 112 thousand ha, while the second district composed of twelve towns with an area of 106 thousand ha.

The province is a part of the great plain extending from Manila Bay north to the Gulf of Lingayen. Most of this area is only a few meters above sea level. Mount Arayat and the elevated strip along the western boundary where a few peaks of the Zambales Mountains rise to a height of nearly 1,900 meters constitute the only high land. The general slope is south and south-east toward Manila Bay and the Rio Grande. In the north-eastern part of the province, the land slopes down toward Mount Arayat. Not far from the base is the Pampanga river which channels flood waters into the Wide Candaba Swamp, then to tributaries, rivulets, creeks and finally to Manila Bay.

The climate of Pampanga is characterized by the distinct wet and dry season. Dry season starts from December and lasts about six months until May. In the dry season, the northeast monsoon reaches the Philippines, which causes rainfall on the eastern side of the country, resulting in almost negligible rainfall in Pampanga. Wet season occurs from June to November in which period heavy rain prevails. The province is on the path of destructive typhoon from July to December. Due to the flood, not only the lowland but also the areas along the path of the tributaries and creeks are inundated every year.

(2) Infrastructures

All the major roads of the province pass through San Fernando, the capital town of the province. One major road is the Mac Arthur Highway which is from Bulacan to the North. From San Fernando there is another major road to Bataan. The newly constructed North Express way connects Tabang to Angeles City. There is also an on-going road construction which connects Capan to Olongapo City. In addition, there are provincial roads, municipality roads and barangay roads. Total length of the provincial roads in Pampanga Province is 318 km, that of municipal is 34 km and that of barangay is 595 km.

There is train service available in the province; five a day service between the province and San Fernando, La Union, and another five a day service between the province and Manila.

Pampanga Electric Cooperative (PELCO) was organized for providing electric service at a nominal price to the remotest areas of the province in 1973. The PELCO covers 18 municipalities at present and is expected to include all 24 municipalities by 1980. However, the percentage of the household using electricity to total household is still low of 44% in the whole province.

Mail, telegraph and telephone services are available in all

towns, which are operated mainly by private companies except mailing service. There exist 9 telegraph offices, 5 telephone companies. There are two radio stations conducting daily broadcasts in English, Tagalog and in the vernacular.

(3) Population and labor structure

Total population of Pampanga province was 1,042 thousand or about 24% of the total population of Central Luzon in 1975. According to the population census it increased by 2.8% per annum during 1970 to 1975. Pampanga is the second most populous province, next to Bulacan, but the most densely populated province in all the Central Luzon with the density of 478 persons per km². The province is predominantly rural and only about 30% of the total population lives in the urban area. During the past five years, the proportion of the urban population decreased from 31.7% to 30.7%.

With respect to age composition, about 45% of the total population belongs to younger age group, 0-14 years, while about 52% to working age group from 15 to 55 and the residual 3% to older age group.

Total households were about 267 thousand in 1975 in Pampanga Province, out of which about 32% were engaged in agriculture including forestry and fishery, 27% in industrial sector and the residual 41% in service sector. Compared with that of all the Central region, the share of the agricultural sector is relatively lower with high ratio of industrial sector.

(4) Agricultural production

a) Land use and soils

The land in Pampanga province is roughly classified into five categories, namely, cultivated land, brushland and openland, commercial forest, non-commercial forest and others. Out of the total land area of 218 thousand ha, about 60% or 132 thousand ha belongs to cultivated land. Brushland and openland dominates the second largest portion of about 19% or 42 thousand ha. Commercial forest and non-commercial forest share 9% and 6% respectively. The residual area is around 11 thousand ha with its share to the total area of 5% classified as others.

In general, the soils of Pampanga are of recent alluvial origin. The whole plain and foothills north and northwest of San Fernando consist of coarse to very fine sand, and to the south and southeast of San Fernando, of silt loam to clay. The average mechanical analysis of Pampanga surface soils from 12 important types in percent is: sand, 54.3, silt, 20.8; clay, 24.9. The average chemical analysis of Pampanga surface soils is: Nitrogen, 0.02 to plus 0.1; Phosphate, 0.06 to 0.28; Potassium,

0.14 to 0.39; Calcium, 1.63 to 5.81; Magnesium, 0.46 to 1.74; Organic Carbon, 0.41 to 3.02; PH value; 5.61 to 6.99. The soils are slightly acid, not sticky and plastic.

b) Crops production

Principal crops produced in the province are rice, sugar cane and corn. The production shares of the province in the Central were about 20% for rice, 34% for corn and 46% for sugarcane for the crop year 1974-1975.

Rice is planted on the total land area of 100-110 thousand ha. The total production in the province has been around 300 thousand tons of paddy since 1973. The production has increased from around 232 thousand tons of paddy in 1970 to 349 thousand tons in 1975, which is attributable partly to the expansion of the cultivated area and partly to the increase in unit yield. Average yield of rice in the province was 3.4t/ha in 1975, higher than that of the Central Luzon average. The production in the province exceeds the local consumption, which can be exported to outside the province.

Sugarcane was cultivated on around 46 thousand ha of arable land. Total production of sugar was 98 thousand tons in 1974-1975 producing roughly a half of the regional production. Towns of Porac, San Fernando, Mexico, Mabalucut and Floridablanca are leading sugarcane producers in the province.

As another important food crop, corn is produced on around 500 ha. Total production was some 600 tons in 1974-1975 crop year. Vegetables planted in the province are eggplant, tomato, squash, upo, ampalaya, raddish and gabi. Allocated land for vegetables is around 13 thousand ha.

c) Livestock, poultry and fishery

Animal raising in Pampanga is either on commercial, semi-commercial or backyard level. Main livestock to have been raised in the province are carabao, cattle, and hogs. About 15-20% of the total population of Central Luzon were held in the province around 1975. There were about 1,400 cattles, 60,400 carabaos, and 147,000 hogs in the province. Carabao and hog are main source of meat production. About 12 thousand tons of meat were made from carabao, while one thousand tons of meat from hog. With respect to poultry population, about 1,393 thousand of chicken and 512 thousand of ducks were held in the province around 1976. The holding share of Pampanga province is around 25% in the whole Central Luzon.

Fishing is one of the important industry in the province. Total fish products were around 14 thousand tons in 1975, which accounted for about 30% of the total region's product in Central Luzon. Around 22 thousand ha of fishponds and fishpens exists in the province, which include both brakish-water system and fresh-water system. Candaba, Guagua, Lubao, Macabebes, Masantor and Sexnoan are leading municipalities for supplying fishproducts.

(5) Industrial activities

a) Mines, quarries and mineral deposits

There exists no important metallic deposit in Pampanga. Only a sizeable amount of feldspar mineral can be found in Mancatian, Porac, which is used for glass materials. This mineral is now being supplied to the existing factories in Pampanga and other provinces. When compared with metallic minerals, non-metallic mineral products such as gravel and sand are currently the most important resources in the province. Sand excavated from the river bed of the Pasig-Potrero river is a good construction material for roads and buildings.

b) Manufacturing

Most of the manufacturing establishments of the province consist of small-scaled or cottage industry, such as bakeries, tailoring and dress shops, hallow block manufacturers and blacksmith, which are mainly of the artisanal level. In terms of the number of establishment, textile, leather and related products establishment is the largest followed by agricultural processing, food products, wood products and metal products. Wood carving and furniture production are typical cottage industry in the province and more than one hundred establishment exist. Home industry or cottage industry produced some nine million peso with the employing population of 9,400 persons in 1976. By municipalities, the greatest number of establishment is found in Angeles city, followed by Guagua, Lubao, San Fernando and San Simon.

In addition, twelve (12) major establishments exist in the province namely two sugar mills in San Fernando and Floridablanca, four carbonated drinks manufacturing establishments in San Fernando, two local wine vinegar establishments in Angeles city and two cigar and cigarette factories in San Fernando and Guagua.

c) Service sector

There are about 11,600 wholesale and retail stores in Pampanga. These are mainly sari-sari stores (small grocery store), refreshment stores, rice retailers followed

by bazaars, dry good stores and general merchandizing. Many of the commercial activity of these stores are concentrated in Angeles city and San Fernando.

There are 51 banking institutions operating in the province. Rural banks are found in every municipality. Banking institutions grant loans to farmers and persons engaged in livestock production. Different types of loans are given to agricultural production, commercial and industrial activities. There are nine life-insurance institutions serving the inhabitants of Pampanga.

d) Education and health

The education in Pampanga is undertaken by government and private sector. The government maintains schools of the elementary and secondary level. There are 429 public and 18 private elementary schools in the province. For secondary schools, there are 41 public ones and 39 private ones including barrio high schools and 4 vocational schools. Besides, two colleges exist in the province; the Basa Air Base College in Floridablanca offering professional courses and the Pampanga Agricultural College in Magalang. The literacy rate in the whole province is high of around 80%.

Health problems of the province are taken care of by the Bureau of Health which maintains clinics and hospitals in various parts of the province. There are 8 public hospitals and 13 private hospitals in the province. In addition, 46 Rural Health Units are distributed to all municipalities of the province. However, malnutrition among the vulnerable age group of 0-6 years remains one of the important health problem in the province.

1.2.3 Flood Condition and Its Protection Works

As mentioned in the preceding section, Central Luzon Region which is located in the Central Plain of the island of Luzon is called the rice granary of the Philippines. However, this area is annually inundated during rainy season by the flood of the Pampanga river as well as the smaller waterways and tributaries. Particularly, the low lying areas have been affected severely. The damages is not only caused by flood water but also by sand sedimentation brought by the flood water.

Although there have been no systematic assessment records of flood damage, annual flood damages on the Pampanga River Basin have been considerably large. The recent flood damage¹ was reported

¹ includes the damages caused not only by flood but also by wind and rain. (From "Initial Report on Typhoon Didang Damages and the Extent of Relief and Rehabilitation Efforts")

to attain around P86.2 million in Central Luzon which was caused by Typhoon "Didang" in May 1976. The estimated damages accounts for only direct ones such as damages on agricultural products, roads, houses and other infrastructures. But the flood has been deteriorating transportation and communication as well as health and sanitary conditions in the region, thus gave considerable minus impact on the regional economy, security in the region and regional environment as a whole.

Facing these flood problems, the Bureau of Public Works made a comprehensive overall scheme of the Pampanga River Flood Control System in order to eliminate or minimize flood damages on rich farm and urban lands and to protect lives, properties and existing facilities such as roads, bridges, buildings and irrigation system. The scheme consists of many tributaries protection plans and main river protection works and proposed to construct dike system, diversion and cut-off channels, gates, and retarding reservoirs as well as improvement of the existing channels.

Included in the scheme is the Pasig Potrero river flood and erosion control plan. The Pasig Potrero river, located in South-western part of the Central Luzon Plain, affects the municipalities of Porac, Sta. Rita, Guagua and Bacolor by flooding annually with considerable sedimentation. Particularly, damage caused by sand sedimentation has been serious in the area, which not only deteriorated agricultural production but also damaged infrastructures such as roads, irrigation facilities and housing facilities. For eliminating the flood, construction of parallel earthdikes, dry-boulder and rip-rapping, dredging and improvement of the channel are underway together with installation of gates and construction of revetment and bridges.

Total amount of P160.7 million was spent for the whole Pampanga River Control System during 1973 to 1977 and additional P148.2 million is planned to be invested from the period of 1978-1982. For the Pasig Potrero river alone, about P24.2 million was used during past five years of 1973-1977 and about P23.9 million is expected to be allocated for 1978-1982 period. (Details of the budget allocation are presented in TABLE I-41).