

CHAPTER VIII REGIONAL DEVELOPMENT

8.1 Provincial Development Plans

The provincial economy of Ilocos Norte is dynamic, diversified and well positioned for future development. It has an established tourism base and adequate transport infrastructure facilities. The manufacturing sector has emerged as a major employer. The province is endowed with an abundant supply of non-metallic mineral reserves, particularly feldspar and limestone and many of its industrial activities are oriented towards the extraction and semi-processing of these resources.

Commercial and tourism ties with Taiwan are strong and the province is geographically well positioned with respect to growth in East Asian countries. However, flooding, siltation, water supply and waste management are serious problems that will have to be addressed. Flooding and siltation can be traced, in part, to erosion in the upland areas of eastern Ilocos Norte.

The development direction of the province is based on the Development Frameworks as outlined by the NEDA and present development concerns of the Provincial Government of Ilocos Norte (PGIN), in its growth pattern and direction, e.g., agro-industrial development, environmental considerations, tourism development, peace and order maintenance and poverty alleviation. As the basic strategy, the development plans have identified pipeline projects under the Northwestern Luzon Quadrangle (NWLQA) and the completed and ongoing projects of the PGIN and the National Line Agencies as anchor projects.

The NWLQA master plan has identified a number of key development thrusts for Ilocos Norte and Laoag City; namely,

- (1) Development of the Currimaog Industrial Area (CIA).
- (2) Expansion of agro-processing through diversification of the produce treated at the North Food Corporation; development of a sweet potato processing industry; and establishment of garlic processing plants.
- (3) Expansion of existing tourism activities and facilities centered on the internationally recognized Fort Hucandia Resort Hotel in Laoag.
- (4) Development of a new tourism complex at Pagudpud.
- (5) Support transport, power, flood control and irrigation infrastructure projects.

The Major Project List provided by the PGIN in 1996 is shown in Table A.8.1. The priority projects related to the development of Laoag River Basin are:

- (1) Philippine Forest Development Program in Ilocos Norte;
- (2) Laoag River Basin Development (sabo and flood control); and
- (3) Ilocos Norte Irrigation Project (Stage II).

8.2 Related Infrastructure Development in the Past

8.2.1 Irrigation Development

(1) Irrigation System

Five (5) national irrigation systems (NIS) and the Ilocos Norte Irrigation Project, Phase I take irrigation water from the Laoag River or its tributaries. The service area of these 6 irrigation systems is 11,835 ha. The other area irrigated by NIS is the Laoag-Vintar RIS service area, which covers part of Laoag City and Sarrat but served

by the Vintar River. The service area of this RIS in the Laoag River Basin is estimated at 370 ha. A total of 12,205 ha is irrigated by NIS, which is about 50% of the lowland cultivated area in the Laoag River Basin. Another area of about 5,100 ha or 21% is irrigated by about 210 communal irrigation systems. Another 7,300 ha or 30% is rainfed cropping area.

Recently, farmers in advanced agricultural areas of Laoag City, San Nicolas and Dingras have been using privately owned shallow wells and portable pumps in the irrigation of diversified crop and supplemental dry season rice. This enables for an intensified crop management for good yields and a reduction in irrigation service area.

The system profile of NIS is summarized in Table A.8.2 and locations are shown in Fig. A.8.1.

(2) Ilocos Norte Irrigation Project, Phase I (INIP, Phase I)

The Ilocos Norte Irrigation Project was formulated by the NIA under the name of Palsiguan River Multipurpose Project in 1977. The JICA dispatched a preliminary survey team to Ilocos Norte and recommended the phasing of the project. The JICA Study Team carried out the F/S for Phase I and II in 1978 and 1980, respectively.

The Phase I project covers about 10,200 ha of the irrigation service area on the alluvial fans located at the right bank of Bongo River. Phase I consists of the construction of five (5) diversion dams in the Labugaon, Solsona, Madongan, Papa and Nueva Era rivers, 45 km of link roads connecting these diversion dams, and main and lateral irrigation canals and drainage. The irrigation service area is 9,212 ha as of 1996.

The Phase II project consists of the Palsiguan Multipurpose Dam in Palsiguan River in Abra Province and the transbasin transfer of the water to the Nueva Era Regulating Dam considering 42.8 MW of hydraulic power generation, irrigation for 12,400 ha of new areas and supplemental water for Phase I service area in dry season. (Phase II is not yet implemented.)

The construction of INIP, Phase I started in 1981 under the financial assistance of OECF Loan PH-P45. During the implementation of the INIP, Phase I, a series of floods since 1984 caused considerable damage to the service areas and irrigation facilities. The construction of five (5) diversion dams were accomplished in early 1986 after remedial measures were taken against damages brought during the construction stage by typhoons Maring and Kuring.

After the project was inaugurated in June 1986, three successive typhoons (Gading, Hiang and Miding) attacked the project area and inflicted considerable damages to the completed irrigation facilities. The repair and additional works were carried out until the end of 1989 with approval of OECF. Road networks in the project area were also damaged. Major roads improved under the OECF Loan were also damaged at river/drainage crossings.

The NIA perceived the necessity of providing effective flood control measures to protect the restored structures and the service area from floods. The Urgent Disaster Prevention Works (UDPW) using the balance of OECF Loan PH-P45 was executed from 1991 to 1993. The UDPW was the first step of flood protection in this area. A total of 26.9 km of low-flow channels were dredged and 44.67 km of levees were constructed on both sides of the Solsona, Madongan and Papa rivers.

The UDPW was an initial and temporary provision as flood control works. As reported, Typhoon Gloring inflicted further damage or washed out some portions of levees and structures constructed under the UDPW in July 1996.

The study and implementation of the Sabo and Flood Control Project in the Laoag River Basin will contribute to the safety of the INIP area and generate savings in repair cost of irrigation and road facilities. Under the UDPW the supposed benefits are the following:

- (a) No damage to irrigation facilities by floods;
- (b) Mitigation of damages to diversion dams;
- (c) No loss or washout of irrigated lands by floods; and
- (d) Increase of farmer's investment for cropping due to lesser losses from floods.

8.2.2 Rural Road Development

(1) Existing Road Networks

The road to population ratio (7.23 kilometers per 1,000 population) of Ilocos Norte is significantly higher than the regional average of 3.44 and the national average of 2.59. The road density of the Province is 0.98 km/km² of total area and 2.30 km/km² of arable land. These figures are slightly higher than the regional and national ratio (0.98 and 1.55 km/km² and 0.54 and 1.14 km/km², respectively). However, the ratio of concrete or asphalt pavement is slightly less than the regional and national levels. The paved ratio of the province is 14.2% and the regional and national ones are 17.0% and 16.6%, respectively.

About 62% of the roads in the province are barangay roads and only 2% of that are paved with concrete or asphalt. Concrete paved barangay roads are short in length and located near housing clusters, which are used not only for traffic but also for sun-drying of agricultural products. Provincial roads are 422.1 km or about 12.6% of the total road length, but the inventory list of provincial roads as of 1996 which was compiled by the Provincial Engineer's Office shows 606.33 km long provincial roads. About 180 km of barangay roads may be converted to provincial roads under the decentralization of local governance. (refer to Table A.8.3)

The road networks in Laoag River Basin are listed in Table A.8.5 and the estimated road length and density in each municipality are shown in Table A.8.4. The road network in the Laoag River Basin is summarized as follows:

(a) National Roads

The Manila North Road traverses the province from south to north along the coastal line. The Manila North Road crosses the downstream of Laoag River at Laoag City. From this Manila North Road, five (5) national roads, namely the Laoag-Sarrat Road, the Ilocos Norte-Apayao Road, the Laoag Airport Road, the Batac-Espiritu Road and the Sarrat Junction-Pinili-Nueva Era Road branch out to enter the Laoag River Basin. Other national roads, namely the Laoag-Sarrat-Piddig-Solsona Road, the Ilocos Norte-Abra Road and the Laoag-Paoay-Balacad Road are connected to the above-mentioned five national roads. These national roads consist the main road networks in the Laoag River Basin and are maintained in good all-weather condition. (see Fig. A.8.2). The total length of national roads is 128.90 km and the density is 0.20 km/km² for arable land. The Ilocos Norte-Apayao Road and the Ilocos Norte-Abra Road extend to other provinces such as Apayao and Abra at the east and south boundaries of the river basin, but they are not yet fully opened to traffic and not yet paved.

(b) Provincial/City Roads

The provincial and city roads of Laoag City are connected to national roads and major barangays. The total length of provincial/city roads is about 237 km and the density is 0.38 km/km² for arable land.

(c) Municipal/City Streets

The total length of municipal/city streets is about 127 km and the density is 0.20 km/km². Almost all of these roads are paved.

(d) Barangay Roads

Barangay roads connect upper class roads and clusters of housing or farm lands. Total length of 1,297.83 km in the river basin are compiled based on the inventory lists of municipalities and Laoag City. This total length includes the registered and unregistered barangay roads; therefore, the road density is quite high and is 2.5 times the national average.

(2) Road Developments in the Past

The Laoag Alacapan Road Project connects two main road arteries of Northern Luzon, namely; the Manila North Road at Laoag City and the Cagayan Valley Road at Magapit, Lallo, Cagayan. The road has a total length of 213.5 km which is paved with concrete and asphalt.

The Ilocos Norte Rural Road Improvement Project, a component of the Ilocos Norte Rural Development Project was implemented under the OECF. The project involved the construction of three (3) secondary national roads and thirty (30) barangay roads with aggregate length of 66 km and 253 km, respectively.

There was another foreign assisted project, The Rural Roads Development Program II under the Ministry of Local Governments with assistance from the World Bank. The project included two networks, each comprising several separate lines and feeder roads totaling some 67.1 km located in Bacarra and Pasuquin and one independent project to serve the municipality of Adams.

These projects were completed in the 1980's. There is no ongoing project except the maintenance of existing roads funded under administrative budget.

Among the above mentioned projects, the Project involving the Laoag River Basin area is the Ilocos Norte Rural Road Improvement Project. The other related projects in the river basin are the rehabilitation of the Ilocos Norte-Apayao Road, the extension of the Ilocos Norte-Abra Road and the road component of the Ilocos Norte Irrigation Project, Phase I.

(a) Ilocos Norte Rural Road Improvement Project

The construction of three (3) secondary national roads connecting municipal poblacions between Piddig - Solsona, Batac - Espiritu and Pinili - Nueva Era, and one provincial road between Vintar - Piddig were undertaken in the Laoag River Basin. The total length of these roads is 33.5 km. These roads except the stretch of mountain area of Batac-Espiritu Road are well maintained.

Ten barangay roads among the 30 barangay road improvements are located in the river basin. Some structures crossing the rivers were damaged by several floods.

(b) Rehabilitation of Ilocos Norte - Apayao Road

In the early 1980's, road extension constructed from the Solsona nursery site (KM528) to the provincial boundary (KM574) was about 46 km in length. This

road was utilized as access for the logging activities in the forest area near the boundary of the province. The road was abandoned in the late 1980's until 1994 due to the total logging ban and the peace and order situation. In 1995, rehabilitation works on the road was started under the "pakyaw contract system" to remove soil deposits on the road surface caused by side slope sliding and also to repair the drainage. Another work which was simultaneously executed under a local minor contract is the pavement of the road surface about 10 km long from Solsona Poblacion to the mountain road entrance. Re-opening of the road was accomplished up to KM536 in the dry season in 1996 and the works will continue up to the provincial boundary.

(c) Extension of Ilocos Norte - Abra Road

In 1989, about 47 km of the road from the Nueva Era poblacion up to the provincial boundary of Abra Province was opened. The periodical maintenance work on the road is implemented under the forced account work or the "pakyaw" contract system. The road, however, is not totally opened. The construction of about 2 km on the Abra side was suspended due to environmental problems on the natural forest zone.

(d) Link Road of Ilocos Norte Irrigation Project, Phase I

Construction of the Ilocos Norte Irrigation Project, Phase I (initially named as the Palsiguan River Multi-Purpose Project) was started in 1981 and major irrigation structures were completed in 1987. The project irrigates about 10,000 ha of cropping area in the alluvial fans formed by five tributaries of the Laoag River. Five diversion dams were constructed to intake irrigation water at the fan apex of these tributaries. For the construction and maintenance of irrigation facilities, NIA improved about 38 km of the barangay roads linking these five diversion dams. These link roads were turned over to each barangay. These roads are now used as barangay roads or provincial roads, but they are not well maintained due to insufficient budget and deterioration of some stretches of roads.

(3) Condition of Roads in Laoag River Basin

The national roads except Batac - Espiritu Road in the river basin are well maintained and passable in all weather conditions. The Batac - Espiritu Road is now passable, but the 9.3 km stretch on the mountain side is still narrow (about 4 meters) with gravel surfacing and is difficult to negotiate in rainy season. About 60 m of the abutment of Bagbag Bridge II of Piddig-Solsona Road was washed away during Typhoon Gloring in July 1996.

As explained in Section 8.2.2, about 180 km of barangay roads were converted to provincial roads in the 1990's. About 60% of these converted roads are located in the area of alluvial fans situated at the right bank of Bongo River, and administered by the municipalities of Solsona, Dingras, Marcos and Banna. The condition of these roads is still the same as barangay roads, with narrow width and earth surface. Other provincial roads are relatively well maintained.

Road network connection in the downstream areas of the river basin such as Laoag City, San Nicolas, Sarrat and western Piddig are relatively well linked to each other. However, the road network in eastern Piddig which is the valley of Guisit River, and in the alluvial fan areas which are formed by the tributaries such as Cura - Labugaon, Solsona, Madongan, Papa and Bongo, are not linked to each other. The roads in these areas are disconnected at the points of river/creek crossing in the alluvial fans due to yearly flooding which occasionally change their width and course. Many bridges and drainage structures constructed in these areas have been washed away or damaged.

Traffic, therefore, is very difficult and isolated during flood season. These conditions give negative impacts to the marketing of products and, social and health care services and communications. Fig. A.8.3 shows the critical places of roads affected by floods.

All-weather roads and bridges traversing the alluvial fan areas and connecting the major barangays shall be provided to maintain traffic and strengthen the socio-economic activities.

8.3 Prospective Infrastructure Developments

8.3.1 Ilocos Norte Irrigation Project, Phase II (INIP, Phase II)

The INIP, Phase II has the following components:

- (1) Construction of the Palsiguan Multipurpose Dam in the Palsiguan River in Abra Province;
- (2) Transbasin transfer of the water to the Nueva Era Regulating Dam by 6.15 km Headrace Tunnel;
- (3) Construction of the Bonga and Nueva Era power stations with a total of 42.8 MW of hydraulic power generation;
- (4) Construction of Nueva Era Regulating Dam 850 m upstream of the existing diversion dam;
- (5) Construction of the Link Canal connecting the five (5) existing diversion dams to supplement the water to the INIP, Phase I area in dry season;
- (6) Construction of 460 km of irrigation and drainage canals to serve 12,400 ha of new irrigable areas located in the municipalities of Solsona and Piddig at the northern area of Phase-I service area, the municipalities of Nueva Era, Pinili, Batac, Paoay and Badoc in Ilocos Norte, and Sinait in Ilocos Sur; and
- (7) Construction of the Madupayas and Tibangran diversion dams to catch the available water from tributaries of Badoc River.

The facilities directly related to the flood control project are (1) the Nueva Era Regulating Dam and (2) Siphons of the Link Canal crossing Papa, Madongan, Solsona and Cura rivers. The design of these siphons shall be properly coordinated with the plan and design of the flood control project.

The downstream area on the right bank of Cura River is to be served by INIP Phase II. This area is presently irrigated by some communal irrigation systems taking water from creeks in the area, but originates from Cura River. In the design of flood control, the existing intake point shall be considered temporarily until such time that INIP Phase II is completed.

8.3.2 Road and Bridge Projects

According to the information from the Municipality of Sarrat, the LGU is requesting bridges crossing the Laoag River at two points: one is a bridge connecting the poblacion and the opposite bank to the Ilocos Norte - Apayao National Road, and another is a bridge connecting both national roads of the left and right banks at the boundary near Dingras. These proposals are in the stage of preliminary consideration by DPWH.

There are no other proposals for road and bridge projects. However, in consideration of the present traffic condition in the alluvial fan areas which are occasionally affected by floods, the following projects are deemed necessary to provide all-weather traffic and strengthen the socio-economic condition of these areas:

- (1) Widening and improvement of provincial and/or barangay roads, including the construction of bridges, traversely connecting the area between the poblacion of Solsona and Nueva Era; and
- (2) Repair and extension of the abandoned Marcos Bridge at Bongo River.

CHAPTER IX LAND USE

9.1 Existing Land Use

The total area of Laoag River Basin is 1,332.1 km² occupying 39.2% of the total land area of Ilocos Norte Province. The existing land use is primarily agriculture in flat lands and forest reserve or reforestation at hilly and mountainous areas. Urban areas extend down to Laoag City, capital of the Province, and at the poblacions of municipalities.

(1) Land Use Classification by Municipality

Table A.9.1 shows the existing land use classification of each municipality categorized as Built-up Areas consisting of residential, commercial and institutional, Agricultural Areas, Forest Areas and Other Use such as industrial, road, bodies of water and bare land, etc. The data was obtained from the Provincial Planning and Development Office (PPDO).

The total area of Laoag City and the ten municipalities which comprise the Laoag River Basin is 211,432 ha, which is 78,222 ha larger than the total drainage area of the basin itself. Laoag City, Nueva Era and Carasi have areas in/out of the river basin. Four barangays of Vintar of about 2,430 ha (4.7% of the total area of the municipality) are located in the river basin.

More than 50% of lands in Laoag City and the municipalities of Sarrat, Dingras and Banna are used for agricultural production. On the other hand, forest areas in Nueva Era, Carasi and Vintar share more than 85% of their land areas.

Areas occupied by bodies of water and rivers within the above-mentioned municipalities accounted for around 5.6% of the total area which is relatively higher than the provincial average of 4.0%.

(2) Land Use Classification by Drainage Block

The river basin was subdivided into 24 drainage blocks in accordance with the hydrological requirement. The results are shown in Table A.9.2. The land was classified into: (1) the Mountainous Area, (2) the Riverbed Area, and (3) the Lowland area. The Mountainous Area is defined as land with more than 3% slope and the flat or gently sloping land on the top of a hill which are usually used for upland crop cultivation or tree crops. The cropping land located in the inner valley of tributaries such as Magalis Creek and Lubong River which are draining into the left bank of Bongo River are also included in the Mountainous Area because these areas are not flood prone areas.

The Riverbed Area is defined as the channels of river and the land periodically flooded. The Lowland Area includes the cultivated cropland, residential area, tree-planted area, brush/grass land, river wash area and the area used for roads/canals and creeks. These areas are generally flat with less than 3% slope. A total of 33,900 ha of the Lowland Area is the beneficial area of this project. These lowland areas including some portions of riverbeds will be subject to the future land use planning. Fig. A.9.1 shows the Existing Land Use.

The river wash area in this classification are the areas of old river channels or lands where flood occasionally flows. Present land feature of river wash areas are bare land covered by deposit of boulders, gravel and sand or covered by vegetation of shrubs and grass.

9.2 Land Loss by Floods in the Past

Land loss by floods in the alluvial fan areas of Bongo River and tributaries is determined by comparing the 1975 and the new 1996 aerial-photos.

It is estimated that about 1,130 ha of cultivated lands were washed away during the last 20 years (1975 to 1995). Fig. A.9.2 shows the location of these areas. The land losses concentrated on the areas along the Cura/Labugaon, Solsona and Madongan rivers. These land losses are supposed to have been caused by the recent floods. On the other hand, about 211 ha of river wash area were recovered into cultivated lands through the efforts of the farmers. These recovered areas are located along old flood channels in the left bank of Madongan River. If river wash areas do not totally loss soil or not covered by sediment deposits these areas can still be recovered as cultivable lands.

Table A.9.3 shows the cultivated lands washed away during 1975 to 1995 and the recovered cultivated lands.

9.3 Future Land Use

9.3.1 Provincial Land Use Plan

The Provincial Planning and Development Office prepared the Comprehensive Land Use Plan of the Province in early 1996. The plan seeks to address development concerns on the growth pattern and direction of the province towards agro-industrial development, tourism, environmental protection and preservation, provision of a peaceful and healthy atmosphere, and poverty alleviation.

The development direction is linked to the National and Regional Development Frameworks and the present development concerns of the Provincial Government of Ilocos Norte (PGIN). As a basic strategy, the Plan has identified pipeline projects under the Northwestern Luzon Growth Quadrangle (NWLGG) and the completed and ongoing projects of the PGIN and the National Agencies.

The plan categorized the province into four (4) Sub-Integrated Area Development (SIAD) based on the Regional Physical Framework Plan prepared by the Regional Land Use Committee-Technical Working Group under the AUSAID-Supported Assistance, and delineated the province as an Integrated Area Development (IAD). SIAD categories are as follows:

- (1) SIAD I-A: Bangui, Adams, Burgos, Dumalneg, Pagudpud and Pasuquin (6 municipalities)
- (2) SIAD I-B: Laoag City, Bacarra, Carasi, Piddig, Sarrat and Vintar (One city and 5 municipalities)
- (3) SIAD II-A: Batac, Badoc, Currimaog, Paoay, Pinili and San Nicolas (6 municipalities)
- (4) SIAD II-B: Dingras, Banna (Espiritu), Marcos, Nueva Era and Solsona (5 municipalities)

The area of Laoag River Basin is covered by SIAD I-B, SIAD II-B and San Nicolas of SIAD II-A. Development thrusts of SIAD I-B are agro-industrial and tourism development as a cluster of central towns and those of SIAD II-B are agro-forestry development.

Table A.9.4 shows the Existing and Proposed Land Use by Land Classification. The proposed land use in the Plan directs the provincial land use development in terms of:

- (1) the expansion of built-up area along major road networks for the residential, commercial and institutional purposes;
- (2) utilization of grassland and pasture as the agriculturally productive area;
- (3) development of sand dune and beach sand area; and
- (4) drastic reduction of bare land such as rocky/coral, river wash, and barren/idle land by proper development.

The Plan, however, noted that the Provincial Land Use Committee (PLUC) was confronted with difficulties in the plan preparation particularly in data gathering and base maps preparation/scaling on land classification. The committee said that these problems were compounded by the lack of sufficient and relevant data from the LGUs. The most problematic points were the issues on land boundaries which were questioned by the affected municipalities due to incomplete cadastral land surveys. The Plan, therefore, specifically set the direction for proper land utilization and not to establish official land boundaries of the municipalities.

9.3.2 Future Land Use in Laoag River Basin

The sediment and flood control works under this project will provide the mitigation of possible disasters on the flood prone areas in the basin.

Economic activities will intensify, since fear of flood inundation which damages properties and investments will be relieved. The built-up area including residential and industrial zones will be expanded along the major roads, complying with the provincial land use plan. Farmers will introduce high yield crops with proper input of fertilizer and chemicals for more income.

The conversion of lands in the built-up area will not be so much. Most large scale conversion of lands is expected on the riverside. The construction of flood protection dikes will provide some idle but usable lands between its alignment and the existing agricultural lands and also in a river wash area divided from river channel at the alluvial fan.

The Comprehensive Land Use Plan of the Province, 1996, proposes to reduce the existing river wash area of 5,126 ha to 480 ha and the existing barren/idle land of 5,090 ha to 269 ha in the whole province. Large reduction of the river wash area and barren/idle lands is also expected in Laoag River Basin, but the sediment and flood control works will be very helpful to the said reduction.

In the land use analysis of the Laoag River Basin, the existing river wash area of 2,350 ha and brush/grass land of 1,337ha were identified. These areas are presently under rough utilization for grazing of cattle and goats, but will be convertible to agriculturally productive areas when protected from floods.

To identify the convertible area from the river wash area, brush/grass land and riverbed to agriculturally productive area, the alluvial fan areas of the Papa, Madongan, Solsona and Cura/Labugaon Rivers were selected since these rivers are given high priority in the implementation of sediment and flood control works. These areas are categorized into five types, based on soil conditions, topography and slope, availability of irrigation water, etc.:

- (1) Not Usable Lands: Lands having a slope of about 1/100 or more which are located near the apex of alluvial fans and along existing flood flow channels. The lands are bare, almost armored by boulders and cobbles. Sediment of sand and silt are few, therefore, vegetation is also much less.
- (2) Available Lands for Grazing (A): Lands having a slope of about 1/100 or more formed by relatively old flood channels. Some areas of these lands are covered by sedimentary sand and silt with vegetation of grass and shrubs. Possible grasslands for grazing are estimated at 20% of total area.

- (3) Available Lands for Grazing (B): Lands having a slope of about 1/100 to 1/150 which are complexly covered by boulders, cobbles, gravel, sand and silt. Some areas of these lands are covered by vegetation of grass and shrubs. Possible grasslands for grazing are estimated at 60% of the total area.
- (4) Available Lands for Upland Crop Cultivation: Lands having a slope of less than 1/150. Surface of land is covered by sand and gravel. The areas are difficult to irrigate.
- (5) Available Lands for Paddy Cultivation: Lands having a slope of less than 1/150. Surface of lands are covered by sand and silt but possible for rice cultivation if the required minor land leveling and/or removing of some gravel is done. The areas are irrigable.

Table A.9.5 and Fig. A.9.2 show the expected convertible areas for agricultural production in alluvial fan areas. About 1,800 ha out of a total 3,100 ha of river wash areas or riverbeds will be converted to agriculturally productive areas for grazing (B), upland cropping and paddy cultivation. About 300 ha of land will be used as roads, canals and creeks for drainage.

The productivity of these lands are estimated as follows:

(1) Available Lands for Grazing (A)

Grazing of about 750 ha will be available at a scale of 15 ha per head for cattle breeding on the following assumptions:

- (a) Productivity of grass = 6 ton/ha/year \times 20% = 1,200 kg/ha/year
- (b) Required grass per head of cattle (400 kg body weight) = 40 kg/day
- (c) Efficiency of grass feeding = 85%
- (d) Available feeding days per head of cattle = $1,200 \text{ kg} \times 0.85 / 40 \text{ kg} = 25 \text{ days/head/ha}$
- (e) Required grazing (A) area per head of cattle = $365 \text{ days} / 25 \text{ days/ha} = 15 \text{ ha per head}$
- (f) This size of grazing is similar to the existing land use for grazing, therefore, no increase in productivity will be expected in the area for grazing (A).

(2) Available Lands for Grazing (B)

Grazing of about 820 ha will be available at a scale of 5 ha per head for cattle breeding on the following assumptions:

- (a) Productivity of grass = 6 ton/ha/year \times 60% = 3,600 kg/ha/year
- (b) Required grass per head of cattle (400 kg body weight) = 40 kg/day
- (c) Efficiency of grass feeding = 85%
- (d) Available feeding days per head of cattle = $3,600 \text{ kg} \times 0.85 / 40 \text{ kg} = 77 \text{ days/head/ha}$
- (e) Required grazing (A) area per head of cattle = $365 \text{ days} / 77 \text{ days/ha} = 5 \text{ ha per head}$
- (f) This size of grazing would be three times that of the existing grazing, therefore, the increase in productivity in the area of grazing (B) will be 2 heads of cattle per 15 ha and about 110 heads of cattle ($820 \text{ ha} / 15 \text{ ha} \times 2 \text{ heads/ha}$) in total.

(3) Available Lands for Upland Crop Cultivation

A total of 512 ha of available land for upland crops are expected to be cultivated for corn, legumes and vegetables. Estimated production in this area is 375 tons of corn in about 30% of the area (150 ha × 2.5 ton/ha), 150 tons of legumes (150 ha × 1.0 ton/ha) in also about 30% of the area, and 1,060 tons of vegetables (212ha × 5 tons/ha) in the remaining area.

(4) Available Lands for Rice Cultivation

A total of 501 ha of available land for rice cultivation is expected to produce about 1,500 tons of palay annually. The land requires minor land leveling and removal of gravel from paddy areas. Soil is not fertile and abundant irrigation water is remote so that the expected yield of palay is estimated only at a maximum of 3.0 ton/ha.

9.3.3 Land Use Development

As mentioned above, about 1,800 ha of the river wash areas and some portions of riverbed and brush/grass lands can be converted into agriculturally productive areas when the sediment and flood control works are implemented. The development of these areas is not the subject of the Project, but will potentially benefit from the Project. The investment for the land use development shall be taken from other financial sources, if required.

It is expected that these lands will be gradually developed by the farmers, if they can be assured of safety from floods. The land use development of these areas will expand every year, and full development is expected within 10 years.

TABLES

Table A.2.1 Census Population: 1970, 1980, 1990 and 1995

Province City/Municipality	Census Population (1000)				Average Annual Growth Rate (%)			
	1970	1980	1990	1995	'70-'80	'80-'90	'90-'95	'70-'95
Philippines	36,684.5	48,317.0	60,559.1	68,349.5	2.79	2.28	2.45	2.52
Region I	2,488.4	2,922.9	3,547.3	3,791.7	1.62	1.95	1.34	1.70
Ilocos Norte Province	343.4	390.7	460.7	482.7	1.30	1.66	0.94	1.37
Laoag River Basin *1	189.7	218.8	259.7	271.0	1.44	1.73	0.85	1.44
- Laoag City	61.7	69.7	83.2	87.8	1.22	1.79	1.07	1.42
- San Nicolas	20.2	23.4	27.6	29.0	1.48	1.68	0.98	1.46
- Sarrat	16.8	18.8	21.3	21.3	1.10	1.24	0.02	0.94
- Dingras	22.8	26.5	30.5	31.5	1.54	1.42	0.63	1.31
- Solsona	12.8	14.7	18.9	19.7	1.41	2.51	0.82	1.73
- Piddig	13.1	14.8	17.1	17.8	1.24	1.45	0.84	1.24
- Marcos	7.4	10.3	13.0	13.7	3.36	2.31	1.11	2.49
- Banna (Espiritu)	11.7	12.9	15.3	16.0	1.00	1.76	0.81	1.26
- Nueva Era	3.4	3.9	5.2	6.2	1.41	2.91	3.52	2.43
- Carasi	0.3	0.4	0.6	0.8	2.16	4.15	3.48	3.22
- Vintar	19.5	23.4	27.1	27.4	1.84	1.48	0.26	1.38

Source: (1) 1990 Census of Population and Housing, NSO

(2) 1995 Census of Population and Housing, NSO

Note: *1 A total figure of a city and ten municipalities involved in the basin.

Table A.2.2(1) Census Population and Labor Force in the Philippines, Region I, Ilocos Norte Province, Laoag River Basin and Municipalities Involved: 1970, 1980 and 1990

Item	Census Population (Thousand)			Percentage Distribution (%)			Average Annual Growth Rate (%)	
	1970	1980	1990	1970	1980	1990	'70-'80	'80-'90
Philippines								
01. Population	36,684	48,317	60,559	100.0	100.0	100.0	2.79	2.28
02. Urban	11,678	18,025	29,440	31.8	37.3	48.6	4.44	5.03
03. Rural	25,066	30,292	31,119	68.3	62.7	51.4	1.91	0.27
04. 15 Years & Over	29,928	28,003	36,572	81.6	58.0	60.4	-	2.71
05. Labor Force	11,679	15,140	21,107	31.8	31.3	34.9	2.63	3.38
06. Labor Participation Rate	39.0%	54.1%	57.7%	-	-	-	-	-
07. Employed	10,737	14,184	19,318	29.3	29.4	31.9	2.82	3.14
08. Employment Rate	91.9%	93.7%	91.5%	-	-	-	-	-
09. Unemployment	942	956	1,788	2.6	2.0	3.0	0.15	6.46
10. Unemployment Rate	8.1%	6.3%	8.5%	-	-	-	-	-
Region I								
01. Population	2,488	2,923	3,547	724.6	748.2	770.0	1.62	1.95
02. Urban	466	693	1,339	135.8	177.5	290.7	4.05	6.80
03. Rural	2,022	2,229	2,208	588.8	570.7	479.3	0.98	-0.10
04. 15 Years & Over	1,397	1,884	2,198	406.9	482.2	477.2	-	1.56
05. Labor Force	-	-	1,171	-	-	254.1	-	*2
06. Labor Participation Rate	-	-	53.2%	-	-	-	-	-
07. Employed	693	788	1,041	201.8	201.6	226.0	1.29	2.83
08. Employment Rate	-	-	88.9%	-	-	-	-	-
09. Unemployed	-	-	129	-	-	28.1	-	*2
10. Unemployment Rate	-	-	11.1%	-	-	-	-	-
Ilocos Norte Province								
01. Population	343.4	390.7	460.7	100.0	100.0	100.0	1.30	1.66
02. Urban	83.0	108.6	130.6	24.2	27.3	28.3	2.73	1.86
03. Rural	260.4	282.0	330.1	75.8	72.2	71.7	0.80	1.59
04. 15 Years & Over	213.8	243.8	299.2	62.2	62.4	65.0	-	2.07
05. Labor Force	109.5	-	169.9	31.9	-	34.9	-	1.94 *2
06. Labor Participation Rate	51.2%	-	53.8%	-	-	-	-	-
07. Employed	100.2	109.1	149.4	29.2	27.9	32.4	0.86	3.19
08. Employment Rate	91.5%	-	92.8%	-	-	-	-	-
09. Unemployed	9.3	-	11.5	2.7	-	2.5	-	1.08 *2
10. Unemployment Rate	8.5%	-	7.2%	-	-	-	-	-
Laoag River Basin *1								
01. Population	189.7	218.8	259.7	55.2	56.0	56.4	1.44	1.73
02. Urban	64.3	65.5	82.7	18.7	16.8	17.9	0.19	2.35
03. Rural	125.4	149.1	172.6	36.5	38.2	37.5	1.74	1.48
04. 15 Years & Over	116.1	113.1	168.7	33.8	28.9	36.6	-	4.08
05. Labor Force	59.7	-	87.8	17.4	-	19.1	-	1.95 *2
06. Labor Participation Rate	51.4%	-	52.1%	-	-	-	-	-
07. Employed	54.2	-	82.5	15.8	-	17.9	-	-
08. Employment Rate	90.8%	-	93.9%	-	-	-	-	-
09. Unemployed	5.5	-	5.4	1.6	-	1.2	-	-0.12 *2
10. Unemployment Rate	9.2%	-	6.1%	-	-	-	-	-

Source: (1) 1970, 1980 and 1990 Census of Population and Housing, Philippines (NSO)

(2) 1970, 1980 1990 Census of Population and Housing, Ilocos Norte (NSO)

Note: *1 The total of a city and ten municipalities involved in the Laoag River Basin.

*2 An average annual growth rate between 1970 and 1990

Table A.2.2(2) Census Population and Labor Force in the Philippines, Region I, Ilocos Norte Province, Laoag River Basin and Municipalities Involved: 1970, 1980 and 1990

Item	Census Population (Thousand)			Percentage Distribution (%)			Average Annual Growth Rate (%)	
	1970	1980	1990	1970	1980	1990	'70-'80	'80-'90
Laoag City								
01. Population	61.7	69.7	83.2	100.0	100.0	100.0	1.22	1.79
02. Urban	30.2	32.4	38.4	48.9	46.4	46.1	0.69	1.72
03. Rural	31.5	37.3	44.8	51.1	53.6	53.9	1.71	1.85
04. 15 Years & Over	38.4	21.5	55.3	62.2	30.8	66.5	-5.65	9.93
05. Labor Force	17.1	-	29.0	27.7	-	34.8	-	2.67 *
06. Labor Participation Rate	44.6%	-	52.3%	-	-	-	-	-
07. Employed	16.0	-	27.3	25.9	-	32.8	-	2.70 *
08. Employment Rate	93.4%	-	94.1%	-	-	-	-	-
09. Unemployed	1.1	-	1.7	1.8	-	2.1	-	2.12 *
10. Unemployment Rate	6.6%	-	5.9%	-	-	-	-	-
San Nicolas								
01. Population	20.2	23.4	27.6	100.0	100.0	100.0	1.48	1.68
02. Urban	11.6	14.4	18.8	57.2	61.8	68.0	2.26	2.65
03. Rural	8.6	8.9	8.8	42.8	38.2	32.0	0.35	-0.10
04. 15 Years & Over	12.3	14.5	18.1	60.9	62.1	65.6	1.68	2.23
05. Labor Force	6.5	-	9.2	32.2	-	33.2	-	1.74 *
06. Labor Participation Rate	52.9%	-	50.6%	-	-	-	-	-
07. Employed	5.7	-	8.8	28.0	-	31.8	-	2.23 *
08. Employment Rate	87.0%	-	95.8%	-	-	-	-	-
09. Unemployed	0.8	-	0.4	4.2	-	1.4	-	-3.84 *
10. Unemployment Rate	13.0%	-	4.2%	-	-	-	-	-
Sarrat								
01. Population	16.8	18.8	21.3	100.0	100.0	100.0	1.10	1.24
02. Urban	4.5	4.7	6.9	26.9	25.2	32.6	0.43	3.91
03. Rural	12.3	14.1	14.3	73.1	74.8	67.4	-	-
04. 15 Years & Over	10.5	11.7	14.3	62.5	62.3	67.2	-	2.02
05. Labor Force	5.0	-	6.7	29.5	-	31.5	-	1.51 *
06. Labor Participation Rate	47.2%	-	46.9%	-	-	-	-	-
07. Employed	4.2	-	6.3	24.7	-	29.4	-	2.07 *
08. Employment Rate	83.5%	-	93.3%	-	-	-	-	-
09. Unemployed	0.8	-	0.4	4.9	-	2.1	-	-2.95 *
10. Unemployment Rate	16.5%	-	6.7%	-	-	-	-	-
Dingras								
01. Population	22.8	26.5	30.5	100.0	100.0	100.0	1.54	1.42
02. Urban	4.8	5.4	5.8	-	20.5	19.0	1.18	0.67
03. Rural	17.9	21.1	24.7	-	79.5	81.0	1.64	1.60
04. 15 Years & Over	13.3	16.2	19.3	58.6	60.9	63.1	1.94	1.78
05. Labor Force	7.5	-	9.9	33.0	-	32.5	-	1.40 *
06. Labor Participation Rate	56.2%	-	51.4%	-	-	-	-	-
07. Employed	6.9	-	9.4	30.3	-	30.8	-	1.56 *
08. Employment Rate	92.0%	-	94.9%	-	-	-	-	-
09. Unemployed	0.6	-	0.5	2.7	-	1.7	-	-0.85 *
10. Unemployment Rate	8.0%	-	5.1%	-	-	-	-	-

Source: (1) 1970, 1980 and 1990 Census of Population and Housing, Philippines (NSO)

(2) 1970, 1980 1990 Census of Population and Housing, Ilocos Norte (NSO)

Note: * Average annual growth rate between 1970 and 1990

Table A.2.2(3) Census Population and Labor Force in the Philippines, Region I, Ilocos Norte Province, Laoag River Basin and Municipalities Involved: 1970, 1980 and 1990

Item	Census Population (Thousand)			Percentage Distribution (%)			Average Annual Growth Rate (%)	
	1970	1980	1990	1970	1980	1990	'70-'80	'80-'90
Solsona								
01. Population	12.8	14.7	18.9	100.0	100.0	100.0	1.41	2.51
02. Urban	2.3	2.4	3.0	17.9	16.3	15.9	0.50	2.21
03. Rural	10.5	12.3	15.9	82.1	83.7	84.1	1.60	2.56
04. 15 Years & Over	7.4	9.1	11.9	57.8	62.0	62.8	2.13	2.63
05. Labor Force	4.1	-	5.9	32.2	-	31.2	-	1.80 *
06. Labor Participation Rate	55.7%	-	49.7%	-	-	-	-	-
07. Employed	3.7	-	5.6	28.5	-	29.5	-	2.13 *
08. Employment Rate	88.6%	-	94.5%	-	-	-	-	-
09. Unemployed	0.5	-	0.3	3.7	-	1.7	-	-1.85 *
10. Unemployment Rate	11.4%	-	5.5%	-	-	-	-	-
Piddig								
01. Population	13.1	14.8	17.1	100.0	100.0	100.0	1.24	1.45
02. Urban	2.6	2.7	3.1	20.1	18.6	17.9	0.43	1.07
03. Rural	10.4	12.0	14.0	79.9	81.4	82.1	1.43	1.53
04. 15 Years & Over	8.0	9.2	11.1	61.0	62.4	65.0	1.47	1.87
05. Labor Force	4.4	-	6.1	33.4	-	36.0	-	1.71 *
06. Labor Participation Rate	54.9%	-	55.4%	-	-	-	-	-
07. Employed	4.0	-	5.4	30.8	-	31.5	-	1.45 *
08. Employment Rate	92.2%	-	87.5%	-	-	-	-	-
09. Unemployed	0.3	-	0.8	2.6	-	4.5	-	4.12 *
10. Unemployment Rate	7.8%	-	12.5%	-	-	-	-	-
Marcos								
01. Population	7.4	10.3	13.0	100.0	100.0	100.0	3.36	2.31
02. Urban	1.4	-	2.6	18.5	0.0	19.8	-	-
03. Rural	6.0	10.3	10.4	81.5	100.0	80.2	5.50	0.07
04. 15 Years & Over	5.5	6.0	8.0	74.6	58.4	61.4	0.87	2.82
05. Labor Force	3.7	-	4.2	49.4	-	32.1	-	0.65 *
06. Labor Participation Rate	66.2%	-	52.4%	-	-	-	-	-
07. Employed	3.2	-	4.1	42.7	-	31.6	-	1.29 *
08. Employment Rate	86.6%	-	98.3%	-	-	-	-	-
09. Unemployed	0.5	-	0.1	6.6	-	0.5	-	-9.22 *
10. Unemployment Rate	13.4%	-	1.7%	-	-	-	-	-
Banna(Espiritu)								
01. Population	11.7	12.9	15.3	100.0	100.0	100.0	1.00	1.76
02. Urban	2.5	2.7	3.0	21.8	20.6	19.8	0.43	1.36
03. Rural	9.1	10.2	12.3	78.2	79.4	80.2	1.15	1.86
04. 15 Years & Over	6.9	7.5	9.5	59.4	58.6	62.2	0.85	2.37
05. Labor Force	3.4	-	5.1	29.5	-	33.4	-	2.00 *
06. Labor Participation Rate	49.7%	-	53.7%	-	-	-	-	-
07. Employed	3.1	-	5.1	26.3	-	32.9	-	2.53 *
08. Employment Rate	89.0%	-	98.7%	-	-	-	-	-
09. Unemployed	0.4	-	0.1	3.3	-	0.4	-	-8.18 *
10. Unemployment Rate	11.0%	-	1.3%	-	-	-	-	-

Source: (1) 1970, 1980 and 1990 Census of Population and Housing, Philippines (NSO)

(2) 1970, 1980 1990 Census of Population and Housing, Ilocos Norte (NSO)

Note: * Average annual growth rate between 1970 and 1990

Table A.2.2(4) Census Population and Labor Force in the Philippines, Region I, Ilocos Norte Province, Laoag River Basin and Municipalities Involved: 1970, 1980 and 1990

Item	Census Population (Thousand)			Percentage Distribution (%)			Average Annual Growth Rate (%)	
	1970	1980	1990	1970	1980	1990	'70-'80	'80-'90
Nueva Era								
01. Population	3.4	3.9	5.2	100.0	100.0	100.0	1.41	2.91
02. Urban	0.6	0.8	1.1	18.8	19.4	21.9	1.71	4.15
03. Rural	2.8	3.2	4.1	81.2	80.6	78.1	1.34	2.59
04. 15 Years & Over	2.0	2.4	3.2	58.2	61.2	61.3	1.93	2.91
05. Labor Force	1.0	-	1.6	28.0	-	31.5	-	2.76 *
06. Labor Participation Rate	48.1%	-	51.4%	-	-	-	-	-
07. Employed	0.9	-	1.6	27.4	-	30.5	-	2.71 *
08. Employment Rate	97.8%	-	96.8%	-	-	-	-	-
09. Unemployed	0.0	-	0.1	0.6	-	1.0	-	4.64 *
10. Unemployment Rate	2.2%	-	3.2%	-	-	-	-	-
Carasi								
01. Population	0.3	0.4	0.6	100.0	100.0	100.0	2.16	4.15
02. Urban	-	-	-	0.0	0.0	0.0	-	-
03. Rural	0.3	0.4	0.6	100.0	100.0	100.0	2.16	4.15
04. 15 Years & Over	0.2	0.3	0.4	57.4	67.0	58.9	3.76	2.81
05. Labor Force	0.2	-	0.2	53.8	-	31.8	-	0.47 *
06. Labor Participation Rate	93.8%	-	54.0%	-	-	-	-	-
07. Employed	0.2	-	0.2	53.8	-	31.8	-	0.47 *
08. Employment Rate	100.0%	-	-	-	-	-	-	-
09. Unemployed	-	-	-	-	-	-	-	-
10. Unemployment Rate	0.0%	-	-	-	-	-	-	-
Vintar								
01. Population	19.5	23.4	27.1	100.0	100.0	100.0	1.84	1.48
02. Urban	3.7	4.2	4.5	19.0	18.1	16.6	-	-
03. Rural	15.8	19.1	22.6	81.0	81.9	83.4	1.96	1.66
04. 15 Years & Over	11.6	14.6	17.7	59.5	62.6	65.4	2.35	1.93
05. Labor Force	6.9	-	9.9	35.5	-	36.7	-	1.83 *
06. Labor Participation Rate	59.7%	-	56.1%	-	-	-	-	-
07. Employed	6.5	-	8.9	33.5	-	32.9	-	1.57 *
08. Employment Rate	91.2%	-	89.6%	-	-	-	-	-
09. Unemployed	0.4	-	1.0	2.1	-	3.8	-	4.84 *
10. Unemployment Rate	5.8%	-	10.4%	-	-	-	-	-

Source: (1) 1970, 1980 and 1990 Census of Population and Housing, Philippines (NSO)

(2) 1970, 1980 1990 Census of Population and Housing, Ilocos Norte (NSO)

Note: * Average annual growth rate between 1970 and 1990

Table A.2.3 Population Density and Average Family Size at 1995 Census

Province City/Municipality	1995 Census Population	Land Area (ha)	Density (Persons/ha)	Number of Households	Family Size (Persons/Family)
Ilocos Norte Province	482,651	339,934	1.42	99,653	4.84
Laoag River Basin *1	271,758	211,432	1.29	52,429	5.18
- Laoag City	88,336	10,751	8.22	14,227	6.21
- San Nicolas	29,083	4,930	5.90	6,113	4.76
- Sarrat	21,301	8,070	2.64	4,668	4.56
- Dingras	31,485	10,020	3.14	6,387	4.93
- Solsona	19,659	16,350	1.20	4,004	4.91
- Piddig	17,797	17,970	0.99	3,734	4.77
- Marcos	13,688	7,941	1.72	2,866	4.78
- Banna (Espiritu)	15,975	7,450	2.14	3,178	5.03
- Nueva Era	6,224	64,470	0.10	1,196	5.20
- Carasi	750	12,190	0.06	136	5.51
- Vintar	27,460	51,290	0.54	5,920	4.64

Source: (1) Ilocos Norte Profile 1995

(2) 1995 Census of Population and Housing, Ilocos Norte (NSO)

Note: *1 A total figure of a city and ten municipalities involved in the basin.

Table A.2.4 Number of Gainful Workers in 15 Years Old and Over by Sector

Item	Gainful Workers (1000)			Percentage Distribution (%)			Ave. Growth Rate(%)	
	1970	1980	1990	1970	1980	1990	'70-'80	'80-'90
Philippines	11,130	14,174	21,098	100.0	100.0	100.0	2.4	4.1
1. Agriculture	5,832	7,295	7,947	52.4	51.5	37.7	2.3	0.9
- Crop Production	5,400	6,513	-	48.5	45.9	-	1.9	-
- Fishery	354	708	-	3.2	5.0	-	7.2	-
- Others	78	74	-	0.7	0.5	-	-0.5	-
2. Industry	1,913	2,153	3,009	17.2	15.2	14.3	1.2	3.4
- Manufacturing	1,368	1,370	1,874	12.3	9.7	8.9	0.0	3.2
- Construction	460	635	936	4.1	4.5	4.4	3.3	4.0
- Others	86	149	199	0.8	1.0	0.9	5.7	3.0
3. Services	3,205	4,560	8,568	28.8	32.2	40.6	3.6	6.5
- Commerce	837	1,384	2,054	7.5	9.8	9.7	5.2	4.0
- Others	2,368	3,176	6,513	21.3	22.4	30.9	3.0	7.4
4. Not Described	179	166	1,575	1.6	1.2	7.5	-0.8	25.3
Ilocos Norte Province	99	109	149	100.0	100.0	100.0	1.0	3.2
1. Agriculture	62	69	77	62.5	63.6	51.3	1.2	1.0
- Crop Production	59	63	-	59.8	58.0	-	0.7	-
- Fishery	2	4	-	2.3	3.5	-	5.3	-
- Others	0	2	-	0.4	2.1	-	19.5	-
2. Industry	13	10	14	13.6	8.9	9.2	-3.1	3.5
- Manufacturing	8	5	7	8.3	4.2	4.4	-5.6	3.6
- Construction	5	4	6	4.6	3.9	4.1	-0.8	3.8
- Others	1	1	1	0.6	0.8	0.7	3.7	1.4
3. Services	22	28	55	22.1	25.4	36.5	2.4	7.0
- Commerce	5	5	11	5.4	4.6	7.3	-0.6	8.0
- Others	17	23	44	16.7	20.8	29.3	3.2	6.8
4. Not Described	2	2	4	1.8	2.1	2.9	2.6	6.7

Source: (1) 1970, 1980 and 1990 Census of Population and Housing, Philippines (NSO)

(2) 1970, 1980 and 1990 Census of Population and Housing, Ilocos Norte (NSO)

Table A.2.5 Inventory of Housing Units by Type: 1990

Province City/Municipality	Housing Type*2			Not Reported	Total
	I/II	III	IV		
1. Ilocos Norte	23,193	33,244	30,234	4	86,675
2. Laoag River Basin*1	13,991	20,624	13,987	0	48,602
- Laoag City	4,871	7,285	2,932	0	15,088
- San Nicolas	1,535	2,516	611	0	4,662
- Sarrat	979	2,278	1,019	0	4,276
- Dingras	1,426	2,436	1,955	0	5,817
- Solsona	1,104	1,241	1,256	0	3,601
- Piddig	901	1,094	1,425	0	3,420
- Marcos	582	798	1,074	0	2,454
- Banna (Espiritu)	615	849	1,417	0	2,881
- Nueva Era	233	156	633	0	1,022
- Carasi	16	27	87	0	130
- Vintar	1,729	1,944	1,578	0	5,251

Source: 1990 Census of Population and Housing, Housing Statistics, Ilocos Norte, Aug. 1992, NSO

Note: *1 A total figure of a city and ten municipalities involved in the basin.

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

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

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

Type IV (Temporary and Makeshift structure): Other structures

Table A.2.6 Inventory of Housing Units by Year Built: 1990

Year Built	Ilocos Norte						
	Ilocos Norte	Laoag River Basin*1	Laoag City	San Nicolas	Sarrat	Dingras	
1986 - 1990	19,540	10,462	2,545	807	749	1,427	
1981 - 1985	14,265	7,862	2,136	769	667	941	
1971 - 1980	19,249	10,789	3,204	1,209	1,070	1,288	
1961 - 1970	13,678	7,785	2,674	876	815	892	
1951 - 1960	8,252	4,685	1,848	476	398	469	
1950 or Earlier	7,568	4,362	1,867	600	337	329	
Total	82,552	45,945	14,274	4,737	4,036	5,346	
Not reported	4,121	2,965	814	233	240	471	
- Weighted Average of Year Built	1973	1973	1970	1971	1972	1975	
- Average Year Passed	23	23	26	25	24	21	
	Ilocos Sur						
	Solsona	Piddig	Marcos	Banna (Espiritu)	Nueva Era	Carasi	Vintar
1986 - 1990	995	846	726	850	386	67	1,064
1981 - 1985	667	617	436	483	231	21	894
1971 - 1980	854	774	579	644	192	23	952
1961 - 1970	512	559	361	333	108	7	648
1951 - 1960	309	307	164	198	62	3	451
1950 or Earlier	195	256	102	141	30	9	496
Total	3,532	3,359	2,368	2,649	1,009	130	4,505
Not reported	69	61	86	232	13	0	746
- Weighted Average of Year Built	1975	1974	1976	1976	1979	1980	1973
- Average Year Passed	21	22	20	20	17	16	23

Source: 1990 Census of Population and Housing, Housing Statistics, Ilocos Norte, Aug. 1992, NSO

Note: *1 A total figure of a city and ten municipalities involved in the basin.

Table A.2.7 Inventory of Housing Units by Floor Area: 1990

Floor Area (m ²)	Ilocos Norte						
	Ilocos Norte	Laoag River Basin*1	Laoag City	San Nicolas	Sarrat	Dingras	
Less than 10	6,282	3,600	1,349	532	190	324	
10 - 19	15,550	8,454	2,152	770	613	1,083	
20 - 29	10,757	10,229	2,625	978	1,029	1,223	
30 - 49	21,639	12,186	3,033	1,027	1,235	1,647	
50 - 69	10,608	6,356	1,986	658	658	860	
70 - 89	6,015	3,436	1,301	444	290	362	
90 - 119	3,760	2,134	1,040	283	124	192	
120 and over	4,048	2,510	1,601	278	137	124	
Total	78,659	48,905	15,087	4,970	4,276	5,815	
Not reported	14	5	1	0	0	2	
- Weighted Average	43	42	52	44	41	39	

	Ilocos Norte						
	Solsona	Piddig	Marcos	Banna (Espiritu)	Nueva Era	Carasi	Vintar
Less than 10	307	139	203	132	148	33	243
10 - 19	666	626	638	599	376	40	891
20 - 29	736	728	632	775	260	23	1,220
30 - 49	1,143	992	607	706	166	21	1,609
50 - 69	415	467	211	360	40	11	690
70 - 89	161	248	99	193	18	1	319
90 - 119	78	125	38	78	6	1	169
120 and over	95	95	26	38	6	0	110
Total	3,601	3,420	2,454	2,881	1,020	130	5,251
Not reported	0	0	0	0	2	0	0
- Weighted Average of Year Built	36	40	31	36	24	22	38

Source: 1990 Census of Population and Housing, Housing Statistics, Ilocos Norte, Aug. 1992, NSO
 Note: *1 A total figure of a city and ten municipalities involved in the basin.

Table A.2.8 Number of Dwelling Units by Year Built and by Building Type: 1980

Year Built	Ilocos Norte Province			Ilocos Norte - Urban			Ilocos Norte - Rural		
	Type I	Type II	Type III	Type I	Type II	Type III	Type I	Type II	Type III
1976 - 1980	2,280	4,837	9,676	647	1,130	1,053	1,633	3,707	8,623
1971 - 1975	1,889	6,606	6,598	712	1,785	685	1,177	4,821	5,913
1961 - 1970	1,619	11,060	7,148	733	3,525	921	886	7,535	6,227
1951 - 1960	508	8,538	4,228	275	3,199	586	233	5,339	3,642
1942 - 1950	230	3,723	2,050	132	1,651	443	98	2,072	1,607
1941 or Earlier	200	3,742	1,710	135	2,250	491	65	1,492	1,219
Total	6,726	38,506	31,410	2,634	13,540	4,179	4,092	24,966	27,231
Grand Total		76,642			20,353			56,289	
- Weighted Average of Year Built	1969	1961	1966	1967	1957	1963	1971	1963	1967
- Average Age(yrs)	11	19	14	13	23	17	9	17	13
- Average Age of All Types		16			20			15	

Source: 1980 Census of Population and Housing: Iloilo, Cebu and Leyte, NSO, NEDA

Note: Building types are classified on the basis of construction materials as follows:

	Outer Walls	Roof
Type I	Galvanized iron, Concrete, tile, etc.	Galvanized iron, Concrete, tile, etc.
Type II	Wood, Plywood, Mixed, Asbestos, etc.	Asbestos
Type III	Cogon, Nipa, Salvaged materials, etc.	Cogon, Nipa, Salvaged materials, etc.

Table A.2.9(1) Number of Dwelling Units by Type of Unit and by Floor Area in Laoag River Basin: 1980

Floor Area (sq.m.)	Ilocos Norte Province			Basin Total*1					
	Single House	Duplex	Others	Single House	Duplex	Others			
Less than 30	33,139	170	336	17,198	127	141			
30 - 49	24,434	175	162	12,259	130	142			
50 - 69	9,143	52	45	4,990	32	50			
70 - 99	5,291	35	25	2,744	15	10			
100 - 149	2,365	26	25	1,324	5	20			
150 - 199	655	0	15	389	0	5			
200 - 249	258	10	15	182	10	10			
250 - 299	123	0	5	84	0	5			
300 & Over	128	0	10	76	0	5			
Total	75,536	468	638	39,246	319	388			
Grand Total		76,642			39,953				
Weighted Average of Floor Area (sq.m.)									
- Each Type	42	47	50	43	43	54			
- All Types		42			43				
Floor Area (sq.m.)	Laoag City			San Nicolas			Sarrat		
	Single House	Duplex	Others	Single House	Duplex	Others	Single House	Duplex	Others
Less than 30	4,990	67	106	1,807	5	15	1,427	5	5
30 - 49	4,369	70	62	1,481	-	15	1,341	5	5
50 - 69	1,740	15	40	691	-	-	562	5	-
70 - 99	1,094	5	10	476	5	-	320	-	-
100 - 149	600	-	15	180	-	5	181	5	-
150 - 199	203	-	5	65	-	-	35	-	-
200 - 249	95	10	10	15	-	-	25	-	-
250 - 299	74	-	-	5	-	-	-	-	5
300 & Over	60	-	5	-	-	-	-	-	-
Total	13,225	167	253	4,720	10	35	3,891	20	15
Grand Total		13,645			4,765			3,926	
Weighted Average of Floor Area (sq.m.)									
- Each Type	49	46	58	46	53	44	46	61	112
- All Types		49			46			46	
Floor Area (sq.m.)	Dingras			Solsona			Piddig		
	Single House	Duplex	Others	Single House	Duplex	Others	Single House	Duplex	Others
Less than 30	491	-	-	1,904	15	-	1,218	-	-
30 - 49	473	-	-	202	5	-	950	-	60
50 - 69	218	-	-	110	-	-	521	-	10
70 - 99	108	-	-	35	-	-	202	-	-
100 - 149	42	-	-	-	-	-	100	-	-
150 - 199	20	-	-	5	-	-	16	-	-
200 - 249	16	-	-	-	-	-	11	-	-
250 - 299	-	-	-	-	-	-	-	-	-
300 & Over	11	-	-	-	-	-	-	-	-
Total	1,379	0	0	2,256	20	0	3,018	0	70
Grand Total		1,379			2,276			3,088	
Weighted Average of Floor Area (sq.m.)									
- Each Type	49	-	-	25	25	-	43	-	43
- All Types		49			25			43	

Source: 1980 Census of Population and Housing: Ilocos Norte, NSO, NEDA

Note: *1 The total of a city and ten municipalities involved in the Laoag River Basin.

Table A.2.9(2) Number of Dwelling Units by Type of Unit and by Floor Area in Laoag River Basin: 1980

Floor Area (sq.m.)	Marcos			Espiritu			Nueva Era		
	Single House	Duplex	Others	Single House	Duplex	Others	Single House	Duplex	Others
Less than 30	1,225	5	-	1,506	-	-	776	-	-
30 - 49	565	-	-	768	20	-	447	-	-
50 - 69	166	-	-	163	-	-	209	-	-
70 - 99	45	-	-	71	-	-	75	-	-
100 - 149	10	-	-	20	-	-	45	-	-
150 - 199	-	-	-	-	-	-	-	-	-
200 - 249	5	-	-	5	-	-	-	-	-
250 - 299	-	-	-	-	-	-	-	-	-
300 & Over	-	-	-	-	-	-	-	-	-
Total	2,016	5	0	2,533	20	0	1,552	0	0
Grand Total		2,021			2,553		1,552		
Weighted Average of Floor Area (sq.m.)									
- Each Type	31	20	-	32	40	-	37	-	-
- All Types		31			32		37		

Floor Area (sq.m.)	Carasi			Vintar		
	Single House	Duplex	Others	Single House	Duplex	Others
Less than 30	31	-	-	1,823	30	15
30 - 49	44	-	-	1,619	30	-
50 - 69	-	-	-	610	12	-
70 - 99	-	-	-	318	5	-
100 - 149	-	-	-	146	-	-
150 - 199	-	-	-	45	-	-
200 - 249	-	-	-	10	-	-
250 - 299	-	-	-	5	-	-
300 & Over	-	-	-	5	-	-
Total	75	0	0	4,581	77	15
Grand Total		75			4,673	
Weighted Average of Floor Area (sq.m.)						
- Each Type	32	-	-	43	-	-
- All Types		32			42	

Source: 1980 Census of Population and Housing: Ilocos Norte, NSO, NEDA

Table A.3.1 Gross Regional Domestic Product by Economic Sector at Current Prices: 1990-1995

Economic Sector	(Unit: Million Pesos)					
	1990	1991	1992	1993	1994	1995
Gross Domestic Product in Philippines						
1. Agriculture	235,956	261,868	294,922	318,546	372,853	412,965
1) Crop Production	130,291	141,880	160,683	174,278	209,544	244,164
Palay	36,416	36,373	35,761	42,167	51,079	63,908
Corn	16,469	14,699	18,233	18,484	18,757	21,770
Others	77,406	90,808	106,689	113,627	139,708	158,486
2) Fishery	40,833	47,276	51,341	57,533	65,860	70,206
3) Livestock & Poultry	46,025	54,959	65,093	66,662	75,784	76,606
4) Agricultural Activities	9,901	11,212	13,174	14,503	16,895	19,243
5) Forestry	8,907	6,541	4,631	5,570	4,770	2,746
2. Industry	371,347	424,504	443,813	481,900	550,709	612,540
1) Mining & Quarring	16,659	17,504	16,263	16,621	16,309	18,244
2) Manufacturing	267,485	315,938	326,839	349,595	393,810	438,247
3) Construction	64,903	61,962	67,968	79,267	95,495	106,639
4) Elec. Gas & Water	22,300	29,100	32,743	36,417	44,895	49,410
3. Services	469,934	561,638	612,823	674,010	769,716	880,926
1) Commerce	154,592	180,485	193,573	207,563	230,799	261,862
2) Others	315,342	381,153	419,251	466,447	538,917	619,064
4. Total	1,077,237	1,248,011	1,351,559	1,474,457	1,693,278	1,906,431
Gross Regional Domestic Product in Region I						
1. Agriculture	13,092	14,619	15,438	16,935	20,109	24,248
1) Crop Production	8,653	9,494	9,837	10,932	13,312	16,677
Palay	3,108	2,987	2,752	3,173	3,585	4,549
Corn	425	456	431	458	698	935
Others	5,120	6,051	6,653	7,300	9,029	11,193
2) Fishery	1,383	1,701	1,688	1,949	2,259	2,394
3) Livestock & Poultry	2,503	2,793	3,166	3,290	3,548	3,748
4) Agricultural Activities	553	632	748	813	990	1,429
5) Forestry	0	0	0	0	0	0
2. Industry	6,393	6,589	4,829	5,931	7,893	9,139
1) Mining & Quarring	369	393	321	723	659	752
2) Manufacturing	1,916	2,286	2,391	2,737	3,033	3,507
3) Construction	3,968	3,719	1,902	2,235	3,877	4,519
4) Elec. Gas & Water	141	190	215	236	324	362
3. Services	13,016	15,127	16,834	19,046	21,728	24,865
1) Commerce	3,665	4,284	4,557	5,007	5,520	6,282
2) Others	9,350	10,843	12,277	14,039	16,208	18,582
4. Total	32,501	36,336	37,101	41,961	49,731	58,252

Source: (1) 1995 Philippine Statistical Year book, NSCB
 (2) Data presented by NSCB and Central Bank

Table A.3.2 Percentage Distribution of GRDP by Economic Sector: 1990-1995

Economic Sector	1990	1991	1992	1993	1994	1995
Philippines						
1. Agriculture	21.9	21.0	21.8	21.6	22.0	21.7
2. Industry	34.5	34.0	32.8	32.7	32.5	32.1
- Manufacturing	24.8	25.3	24.2	23.7	23.3	23.0
3. Services	43.6	45.0	45.3	45.7	45.5	46.2
- Commerce	14.4	14.5	14.3	14.1	13.6	13.7
4. Total	100.0	100.0	100.0	100.0	100.0	100.0
Region I						
1. Agriculture	40.3	40.2	41.6	40.5	40.4	41.6
2. Industry	19.7	18.1	13.0	14.1	15.9	15.7
- Manufacturing	5.9	6.3	6.4	6.5	6.1	6.0
3. Services	40.0	41.6	45.4	45.4	43.7	42.7
- Commerce	11.3	11.8	12.3	11.9	11.1	10.8
4. Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: (1) 1995 Philippine Statistical Year book, NSCB
(2) Data presented by NSCB and Central Bank

Table A.3.3 GRDP per Capita: 1990-1995

Item	1990	1991	1992	1993	1994	1995
In Pesos						
Philippines	17,746	20,086	21,252	22,652	25,415	27,956
Region I	9,154	10,036	10,050	11,148	12,957	14,835
In US\$ Equivalent						
Philippines	726	732	837	831	963	1,084
Region I	374	366	396	409	491	577

Source: (1) 1995 Philippine Statistical Year book, NSCB
(2) Data presented by NSCB and Central Bank

Table A.3.4 Gross Regional domestic Product by Economic Sector at 1985 Constant Prices: 1990-1995

		(Unit: Million Pesos)					
Economic Sector	1990	1991	1992	1993	1994	1995	
Gross Domestic Product in Philippines							
1. Agriculture	160,734	162,937	163,571	167,053	171,472	172,999	
1) Crop Production	85,870	88,695	87,662	89,660	92,857	93,092	
Palay	24,873	25,868	24,412	25,228	28,182	28,190	
Corn	10,950	11,093	11,009	11,435	10,769	9,837	
Others	50,047	51,733	52,241	52,997	53,906	55,065	
2) Fishery	30,783	32,001	32,375	32,820	33,195	33,853	
3) Livestock & Poultry	29,069	29,687	31,194	32,862	34,113	35,895	
4) Agricultural Activities	7,692	7,823	8,154	8,214	8,336	8,632	
5) Forestry	7,320	4,732	4,186	3,497	2,971	1,527	
2. Industry	255,549	248,719	247,385	251,460	265,972	285,219	
1) Mining & Quarring	11,091	10,770	11,495	11,571	10,763	11,396	
2) Manufacturing	183,925	183,111	179,947	181,289	190,374	203,271	
3) Construction	41,858	35,285	36,261	38,344	41,774	44,492	
4) Elec. Gas & Water	18,674	19,552	19,681	20,255	23,061	26,060	
3. Services	304,409	304,866	307,986	315,643	329,006	345,232	
1) Commerce	107,428	108,002	109,780	112,479	116,923	123,430	
2) Others	196,980	196,865	198,206	203,164	212,083	221,802	
4. Total	720,691	716,523	718,942	734,156	766,451	803,450	
Gross Regional Domestic Product in Region I							
1. Agriculture	9,125	9,217	9,074	9,145	9,531	10,448	
1) Crop Production	6,082	6,135	5,941	5,910	6,294	6,972	
Palay	2,366	2,385	2,193	2,241	2,424	2,339	
Corn	253	255	186	202	297	365	
Others	3,463	3,495	3,561	3,468	3,573	4,268	
2) Fishery	1,029	1,146	1,086	1,119	1,149	1,163	
3) Livestock & Poultry	1,567	1,483	1,566	1,635	1,586	1,731	
4) Agricultural Activities	446	453	481	450	503	582	
5) Forestry	0	0	0	0	0	0	
2. Industry	4,168	3,844	2,597	2,788	3,456	3,888	
1) Mining & Quarring	201	217	146	228	213	305	
2) Manufacturing	1,264	1,301	1,252	1,356	1,401	1,537	
3) Construction	2,584	2,199	1,064	1,071	1,683	1,864	
4) Elec. Gas & Water	120	128	135	132	158	183	
3. Services	8,576	8,518	8,674	8,960	9,308	9,684	
1) Commerce	2,670	2,688	2,732	2,794	2,904	3,062	
2) Others	5,906	5,830	5,942	6,166	6,404	6,623	
4. Total	21,869	21,579	20,344	20,893	22,295	24,021	

Source: (1) 1995 Philippine Statistical Year book, NSCB
 (2) Data presented by NSCB and Central Bank

Table A.3.5 Real Growth of GRDP by Economic Sector: 1990-1995

Economic Sector	1991	1992	1993	1994	1995	'90-'95
Philippines						
1. Agriculture	1.37	0.39	2.13	2.65	0.89	1.48
2. Industry	-2.67	-0.54	1.65	5.77	7.24	2.22
- Manufacturing	-0.44	-1.73	0.75	5.01	6.77	2.02
3. Services	0.15	1.02	2.49	4.23	4.93	2.55
- Commerce	0.53	1.65	2.46	3.95	5.56	2.82
4. Total	-0.58	0.34	2.12	4.40	4.83	2.20
Region I						
1. Agriculture	1.01	-1.55	0.78	4.22	9.62	2.75
2. Industry	-7.76	-32.46	7.39	23.93	12.52	-1.38
- Manufacturing	2.93	-3.76	8.36	3.30	9.67	3.99
3. Services	-0.68	1.83	3.30	3.88	4.05	2.46
- Commerce	0.67	1.62	2.29	3.91	5.44	2.77
4. Total	-1.32	-5.72	2.70	6.71	7.74	1.89

Source: (1) 1995 Philippine Statistical Year book, NSCB
 (2) Data presented by NSCB and Central Bank

Table A.3.6 Real Growth of GRDP per Capita: 1990-1995

Economic Sector	1990	1991	1992	1993	1994	1995
GRDP per Capita at 1985 Constant Prices (Pesos)						
Philippines	11,872	11,532	11,305	11,279	11,504	11,782
Region I	6,159	5,961	5,511	5,551	5,809	6,138
Annual Growth Rate (%)						
Philippines	-2.87	-1.97	-0.23	2.00	2.42	-0.15
Region I	-3.22	-7.54	0.72	4.65	5.67	-0.07

Source: (1) 1995 Philippine Statistical Year book, NSCB
 (2) Data presented by NSCB and Central Bank

Table A.3.7 Balance of Payments: 1989-1994

Item	(Unit: Million US\$)					
	1989	1990	1991	1992	1993	1994
Current-account Balance						
- Merchandise Exports (FOB)	7,821	8,186	8,840	9,824	11,375	13,483
- Merchandise Imports (FOB)	-10,419	-12,206	-12,051	-14,519	-17,597	-21,333
Trade Balance	-2,598	-4,020	-3,211	-4,695	-6,222	-7,850
- Export of Services	3,225	3,244	3,654	4,742	4,673	6,768
- Import of Services	-1,564	-1,761	-1,804	-2,308	-3,090	-4,654
Balance of Goods, and Services	-937	-2,537	-1,361	-2,261	-4,639	-5,736
- Inflow of IPD*1	1,361	1,598	1,969	2,755	2,824	3,782
- Outflow of IPD*1	-2,710	-2,470	-2,469	-2,310	-1,867	-1,822
Balance of Goods, Services and IPD	-2,286	-3,409	-1,861	-1,816	-3,682	-3,776
- Net Transfer	830	714	827	816	699	936
Current-account Balance	-1,456	-2,695	-1,034	-1,000	-2,983	-2,840
Capital-account Balance						
- Direct Investment	563	530	544	228	763	1,053
- Portfolio Investment	280	-50	110	40	-164	-437
- Other Capital	511	1,577	2,273	2,940	2,455	3,540
Capital-account Balance	1,354	2,057	2,927	3,208	3,054	4,156
Error & Omissions	402	593	-138	-520	265	203
Overall Balance	300	-45	1,755	1,688	336	1,519

Source: International Financial Statistics, June 1996, IMF
 Note: Income as interest, profit and dividends

Table A.3.8 Outstanding Internal Public Debt: 1989-1994

Item	(Unit: Billion Pesos)					
	1989	1990	1991	1992	1993	1994
Outstanding by Level of Government						
National Government	225.2	243.3	286.6	445.5	632.2	613.7
Local Government	0.1	-	-	-	-	-
Government Corporation	5.9	6.5	6.7	7.0	6.1	6.4
Monetary Institutions	6.0	4.0	47.5	68.7	24.8	4.6
Total	237.3	253.8	340.8	521.2	663.1	624.6
Outstanding by Period of Maturity						
Long Term	20.9	20.2	22.5	18.6	67.9	67.7
Medium Term	29.9	23.0	56.0	93.2	141.3	138.4
Short Term	186.4	210.7	262.2	409.4	453.9	418.5
Total	237.3	253.8	340.7	521.2	663.1	624.6

Source: 1995 Philippine Statistical Yearbook, Oct 1995, NSCB

Table A.3.9 Official Development Assistance^{*1}: 1989-1994

Item	(Unit: Million US Dollars)				
	1990	1991	1992	1993	1994
Bilateral	1,105.1	860.1	1,538.7	1,330.1	942.5
Japan	647.5	458.9	1,030.7	758.4	591.6
USA	248.0	224.0	229.0	262.0	116.0
Germany	44.0	47.5	75.1	88.4	56.4
Italy	14.9	7.7	43.8	71.8	4.5
Spain	4.6	1.8	4.0	31.2	16.8
Australia	28.6	37.5	36.1	28.5	33.7
Canada	28.7	22.5	28.4	24.4	24.1
Others	88.8	60.2	91.6	65.4	99.4
Multilateral	171.9	193.6	174.8	154.1	111.2
ADB	127.5	100.5	83.1	100.2	55.0
Others	44.4	93.1	91.7	53.9	56.2
Arab Countries	0.4	-0.7	2.6	2.7	3.8
Total	1,277.4	1,053.0	1,716.1	1,486.9	1,057.5

Source: Geographical Distribution of Financial Flows to Aid Recipients, Disbursements Commitments Country Indicators 1990-1994, OECD Development Assistance Committee

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

Table A.3.10 External Debt: 1989-1994

Item	(Unit: US\$ Billion)					
	1989	1990	1991	1992	1993	1994
Total External Debt	28.7	30.6	32.5	33.0	35.9	39.3
1. Long Term Debt	23.6	25.3	26.4	26.6	29.7	32.5
2. Use of IMF Credit	1.2	0.9	1.1	1.1	1.2	1.1
3. Short Term Debt	4.0	4.4	4.9	5.3	5.0	5.7
Debt Outstanding of Long Term Debt	23.6	25.3	26.4	26.6	29.7	32.5
1. Public and Publicly Guaranteed	22.4	24.1	25.1	25.6	27.5	29.6
a. Official Creditors	12.7	15.4	17.3	19.1	21.2	22.6
- Multilateral	5.0	6.3	6.7	6.9	7.6	8.3
- Bilateral	7.7	9.1	10.7	12.2	13.5	14.2
b. Private Creditors	9.7	8.7	7.7	6.5	6.3	7.0
- Bonds	0.4	0.8	1.0	4.2	4.7	4.9
- Commercial Banks	8.0	6.7	5.8	1.3	0.6	0.4
- Others	1.3	1.2	1.0	1.0	0.9	1.8
2. Private Nonguaranteed	1.2	1.2	1.4	1.0	2.2	2.9
Total Debt Service	3.2	3.6	3.4	4.3	4.9	4.5
1. Principal Repayment	1.1	1.8	1.8	2.8	2.8	2.4
a. Long Term Debt	0.9	1.5	1.5	2.6	2.7	2.2
b. IMF Repurchases	0.2	0.3	0.3	0.2	0.1	0.3
2. Interest Payments	2.2	1.8	1.6	1.5	2.1	2.1
a. Long Term Debt	1.7	1.6	1.5	1.3	1.8	1.6
b. IMF Charges	0.1	0.1	0.1	0.1	0.1	0.1
c. Short Term Debt	0.4	0.1	0.1	0.1	0.3	0.4
Ratios (%)						
1. Total External Debt/GNP	68.3	68.8	70.4	60.8	64.1	59.3
2. Debt Service Ratio *1	25.4	27.0	23.0	24.4	25.5	18.5

Source: World Debt Tables, 1996, World Bank

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

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

Table A.4.1 Production of Major Crops: 1993 - 1995

Crop	1993			1994			1995		
	Area (1000ha)	Quantity (1000ton)	Value (Mil. Pesos)	Area (1000ha)	Quantity (1000ton)	Value (Mil. Pesos)	Area (1000ha)	Quantity (1000ton)	Value (Mil. Pesos)
Philippines									
1. Cereals									
- Palay	3,282.4	9,434.3	50,189.9	3,651.5	10,538.1	59,118.6	3,758.7	10,540.7	77,684.9
- Corn	3,149.3	4,798.0	21,590.6	3,005.8	4,519.3	22,862.3	2,692.3	4,128.3	25,925.4
2. Major Crops									
- Coconut	3,075.2	11,328.0	23,110.0	3,066.7	11,207.0	22,862.3	3,078.9	12,183.0	21,320.5
- Sugar Cane	374.0	22,915.1	13,290.8	395.7	24,695.2	18,274.4	284.1	18,679.4	17,745.5
- Banana	325.8	3,069.0	10,311.9	330.0	3,112.2	11,452.8	328.7	3,082.0	10,817.7
- Pineapple	66.9	1,287.4	5,394.3	68.9	1,323.8	5,771.8	78.4	1,397.4	4,932.8
- Garlic	4.3	12.3	764.7	5.6	15.7	875.2	6.4	17.2	948.7
- Tobacco	19.0	104.8	2,485.6	48.2	56.9	1,340.0	55.1	63.7	1,566.6
- Tomato	15.8	138.5	786.6	17.3	150.6	1,090.6	17.9	155.8	711.8
- Onion	6.5	61.5	536.6	7.7	73.6	1,083.1	8.6	88.4	994.8
- Mango	57.7	335.6	5,120.5	58.0	366.0	6,356.9	68.1	432.3	7,263.0
Ilocos Norte Province									
1. Cereals									
- Palay	44.1	98.3	572.0	46.7	122.3	773.0	48.3	130.0	1,047.5
- Corn	14.0	9.0	56.2	9.7	17.2	123.3	5.9	20.3	143.8
2. Major Crops									
- Garlic	2.5	6.0	234.1	3.8	9.4	488.2	4.0	9.7	1,072.8
- Tobacco	7.7	7.8	178.7	2.9	3.6	84.1	3.1	3.6	109.9
- Tomato	1.6	7.2	50.0	0.8	12.6	102.1	1.0	15.7	126.1
- Onion	0.8	2.8	32.9	0.9	3.7	57.7	0.8	5.3	54.9
- Mango	2.2	3.0	50.3	2.3	3.5	73.5	2.2	4.9	57.1

Source: (1) 1995 Philippine Statistical Yearbook, NSCB
(2) 1996 Philippine Statistical Yearbook, NSCB
(3) Data presented by BAS in Manila and Laoag

Table A.4.2 Production of Food Crops in the Laoag River Basin: 1995

City Municipality	Yield Production			Yield Production			Yield Production		
	Area Harvested (1000ha)	(MT/ha)	(1000T)	Area Harvested (1000ha)	(MT/ha)	(1000T)	Area Harvested (1000ha)	(MT/ha)	(1000T)
I. Palay									
	Wet Season (May-September)			Dry Season (October-April)			Annual Total		
Laoag City	3.1	4.0	12.1	1.0	4.4	4.2	4.0	4.1	16.4
San Nicolas	1.5	4.1	6.2	0.1	4.7	0.6	1.7	4.1	6.9
Sarrat	1.8	3.7	6.9	0.2	4.2	0.9	2.1	3.8	7.8
Dingras	6.5	3.6	23.2	2.3	4.6	10.5	8.7	3.9	33.7
Solsona	3.7	4.2	15.6	1.4	4.5	6.3	5.2	4.2	21.9
Piddig	4.0	3.6	14.5	1.2	4.0	4.7	5.1	3.7	19.2
Marcos	2.9	4.3	12.3	0.1	4.8	0.6	3.0	4.3	12.8
Espiritu	2.2	3.5	7.8	0.5	4.5	2.4	2.7	3.7	10.2
Nueva Era	1.2	3.7	4.3	0.2	4.3	0.9	1.4	3.8	5.1
Carasi	0.1	2.5	0.3	0.0	3.5	0.0	0.1	2.6	0.3
Vintar	2.2	3.6	8.1	1.0	4.1	4.1	3.2	3.8	12.1
Total	29.2	3.8	111.2	8.0	4.4	35.2	37.2	3.9	146.4
II Food Crops									
	Corn			Vegetables			Legumes		
Laoag City	0.9	3.0	2.7	2.3	8.0	18.4	1.6	1.2	1.9
San Nicolas	0.1	2.8	0.2	0.3	6.0	2.0	0.3	1.1	0.3
Sarrat	0.2	2.5	0.5	0.6	7.5	4.7	0.6	1.2	0.7
Dingras	0.0	2.0	0.0	0.0	5.0	0.1	0.0	0.9	0.0
Solsona	0.6	3.5	2.1	0.4	15.0	6.0	0.8	1.1	0.8
Piddig	0.4	2.5	0.9	0.6	9.0	5.4	0.6	1.3	0.8
Marcos	0.5	3.3	1.6	0.8	1.0	0.8	0.3	10.0	3.0
Espiritu	0.3	3.0	0.8	0.2	7.5	1.3	0.2	1.0	0.2
Nueva Era	0.3	3.0	0.9	0.4	7.5	2.6	0.3	1.2	0.4
Carasi	0.0	2.0	0.0	0.0	5.0	0.1	0.0	0.9	0.0
Vintar	0.2	3.0	0.6	0.8	10.0	8.0	0.9	1.3	1.1
Total	3.4	3.0	10.3	6.4	7.7	49.4	5.5	1.7	9.2
	Tobacco			Fruits			Garlic*2		
Laoag City	-	-	-	0.2	8.5	1.7	0.6	2.9	1.7
San Nicolas	0.2	1.0	0.2	0.1	9.0	0.8	0.2	3.0	0.6
Sarrat	0.2	1.5	0.2	0.1	9.0	0.7	0.3	3.1	0.9
Dingras	0.3	1.2	0.3	0.1	11.0	1.2	0.2	3.0	0.7
Solsona	0.0	1.0	0.0	0.1	8.0	0.4	-	-	-
Piddig	0.3	1.0	0.3	0.1	10.5	0.8	0.1	3.0	0.3
Marcos	0.3	1.0	0.3	0.1	8.5	0.4	0.0	2.5	0.0
Espiritu	0.2	1.0	0.2	0.1	9.0	0.5	0.1	2.5	0.1
Nueva Era	0.0	1.0	0.0	0.0	11.0	0.3	0.0	2.5	0.1
Carasi	-	-	-	0.0	9.0	0.1	0.0	3.0	0.0
Vintar	0.1	1.0	0.1	0.6	8.0	4.5	0.2	3.0	0.5
Total	1.4	1.1	1.6	1.3	8.7	11.5	1.6	3.0	4.8

Source: Provincial Agriculture Office, Ilocos Norte

Note: *1 The figures above cover the production in the whole municipal territories.

*2 Production in 1991

Table A.4.3 Inland Fishery Production of Brackish-water and Fresh-water Fishpond: 1994-1995

Item	1993			1994			1995		
	Area (1000ha)	Quantity (1000ton)	Value (Mil. Pesos)	Area (1000ha)	Quantity (1000ton)	Value (Mil. Pesos)	Area (1000ha)	Quantity (1000ton)	Value (Mil. Pesos)
Philippines	177,234	283,279	25,834	176,587	291,242	28,734	149,720	280,000	29,601
1. Brackish-water	168,602	234,651	23,409	169,102	244,360	28,733	143,197	237,056	27,900
a. Bangus	96,209	124,510	5,303	100,490	135,682	7,100	87,701	137,796	7,392
b. Endeavor Prawn	6,740	9,490	1,097	745	1,843	384	1,164	1,295	220
c. Tilapia	6,161	7,944	340	7,176	9,829	10	5,894	5,317	241
2. Fresh-water	8,632	48,628	2,425	7,485	46,882	2	6,523	42,944	1,700
a. Tilapia	7,427	47,893	2,391	6,048	38,867	2	5,588	38,410	1,520
b. Carp	141	72	1	18	56	0	75	273	8
c. Cat Fish	257	191	11	205	913	0	229	1,300	54
d. Mud Fish	630	378	19	184	703	0	356	2,433	92
Ilocos Norte	318	232	18	199	212	4	209	296	22
1. Brackish-water	252	122	8	116	56	4	112	63	5
a. Bangus	32	11	1	10	5	0	9	9	669
b. Endeavor Prawn	-	-	-	-	-	-	2	-	8
c. Tilapia	153	108	7	104	50	4	95	52	4
2. Fresh-water	66	110	9	83	156	0	97	233	17
a. Tilapia	66	108	9	63	119	0	68	196	15
b. Carp	-	2	0	-	-	0	24	34	3
c. Cat Fish	-	-	-	-	-	0	1	1,300	26
d. Mud Fish	-	-	-	1	2	0	4	3	125

Source: Data presented by BAS in Manila

Table A.4.4 Inventory of Livestock and Poultry: 1993-1995

Species	(Unit: 1000 Heads)		
	1993	1994	1995
Philippines			
1. Livestock			
- Carabao	2,575.8	2,559.7	2,707.8
- Cattle	1,913.9	1,936.0	2,021.1
- Hog	7,953.7	8,226.5	8,941.2
- Goat	2,562.4	2,633.0	2,828.1
2. Poultry			
- Chicken	87,157.6	93,109.7	96,215.7
- Duck	8,706.8	8,186.9	9,110.8
Ilocos Norte Province			
1. Livestock			
- Carabao	27.3	26.6	24.4
- Cattle	48.1	43.8	53.9
- Hog	102.9	85.6	94.2
- Goat	34.6	41.8	35.6
2. Poultry			
- Chicken	796.4	629.9	896.8
- Duck	104.8	101.0	66.2
Laoag River Basin*1			
1. Livestock			
- Carabao	13.5	12.7	12.2
- Cattle	28.3	27.2	33.5
- Hog	58.4	48.9	53.8
- Goat	15.7	19.1	16.3
2. Poultry			
- Chicken	354.7	326.7	465.2
- Duck	61.1	58.3	38.6

Source: (1) 1995 Philippine Statistical Yearbook, NSCB

(2) Data presented by BAS, Ilocos Norte

Note: *1 The total of a city and ten municipalities involved in the Laoag River Basin.

Table A.4.5 Inventory of Manufacturing Industry in Laoag River Basin: 1996

Basin/City Municipality	Industrial Classification *1									Total
	1	2	3	4	5	6	7	8	9	
Ilocos Norte Province	54	3	105	24	54	45	9	20	3	317
Laoag River Basin*2	25	3	63	24	46	34	7	17	2	221
- Laoag City	10	2	20	5	17	15	3	9	1	82
- San Nicolas	1	0	17	1	22	11	0	2	0	54
- Sarrat	5	0	7	17	0	4	4	4	1	42
- Dingras	1	1	1	0	4	0	0	2	0	9
- Solsona	3	0	7	0	2	0	0	0	0	12
- Piddig	0	0	5	0	0	0	0	0	0	5
- Marcos	3	0	0	0	0	1	0	0	0	4
- Banna (Espiritu)	2	0	1	1	0	2	0	0	0	6
- Nueva Era	0	0	0	0	0	0	0	0	0	0
- Carasi	0	0	0	0	0	0	0	0	0	0
- Vintar	0	0	5	0	1	1	0	0	0	7

Source: Business Name Registration Directory in Ilocos Norte Province, 1996, DTI

Note: *1 Classification of manufacturing establishments

1. Food and beverages
2. Chemicals and related products
3. Wood, paper products and furnitures
4. Textile, fabrics, garments and clothing accessories
5. Non-metal mineral products
6. Metal products
7. Machinery and electric appliances
8. Handicrafts
9. Others

*2 A total figure of a city and ten municipalities involved in the basin.

Table A.4.6 Assets Holdings of Manufacturing Industry: 1991

		(Value in Million Pesos)	
Item	Philippines	Region I	
I. Large Scale Manufacturer with Average Total Employment of 10 and More			
1.	Number of Establishments (nos)	11,424	197
2.	Employment (Average for the year)		
1)	Total (persons)	944,094	8,209
2)	Paid Employees (persons)	936,496	7,942
3)	Compensation	56,653	379
3.	Production and Value Added		
1)	Value of Output *1	678,420	5,505
2)	Production Cost *2	459,312	3,448
3)	Value Added	219,108	2,057
4.	Fixed Assets		
1)	Land	1,003	6
2)	Building	7,652	12
3)	Transport Equipment	1,835	32
4)	Machinery	18,774	98
5)	Other Fixed Assets	3,481	15
	Total	32,745	163
5.	Inventory		
1)	Finished Products	39,192	201
2)	Works-in-Process	18,576	66
3)	Material, Fuel & Supplies	64,501	228
4)	Goods for Resale	2,325	7
	Total	124,594	502
II. Small Scale and Cottage Manufacturer with Average Total Employment of Less Than 10			
1.	Number of Establishments (nos)	76,872	8,415
2.	Employment (Average for the year)		
1)	Total (persons)	289,060	23,525
2)	Paid Employees (persons)	169,234	9,212
3)	Compensation	3,903	164
3.	Production and Value Added		
1)	Value of Output *1	28,142	823
2)	Production Cost *2	17,503	379
3)	Value Added	10,639	444
4.	Fixed Assets		
1)	Land	164	-
2)	Building	207	-
3)	Transport Equipment	67	-
4)	Machinery	132	17
5)	Other Fixed Assets	71	-
	Total	641	17
5.	Inventory		
1)	Finished Products	1,582	25
2)	Works-in-Process	174	4
3)	Material, Fuel & Supplies	822	7
4)	Goods for Resale	106	6
	Total	2,684	42

Source: 1991 Annual Survey of Establishments, Vol. III Manufacturing, NSO

Note: *1 In producers' prices

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

Table A.4.7 Inventory of Wholesale and Retail Trade in Laoag River Basin: 1996

Province Basin/City Municipality	Wholesale	Retail Store			Total
		Food Store		Non-food Store	
		Ordinary Store	Sari-sari Store (Small Scale Store)		
Ilocos Norte Province	65	191	1,673	425	2,289
Laoag River Basin*1	77	116	791	534	1,441
- Laoag City	52	54	207	357	628
- San Nicolas	8	20	89	36	145
- Sarrat	4	23	151	20	194
- Dingras	6	6	20	51	77
- Solsona	5	1	65	13	79
- Piddig	0	2	88	13	103
- Marcos	0	3	31	5	39
- Banna (Espiritu)	1	2	52	6	60
- Nueva Era	0	0	0	1	1
- Carasi	0	0	0	0	0
- Vintar	1	5	88	22	115

Source: Business Name Registration Directory in Ilocos Norte Province, 1996, DTI

Note: *1 A total figure of a city and ten municipalities involved in the basin.

Table A.4.8 Assets Holdings of Wholesale and Retail Trade: December 1989

Item	(Value in Million Pesos)	
	Philippines	Region I
I. Wholesale Trade		
1. Number of Establishments (nos)	21,271	82
2. Employment (nos)		
1) Total	190,645	1,720
2) Employees	160,014	1,649
3) Compensation	42,588	90
3. Sale Amount and Value Added		
1) Annual Sales	248,567	4,674
2) Gross Margin	50,822	2,084
3) Value Added	42,588	1,990
4. Fixed Assets		
1) Land	402	3
2) Building	762	11
3) Transport Equipment	672	11
4) Machinery	678	8
5) Other Fixed Assets	159	0
Total	2,673	33
5. Inventory		
1) Goods for Resale	27,143	602
2) Materials & Supplies	921	4
3) Fuels, Lubricants Oils & Greases	6	0
4) Other Inventories	313	0
Total	28,383	606
II. Retail Trade		
1. Number of Establishments (nos)	148,435	170
2. Employment (nos)		
1) Total	692,364	3,045
2) Employees	460,929	2,868
3) Compensation	12,288	84
3. Sale Amount and Value Added		
1) Annual Sales	220,558	1,706
2) Gross Margin	41,506	240
3) Value Added	32,372	166
4. Fixed Assets		
1) Land	174	-
2) Building	646	1
3) Transport Equipment	271	6
4) Machinery	265	2
5) Other Fixed Assets	142	1
Total	1,498	10
5. Inventory		
1) Goods for Resale	18,110	386
2) Materials & Supplies	83	2
3) Fuels, Lubricants Oils & Greases	20	1
4) Other Inventories	71	3
Total	18,284	392

Source: 1990 Annual Survey of Establishments, Vol. VII Wholesale and Retail Trade, NSO

Table A.4.9 Export by Commodity: 1990-1994

(Unit: US\$ Million in FOB)

Code	Commodity	1990	1991	1992	1993	1994
0	Food and Live Animals	1,075	1,228	1,132	1,329	1,333
03	Fish and Fish Preparations	395	466	392	477	532
05	Vegetables and Fruits	423	466	504	600	572
06	Sugar, Sugar Preparations and Honey	142	175	122	138	85
	Others	115	121	115	115	143
1	Beverages and Tobacco	58	86	54	44	45
11	Beverages	9	17	11	10	12
12	Tobacco and Tobacco Manufacturers	49	70	43	35	33
2	Crude Materials, Inedible Except Fuel	545	482	492	388	411
24	Cork and Wood	34	31	31	39	32
28	Metalliferous Ores	361	309	319	200	227
29	Crude Animal and Vegetable	62	52	48	54	64
	Others	88	91	95	94	88
3	Mineral fuels, Lubricant and Related Materials	181	211	238	229	217
33	Petroleum, Petroleum Product and Related Minera	131	154	162	136	122
34	Gas Natural and Manufactured	49	58	76	92	96
4	Animals and Vegetable Oils, Fats and Waxes	375	312	495	370	491
41	Animal Oils and Fats	1	1	2	1	0
42	Fixed Veg. Oils and Fats	362	300	483	359	476
43	Animal and Veg. Oils and Fats	13	10	11	11	14
5	Chemicals and Related Products	261	304	268	262	304
51	Organic Chemical	67	51	46	41	43
52	Inorganic Chemical	39	41	88	85	101
56	Fertilizers, Manufactured	72	116	34	36	39
	Others	84	97	100	99	120
6	Manufactured Goods Classified Chiefly by Materia	763	704	682	756	873
63	Cork and Wood Manufactured	193	170	152	125	145
65	Textile Yarns and Fabrics	93	100	121	118	173
68	Non-Ferrous Metals	290	236	237	284	297
	Others	187	198	173	229	258
7	Machinery Transport Equipment	989	1,210	1,646	2,099	2,879
75	Office Machine and Automatic Data Processing M	69	107	194	215	233
76	Telecommunication and Sound Recording	227	306	408	506	681
77	Electrical Machinery	613	723	950	1,230	1,729
	Others	81	74	94	149	236
8	Miscellaneous Manufactured Articles	1,341	1,440	1,657	1,772	1,982
82	Furniture, Parts and Stuff Furnishing	189	177	181	203	240
84	Article of Apparel	681	678	819	835	897
89	Miscellaneous Manufacturing	327	385	445	487	518
	Others	143	200	213	248	327
9	Commodities and Transaction	2,502	2,778	3,061	3,960	4,767
93	Special Transactions 7 Commodities	2,500	2,777	3,026	3,797	4,555
97	Gold Non-Monetary	0	1	35	163	212
	Others	2	0	0	0	0
	Total	8,091	8,755	9,726	11,210	13,302

Source: Trade Statistics in 1990 to 1994, NSO

Table A.4.10 Import by Commodity: 1990-1994

(Unit: US\$ Million in CIF)

Code	Commodity	1990	1991	1992	1993	1994
0	Food and Live Animals	1,213	892	1,115	1,268	1,506
02	Dairy Products and Bird's Eggs	267	224	267	273	333
04	Cereals and cereal Preparation	545	270	351	400	463
08	Feeding Stuff for Animals	200	178	216	276	227
	Others	201	220	281	319	483
1	Beverages and Tobacco	90	109	133	136	237
11	Beverages	23	24	28	38	54
12	Tobacco and Tobacco Manufacturers	67	85	105	99	183
2	Crude Materials, Inedible Except Fuel	595	666	680	776	977
26	Textile Fiber	166	180	192	128	123
27	Crude Fertilizer	83	104	86	157	241
28	Metalliferous Ores	178	221	197	244	318
	Others	168	162	205	247	295
3	Mineral fuels, Lubricant and Related Materials	1,946	1,921	2,159	2,162	2,161
32	Coal, Coke and Briquette	46	88	36	58	45
33	Petroleum, Petroleum Product and Related Mineral	1,830	1,752	2,005	1,947	1,937
34	Gas Natural and Manufactured	70	81	117	157	179
4	ANIMALS AND VEG. OILS, FATS AND WAXES	27	24	37	26	41
41	Animal Oils and Fats	4	4	6	5	5
42	Fixed Veg. Oils and Fats	20	18	26	14	26
43	Animal and Veg. Oils and Fats	3	3	5	7	10
5	Chemicals and Related Products	1,479	1,440	1,618	1,813	2,191
51	Organic Chemical	311	299	328	207	385
52	Inorganic Chemical	169	181	183	393	269
58	Plastics in Non-Primary Forms	359	305	336	209	501
	Others	641	655	771	1,004	1,035
6	Manufactured Goods Classified by Materials	1,931	1,835	2,331	2,814	3,143
65	Textile Yarns and Fabrics	565	556	668	740	822
67	Iron and Steel	629	619	756	921	970
68	Non-Ferrous Metals	183	177	218	386	421
	Others	554	483	688	766	929
7	Machinery Transport Equipment	3,375	3,235	4,422	6,144	7,585
72	Machinery Specialized for Particular Industry	570	488	609	815	925
77	Electrical Machinery	759	908	1,115	1,419	1,805
78	Road Vehicles including Air Cushion	551	479	632	911	1,097
	Others	1,495	1,360	2,065	2,998	3,757
8	Miscellaneous Manufactured Articles	325	369	454	623	776
87	Prof. Scientific and Control Instruments and Apparatus	85	81	97	157	173
88	Photo., Optical Goods, Watch and Clocks	63	72	91	108	147
89	Miscellaneous Manufacturing	141	160	194	248	326
	Others	36	56	72	109	130
9	Commodities and Transaction	2,059	2,365	2,516	3,007	4,022
93	Special Transactions 7 Commodities	2,029	2,359	2,516	3,007	4,022
95	Armored Fighting Vehicle	2	0	0	0	0
	Others	29	7	0	0	0
	Total	13,040	12,856	15,464	18,768	22,638

Source: Trade Statistics in 1990 to 1994, NSO

Table A.4.11 Export and Import by Country: 1990-1994

(Unit: FOB US\$ Million)

Country	1990		1991		1992		1993		1994	
	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
South-East Asian Countries										
1. Japan	2,259	1,622	2,373	1,771	3,087	1,745	4,037	1,827	5,190	2,035
2. Singapore	487	240	455	229	551	252	978	379	1,441	710
3. Hongkong	555	330	596	392	721	464	877	548	1,113	651
4. Taiwan	806	209	825	210	960	287	1,025	346	1,226	453
5. Thailand	137	156	94	221	138	98	171	169	197	364
6. Korea Republic	478	230	609	228	697	176	898	221	1,107	292
7. Malaysia	272	127	298	123	387	128	356	161	431	224
8. China	162	62	223	128	184	114	181	174	294	164
9. Indonesia	182	61	162	42	181	40	341	48	367	71
10. Brunei	110	1	95	1	92	2	51	2	35	3
Middle Eastern Countries										
1. Saudi Arabia	546	64	643	59	874	57	740	68	945	59
2. Kuwait	194	6	-	3	83	7	192	10	80	9
3. Bahrain	4	2	0	4	3	6	9	7	7	7
American Continents										
1. USA	2,366	3,095	2,426	3,144	2,620	3,832	3,522	4,371	3,941	5,143
2. Canada	167	123	159	146	201	160	152	194	139	196
European Countries										
1. Germany F. R. *1	532	390	465	502	670	522	613	586	761	665
2. UK	248	351	215	372	300	467	379	541	389	639
3. Netherlands	170	357	144	338	180	406	237	362	279	516
4. France	151	144	140	165	212	179	201	209	235	185
5. Italy	88	61	102	78	120	100	136	85	165	90
6. Romania	12	1	17	5	15	1	16	2	12	1
Oceanian Countries										
1. Australia	369	96	380	104	407	113	473	114	587	140
Total *2	12,206	8,186	12,051	8,840	14,519	9,824	17,597	11,375	21,333	13,483

Source: 1995 Philippine Statistical Yearbook, NSCB

Note: *1 Starting 1991, data includes German Democratic Republic.

*2 The total figures include other countries not listed in the above.

Table A.4.12 Average Family Annual Income and Expenditure: 1991

Item	Philippines	Region I	Ilocos Norte Province
I. Average Annual Income (Pesos)	65,186	56,678	58,330
II. Average Annual Expenditure (Pesos)	51,991	45,016	45,033
III. Details of Expenditure (%)	100.0	100.0	100.0
1 Food	48.5	50.6	50.7
- Consumed at Home	44.7	47.0	46.0
- Consumed Outside the Home	3.8	3.6	4.7
2 Tobacco and Alcoholic	2.7	2.5	2.8
3 Clothing, Other Wear	3.7	4.1	4.7
4 Housing Expenses	21.6	19.1	14.3
- Fuel, Light & Water	5.7	6.0	5.6
- Furniture and Equipment	2.4	2.8	2.8
- Rental Value of Dwelling Unit	12.4	8.3	4.4
- Maintenance & Repairs	1.1	2.0	1.5
5 Taxes Paid	1.4	1.0	1.7
6 Other Expenses	22.1	22.7	25.8
- Education	3.0	3.4	4.0
- Medical Care	1.8	2.2	2.1
- Others	17.3	17.1	19.7
IV. Annual Savings (Balance)	13,195	11,662	13,297

Source: 1991 Family Income and Expenditure Survey, NSO

Table A.4.13 Consumer Price Index, Inflation Rate and Purchasing Power of Peso: 1991-1997

Year Month	Philippines			Metro Manila			Region I			Ilocos Norte		
	CPI	IR (%)	PPP	CPI	IR (%)	PPP	CPI	IR (%)	PPP	CPI	IR (%)	PPP
1991	152.0	18.7	0.66	153.6	20.7	0.65	149.3	16.2	0.67	149.8	21.2	0.67
1992	165.6	8.9	0.60	172.4	12.2	0.58	160.4	7.4	0.62	163.3	9.0	0.61
1993	178.2	7.6	0.56	190.3	10.4	0.53	177.9	10.9	0.56	182.4	11.7	0.55
1994	194.3	9.0	0.51	209.8	10.2	0.48	192.9	8.4	0.52	196.0	7.5	0.51
1995	227.4	8.8	0.44	245.2	8.5	0.41	227.8	9.5	0.44	247.0	12.8	0.41
1996	227.7	8.5	0.44	245.8	8.4	0.41	227.8	9.2	0.44	246.9	12.1	0.41
Jan.	222.0	11.2	0.45	238.2	11.1	0.42	220.9	12.8	0.45	240.3	20.9	0.42
Feb.	224.1	11.8	0.45	239.3	11.3	0.42	224.5	14.1	0.45	243.9	22.0	0.41
Mar.	224.9	11.8	0.44	240.8	10.8	0.42	225.8	14.7	0.44	244.5	23.2	0.41
Apr.	225.8	11.3	0.44	243.0	9.5	0.41	226.3	14.2	0.44	246.2	21.0	0.41
May	226.5	10.4	0.44	243.8	7.9	0.41	226.2	13.1	0.44	245.9	19.1	0.41
June	228.1	9.8	0.44	246.3	8.2	0.41	228.0	10.2	0.44	246.8	8.3	0.41
July	228.4	8.9	0.44	246.1	8.0	0.41	229.2	9.2	0.44	245.7	6.5	0.41
Aug.	230.7	7.9	0.43	249.9	8.1	0.40	233.8	8.6	0.43	252.3	7.1	0.40
Sep.	230.3	4.5	0.43	248.8	6.5	0.40	231.3	3.8	0.43	247.7	1.7	0.40
Oct.	230.1	4.7	0.43	249.8	5.6	0.40	231.5	2.3	0.43	255.8	7.3	0.39
Nov.	229.7	4.6	0.44	250.4	6.7	0.40	227.9	2.3	0.44	248.2	4.2	0.40
Dec.	231.5	5.2	0.43	252.7	7.4	0.40	228.5	4.6	0.44	245.2	3.7	0.41
1997												
Jan.	233.0	5.0	0.43	252.7	6.1	0.40	230.2	4.2	0.43	245.7	2.2	0.41
Feb.	234.0	4.4	0.43	255.0	6.6	0.39	228.7	1.9	0.44	245.5	0.7	0.41
Mar.	235.8	4.8	0.42	257.7	7.0	0.39	230.4	2.0	0.43	244.3	-0.1	0.41
Apr.	236.1	4.6	0.42	257.5	6.0	0.39	232.0	2.5	0.43	248.5	0.9	0.40
May	236.0	4.2	0.42	258.3	5.9	0.39	231.4	2.3	0.43	246.7	0.3	0.41
June	239.0	4.8	0.42	263.3	6.9	0.39						

Source: NSO, Industrial and Trade Statistics Department

Note: CPI stands for Consumer Price Index (1988=100)

IR stands for Inflation Rate, an annual inflation rate in percent.

PPP stands for Purchasing Power of Pesos (1988=100)

Table A.4.14 Wholesale Price Index of Construction Materials in Metro Manila: 1990-1997

Year	Month	Wholesale Price Index									
		General Index (1978=100)			Construction Materials in M.M. (1985=100)						
		All Items	Crude Materials Ex. Fuel	Manufactured Goods	All Items	Cement	Sand, Stone & Gravel	Rain- forced Steel	Lumber	Fuel & Lubricant	Machinery & Equip- ment Rental
1990		607.5	476.1	546.0	157.5	157.9	221.9	171.3	176.2	104.8	182.8
1991		689.3	569.7	629.1	182.6	193.0	258.3	182.7	208.5	152.1	182.8
1992		720.6	615.6	672.9	189.3	200.7	265.4	187.6	221.2	131.6	182.8
1993		712.5	601.6	675.2	191.4	176.1	281.7	189.3	236.0	127.5	254.8
1994		770.8	686.3	678.2	200.6	179.8	300.9	188.5	264.9	126.7	254.8
1995		795.9	665.4	683.3	208.2	196.0	312.0	196.5	268.0	124.5	254.8
1996		868.1	751.3	699.1	214.5	214.7	330.5	207.0	270.4	133.0	254.8
1997											
	Jan.	883.7	764.8	698.5	218.6	209.7	336.3	207.4	276.4	143.2	254.8
	Feb.	880.6	774.7	704.8	219.9	210.3	341.2	207.4	279.6	142.2	254.8
	Mar.	895.3	757.4	707.9	219.8	210.0	341.5	207.4	279.6	139.5	254.8
	Apr.				219.4	204.5	341.5	207.4	279.6	138.5	254.8

Source: NSO, Prices and Indicators Section
 1995 Philippine Statistical Yearbook, NSCB
 1996 Philippine Statistical Yearbook, NSCB
 Data presented by Central Bank

Table A.4.15 Foreign Exchange Rate of Pesos per US Dollar at the end of Period: 1987-1997

Month	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Jan.	20.478	20.870	21.350	22.543	28.000	26.527	25.348	27.676	24.573	26.185	26.344
Feb.	20.528	21.010	21.350	22.761	28.000	26.045	25.280	27.701	25.732	26.177	26.333
Mar.	20.550	21.016	21.330	22.750	28.000	25.383	25.513	27.565	25.987	26.197	26.367
Apr.	20.484	21.018	21.564	22.805	27.842	25.804	26.385	27.277	26.021	26.173	26.369
May	20.466	20.905	21.608	22.977	27.806	26.250	27.094	26.874	25.797	26.222	
June	20.456	21.062	21.807	23.270	27.750	25.584	27.272	26.910	25.575	26.203	
July	20.440	21.038	21.880	23.860	27.750	24.910	27.695	26.829	25.585	26.228	
Aug.	20.453	21.079	21.880	25.000	27.000	23.924	28.043	26.484	25.875	26.202	
Sep.	20.600	21.336	21.945	25.750	27.000	25.120	29.813	26.000	26.065	26.257	
Oct.	20.725	21.392	22.100	25.750	27.000	24.636	28.831	24.928	25.992	26.285	
Nov.	20.877	21.379	22.234	28.000	26.700	25.492	27.958	23.879	26.183	26.287	
Dec.	20.800	21.335	22.440	28.000	26.650	25.096	27.699	24.418	26.214	26.288	
Ave.	20.571	21.120	21.791	24.456	27.458	25.398	27.244	26.378	25.800	26.225	

Source: Data presented by Central Bank
 International Financial Statistics, IMF

Table A.5.1 Inventory of Educational Facility: 1994-95 School Year

Item	Philippines		Region I	Ilocos Norte *1	Laoag River Basin*1*2
	No. of Schools	Enrolment			
Pre-School	6,362	480,338	623	101	65
Government	4,095	225,960	560	92	59
Private	2,267	254,378	63	9	6
Elementary School	35,671	10,903,523	2,316	360	187
Government	33,425	10,087,702	2,215	349	178
Private	2,246	815,821	101	11	9
Secondary School	6,055	4,762,877	534	63	32
Government	3,676	3,258,493	361	33	16
Private	2,379	1,504,384	173	30	16
Tertiary School	2,457	1,651,918	154	10	4
Government	522	-	25	5	1
Private	1,935	-	129	5	3

Source: 1995 Philippine Statistical Yearbook, NSCB

Data from DECS (Department of Education, Culture & Sports), Provincial Division

Data from DECS, Laoag City Division

Note: *1 Figures come from "Flood Damage Survey" conducted by JICA Study Team

*2 Data in school year of 1996-1997

*3 In general, the period of school attendance for respective schools are as follows:

2 years for pre-school; 6 years for primary school; 4 years for secondary school; and

4 years for tertiary school. The period of tertiary school depends on the field of study.

Table A.5.2 Inventory of Hospitals, Barangay Health Station and Rural Health Units: 1996

Item	Philippines*1	Region I*1	Ilocos Norte	Laoag River Basin
1. Hospital	1,632	90	19	13
Public	537	30	9	6
Private	1,095	60	10	7
Bed Capacity	71,865	-	565	247
Bed Capacity per 1000 Population	1.1	-	1.1	0.9
2. Barangay Health Station	11,072	813	100	54
3. Rural Health Unit	2,327	145	26	13

Source: 1995 Philippine Statistical Yearbook, NSCB

Data from Department of Health (DOH), Regional/Provincial Division

Note: *1 Data in 1993

Table A.5.3 Inventory of Roads and Bridges: 1994

Item	Philippines	Ragion I	Ilocos Norte
1. Road by System Classification (km)			
a. National	26,659	1,500	417
b. Provincial	29,156	1,783	422
c. Municipal	12,819	1,080	295
d. City	3,949	168	131
e. Barangay	88,364	8,002	2,073
Total	160,948	12,533	3,338
2. Road by Surface Type (km)			
a. Concrete	13,586	769	320
b. Asphalt	13,117	1,356	154
c. Gravel	125,743	9,966	2,686
d. Earth	8,502	441	179
Total	160,948	12,533	3,338
Road Density (m./sq.km)	536	976	982
Land Area (Sq.km.)	300,000	12,840	3,399
3. Bridge			
Length of Bridges (m)	255,261	22,107	6,725
- Permanent *1	213,821	20,069	5,289
- Temporary *2	41,440	2,038	1,436

Source: (1) National Handbook on Land Other Physical Resources, NLUC and NEDA
 (2) 1995 Philippine Statistical Yearbook, NSCB
 (3) Data presented by DPWH

Note: *1 Concrete, Steel and Similar Materials
 *2 Bailey, Timber, Coconut and Similar Materials

Table A.5.4 Number of Households by Water Supply Systems: 1990

Item	Philippines	Ragion I	Ilocos Norte
1. Existing Water Supply System*1	893,661	159,921	-
Level I *1	892,916	159,856	-
Level II *2	156	10	-
Level III *3	589	55	6 *4
2. Households Served	4,057,425	388,425	60,271
Level I	3,395,227	348,620	-
Level II	27,981	1,563	-
Level III	634,217	38,242	12,634 *4
3. Coverage of Household Served (%) *4	35.6	58.9	65.8
1990 Census Population (1000)	60,559	3,547	461
1990 Households (1000)	11,407	659	92

Source: (1) National Handbook on Land Other Physical Resources, NLUC and NEDA
 (2) Data presented by LWUA
 (3) Socio-Economic Profile, Province of Ilocos Norte

Note: *1 Water supply Level I consist of shallow wells, deep wells, dug wells, developed springs, rivers/ponds/udeveloped springs and rain collectors, as of 1987.
 *2 RWSA projects (completed-operational), as of July 31, 1987.
 *3 1990Number of cities/municipalities covered by water districts, as of June 30, 1990.
 *4 Figures in 1995

Table A.5.5 Electrification Program: Coverage, Number and Percentage Served as of May, 1996

Item	Philippines	Ragion I	Ilocos Norte
1. Municipality Level			
Program Coverage (nos)	1,416	116	23
Number Energized (nos)	1,374	115	23
Percent Served (%)	97%	99%	100%
2. Barangay Level			
Program Coverage (nos)	35,341	3,012	558
Number Energized (nos)	23,753	2,839	556
Percent Served (%)	67%	94%	100%
3. Total Connection			
Program Coverage (nos)	7,209,000	541,000	87,000
Number Energized (nos)	3,984,201	424,373	82,009
Percent Served (%)	55%	78%	94%

Source: Data presented by NEA

Table A.5.6 Telephone Sservice Penetration by Operation by Operator by Operator Category As of December, 1995

Item	Philippines	Ragion I	Ilocos Norte
1. Number of Cities & Municipalities	1,604	125	23
2. Cities & Municipalities Served			
- No. of Cities & Mun. Served	-	69	11
- Capacity	-	37,133	7,880
- Total Connection	1,409,639	27,711	5,798
- 1995 Population (1000) *1	70,267	4,031	524
- Telepone Density per 100 persons *2	2.01	0.69	1.11
3. Towns not Served	-	56	12

Source: (1) National Handbook on Land Other Physical Resources, NLUC and NEDA
(2) 1995 Philippine Statistical Yearbook, NSCB

Note: *1 Population based on ten year projection by region of NEDA on February 1996.

*2 As a reference, the telephone density in NCR, the densest area, was 8.31.

Table A.6.1 Trend of National Government Financial Statement: 1990-1995

Item	(Unit: Billion Pesos)					
	1990	1991	1992	1993	1994	1995
Revenue	180.9	220.8	242.7	260.4	336.2	360.3
1. Tax Revenue	151.7	182.3	208.7	230.2	271.3	310.0
a. Income & Profit Taxes	49.4	61.1	70.1	74.8	91.9	-
b. Property Tax	0.3	0.2	0.2	0.2	0.4	-
c. Taxes on Goods & Services	50.7	51.2	57.3	65.9	76.0	-
d. Taxes on International Trade & Transactions	46.6	65.0	73.6	82.7	82.3	-
e. Others	4.7	4.9	7.5	6.5	20.7	-
2. Non-tax Revenue	29.2	38.5	34.0	30.2	64.9	50.3
Expenditure	255.8	298.9	308.4	313.7	373.6	384.6
1. Social Services	49.1	65.0	67.4	64.5	93.3	106.8
2. Economic Services	51.9	59.0	66.7	64.2	81.8	84.1
a. Agriculture, Natural Resources, etc.	15.1	18.0	18.7	15.5	18.2	17.3
b. Trade & Industry	1.7	1.4	1.7	2.4	2.6	2.9
c. Tourism*1	-	-	-	0.4	0.5	0.5
d. Power & Energy	6.8	1.8	2.5	5.4	2.0	0.9
e. Water Resources & Flood Control	3.8	4.0	4.8	3.5	3.1	3.7
f. Communications & Transport	17.1	22.3	25.2	22.7	31.9	28.8
g. Others	7.4	11.5	13.8	1.3	7.0	11.6
h. Subsidy to LGUs*2	-	-	-	13.0	16.5	18.4
3. Defense	22.7	25.2	26.3	19.9	22.0	24.3
4. General Public Services	23.6	26.1	33.3	48.3	50.7	58.9
5. Net Lending	-	-	-	2.7	1.2	1.1
6. Debt Service Fund	108.5	123.6	114.5	114.1	124.6	109.4
a. Interest Payments	-	-	-	77.3	87.0	77.2
b. Principal Amortization	-	-	-	36.8	37.6	32.2
Balance	-74.9	-78.1	-65.7	-53.3	-37.4	-24.3

Source: 1996 Philippine Statistical Yearbook, Oct 1996, NSCB

Budget on Expenditure and Sources of Financing, Department of Budget and Management

Note: *1 "Tourism" is included in "b) Trade & Industry" for 1990-1992.

*2 "Subsidy to LGUs" is included in "g) Others" for 1990-1992.

**Table A.6.2 Trend of Provincial Government Financial Statement in Ilocos Norte:
1990-1995**

Item	(Unit: Million Pesos)					
	1990	1991	1992	1993	1994	1995
Revenue	28.5	33.5	53.4	92.5	148.6	177.6
1. National Assistance	16.2	22.5	46.1	83.4	136.6	162.7
a. Internal Revenue Allotment	16.2	22.5	46.1	83.4	124.2	136.9
b. Tobacco Excise Tax	-	-	-	-	12.4	25.8
2. Tax Revenue	4.3	3.2	2.8	3.2	3.9	5.1
a. Property Tax	3.0	2.6	2.6	2.8	3.5	4.3
b. Local Taxes	1.4	0.7	0.2	0.4	0.4	0.8
3. Non-tax Revenue	8.0	7.8	4.5	5.9	8.1	9.8
Expenditure	23.9	33.2	51.9	87.7	113.0	145.6
1. General Public Services	16.9	22.9	33.5	32.7	36.5	42.3
2. Education, Culture and Sports	0.0	0.0	0.0	0.0	0.1	0.1
3. Health Services	0.5	0.7	0.4	21.9	27.9	33.4
4. Housing & community Development	0.3	0.9	0.4	0.8	0.7	1.1
5. Social welfare Services	0.3	0.5	0.5	1.1	1.4	1.9
a. Social welfare Services	-	-	-	0.6	0.9	1.4
b. Population Control	0.3	0.5	0.5	0.5	0.5	0.6
6. Economic Services	1.2	2.4	9.2	19.9	15.2	24.0
a. Agriculture, Veterinary, & Natural Resources, etc.	1.0	1.9	1.2	6.7	8.1	8.9
b. Engineering Services	-	-	7.7	13.0	6.8	14.7
c. Radio communication Services	-	-	0.2	0.2	0.2	0.3
d. Provincial Telephone System	0.2	0.5	-	-	-	-
7. Other Purposes	4.6	5.7	7.9	11.3	31.3	42.8
a. Infrastructure Fund	2.7	2.8	-	-	-	-
b. Local Development Projects	1.8	2.7	6.9	7.6	11.9	11.8
c. Retirement & Other Benefits	-	-	-	0.1	0.1	0.2
d. Provincial Aid to Barangays	0.0	-	0.5	0.5	0.5	0.5
e. Budgetary Reserves	0.1	0.1	0.5	3.1	6.3	7.2
f. Others-Loan Amortization	-	-	-	-	1.4	1.5
g. Tobacco Excise Tax (R.A.7171)	-	-	-	-	11.1	21.5
h. Public Safety	-	-	-	-	-	0.2
i. Miscellaneous	-	0.1	-	-	-	-

Source: Provincial Accountant of Ilocos Norte

**Table A.6.3 Trend of National Budget for Capital Investment of Flood Control Projects:
1990-1998**

(Unit: Million Pesos)

Year	National Total	Region I			Other Regions
		Region Total	Ilocos Norte Province	Other Three Provinces	
DPWH Record					
1990	1,327.6	151.8	1.0	150.8	1,175.8
1991	1,552.0	90.5	-	90.5	1,461.5
1992	2,077.9	58.9	-	58.9	2,019.0
1993	1,715.7	51.4	-	51.4	1,664.3
1994	1,907.0	129.2	6.5	122.7	1,777.8
1995	2,606.0	151.3	1.8	149.5	2,454.7
1996	2,852.9	108.0	10.0	98.0	2,744.9
DPWP Program *1					
1997	3,542.2	321.8 *2	126.6 *2	195.2 *2	3,220.4
1998	5,261.0	522.0 *2	279.7 *2	242.3 *2	4,739.0
Later Years	36,937.7	5,554.2 *2	393.7 *2	5,160.5 *2	31,383.5

Source: DPWH Medium-term Public Investment Program 1993-1998, DPWH

Note: *1 Quoted from the above source.

*2 Locally funded projects are not included.

**Table A.6.4 Trend of National Disbursement for Capital Investment of Flood Control Projects:
1990-1995**

(Unit: Million Pesos)

Year	National Total	Region I			Other Regions
		Region Total	Ilocos Norte Province	Other Three Provinces	
I. Locally Funded					
1990	1,287.9	0.0	0.0	0.0	1,287.9
1991	788.3	0.0	0.0	0.0	788.3
1992	287.1	0.0	0.0	0.0	287.1
1993	790.4	18.0	0.0	18.0	772.4
1994	822.3	95.5	10.0	85.5	726.8
1995	0.0	0.0	0.0	0.0	0.0
II. Foreign Assisted					
1990	Total	50.0	0.0	0.0	50.0
	Local	25.0	0.0	0.0	25.0
	Foreign	15.2	0.0	0.0	15.2
1991	Total	40.6	0.0	0.0	40.6
	Local	20.3	0.0	0.0	20.3
	Foreign	0.0	0.0	0.0	0.0
1992	Total	0.0	0.0	0.0	0.0
	Local	0.0	0.0	0.0	0.0
	Foreign	0.0	0.0	0.0	0.0
1993	Total	923.4	35.4	0.0	888.0
	Local	461.7	0.7	0.0	461.0
	Foreign	701.2	34.7	0.0	666.5
1994	Total	724.4	27.2	0.0	697.2
	Local	362.2	6.5	0.0	355.7
	Foreign	605.0	20.7	0.0	584.3
1995	Total	738.6	22.4	0.0	716.2
	Local	369.3	0.0	0.0	369.3
	Foreign	744.6	22.4	0.0	722.2

Source: DPWH

Table A.7.1 Population Projection: 1995 to 2020

Area	Population (in 1000)				Average Annual Growth Rate 1995/2020(%)
	1995 ^{*1}	2000	2010	2020	
Total Population					
1. Philippines	68,349.5	78,320.1	91,851.3	105,503.1	1.75
2. Region I	3,791.7	4,140.5	4,802.0	5,328.3	1.37
3. Ilocos Norte Province	482.7	504.6	551.5	602.8	0.89
4. Population in One City and Ten Municipalities Related to the Laoag River Basin					
Laoag City	88.3	92.7	101.8	111.4	0.93
San Nicolas	29.1	30.5	33.3	36.3	0.89
Sarrat	21.3	22.7	25.7	28.9	1.23
Dingras	31.5	32.3	34.0	35.6	0.49
Solsona	19.7	20.4	21.8	23.2	0.67
Piddig	17.8	18.4	19.8	21.1	0.69
Marcos	13.7	14.3	15.7	17.2	0.92
Espiritu	16.0	16.5	17.7	18.9	0.68
Nueva Era	6.2	7.4	10.3	14.3	3.37
Carasi	0.8	0.9	1.2	1.7	3.34
Vintar	27.5	27.7	28.1	28.4	0.14
Total	271.8	283.8	309.4	337.2	0.87
Household Population					
5. Population in One City and Ten Municipalities Related to the Laoag River Basin					
Laoag City	87.8	92.1	101.1	110.7	0.93
San Nicolas	29.0	30.4	33.2	36.2	0.89
Sarrat	21.3	22.7	25.7	28.9	1.23
Dingras	31.5	32.3	34.0	35.6	0.49
Solsona	19.7	20.4	21.8	23.2	0.67
Piddig	17.8	18.4	19.8	21.1	0.69
Marcos	13.7	14.3	15.7	17.2	0.92
Espiritu	16.0	16.5	17.7	18.9	0.68
Nueva Era	6.2	7.3	10.2	14.2	3.37
Carasi	0.8	0.9	1.2	1.7	3.34
Vintar	27.4	27.6	28.0	28.4	0.14
Total	271.0	283.0	308.5	336.2	0.87
6. Population within the Laoag River Basin Boundary					
Laoag City	39.9	41.8	45.9	50.3	0.93
San Nicolas	29.0	30.4	33.2	36.2	0.89
Sarrat	21.1	22.4	25.4	28.6	1.23
Dingras	31.5	32.3	34.0	35.6	0.49
Solsona	19.7	20.4	21.8	23.2	0.67
Piddig	17.6	18.3	19.6	20.9	0.69
Marcos	13.7	14.3	15.7	17.2	0.92
Espiritu	15.8	16.3	17.5	18.7	0.68
Nueva Era	5.0	5.9	8.2	11.4	3.37
Carasi	0.4	0.5	0.7	1.0	3.34
Vintar	3.4	3.4	3.5	3.5	0.14
Total	196.9	206.0	225.5	246.6	0.90

Source: NEDA, Region I, and NSO

Note: *1 The 1995 census population

Table A.7.2 GDP and GRDP Projection at 1995 Constant Prices: 1995 to 2020

Area	Updated Medium-Term Plan Period			*2	*2	*2	
	1995	1996	1998	2000	2010	2020	
1. GDP and GRDP Growth Rates Used in this Study (Billion Pesos at 1996 Constant Prices)							
1) Philippines	4.83 *1						
Low Growth Rate (%)		5.60		5.60	4.20	2.80	
Medium Growth Rate (%)		7.20		7.20	5.40	3.60	
High Growth Rate (%)		7.60		7.60	5.70	3.80	
2) Region I	7.74 *1						
Low Growth Rate (%)		4.90		4.90	3.68	2.45	
Medium Growth Rate (%)		6.20		6.20	4.65	3.10	
High Growth Rate (%)		8.90		8.90	6.68	4.45	
2. GDP and GRDP Projection (Billion Pesos at 1995 Constant Prices)							
1) Philippines	1,906.43 *1						
Low Growth Rate (%)		2,013.19	2,244.98	2,503.46	3,777.62	4,979.08	
Medium Growth Rate (%)		2,043.69	2,348.58	2,698.95	4,566.69	6,504.27	
High Growth Rate (%)		2,051.32	2,374.97	2,749.68	4,786.66	6,950.34	
2) Region I	58.25 *1						
Low Growth Rate (%)		61.11	67.24	73.99	106.15	135.22	
Medium Growth Rate (%)		61.86	69.77	78.69	123.97	168.23	
High Growth Rate (%)		63.44	75.23	89.22	170.25	263.12	
3. Per Capita G(R)DP							
A. Per Capita G(R)DP (Pesos at 1995 Constant Prices)							
1) Philippines	Low	27,892	28,663	30,269	31,964	41,128	47,194
	Medium	27,892	29,097	31,666	34,461	49,718	61,650
	High	27,892	29,206	32,021	35,108	52,113	65,878
2) Region I	Low	15,363	15,835	16,822	17,870	22,106	25,378
	Medium	15,363	16,031	17,455	19,005	25,817	31,574
	High	15,363	16,438	18,820	21,547	35,453	49,382
B. Per Capita G(R)DP (US\$ at 1995 Constant Prices: 25.80 Pesos/US\$)							
1) Philippines	Low	1,081	1,111	1,173	1,239	1,594	1,829
	Medium	1,081	1,128	1,227	1,336	1,927	2,390
	High	1,081	1,132	1,241	1,361	2,020	2,553
2) Region I	Low	595	614	652	693	857	984
	Medium	595	621	677	737	1,001	1,224
	High	595	637	729	835	1,374	1,914
C. Average Growth Rate (%/annum)							
1) Philippines	Low	2.42	2.76	2.76	2.76	2.55	1.39
	Medium	2.42	4.32	4.32	4.32	3.73	2.17
	High	2.42	4.71	4.71	4.71	4.03	2.37
2) Region I	Low	5.67	3.07	3.07	3.07	2.15	1.39
	Medium	5.67	4.35	4.35	4.35	3.11	2.03
	High	5.67	7.00	7.00	7.00	5.11	3.37

Source: Medium-Term Philippine Development Plan 1993-1998, 1993, NEDA

Note: *1 Real estimate in 1990

*2 Growth rate was assumed: 3/4 of the plan during 2000-2010 and 1/2 after 2010.

Table A.7.3 Projected Public Investment by National Government: 1995 to 2020

Item	(Unit: Billion Pesos)				
	1990-95 Average	1990-95 Average*1	1995	2000	2010 2020
1. GDP at 1995 Constant Prices *2	-	1,458.5	1,906.4	2,699.0	4,566.7 6,504.3
2. Total Expenditure by National Government*3	100.0%	322.5	384.6	596.8	921.3 1,438.2
1) Economic Services	21.1%	68.0	84.1	125.7	194.1 303.0
a. Agriculture, Natural Resources, etc.	5.3%	17.1	17.3	31.7	48.9 76.4
b. Trade & Industry	0.7%	2.1	2.9	3.9	6.0 9.4
c. Tourism	0.1%	0.5	0.5	0.9	1.3 2.1
d. Power & Energy	1.0%	3.2	0.9	6.0	9.2 14.4
e. Water Resources & Flood Control	1.2%	3.8	3.7	7.1	10.9 17.0
- Flood Control*4	0.4%	1.3	0.7	2.5	3.8 5.9
- a. Locally Funded	0.2%	0.7	0.0	1.2	1.9 3.0
- b. Foreign Assisted	0.1%	0.4	0.7	0.8	1.2 1.8
f. Communications & Transportation	7.6%	24.7	28.8	45.6	70.5 110.0
g. Others	2.7%	8.8	11.6	16.2	25.0 39.1
h. Subsidy to LGUs	5.0%	16.0	18.4	29.5	45.6 71.2
3. Expenditure for Flood Control					
1) Single Year Investment	-	1.3	0.7	2.5	3.8 5.9
2) Accumulation of Capital Investment (After 1995 to the Year Indicated *5)	-	-	0.7	8.8	40.2 88.9

Note:

*1 Average of expenditure between 1990 and 1995 at current prices

*2 Refer to Table A.7.2.

*3 Rate of the total expenditure to GDP was assumed at 22.1%, average between 1990 and 1995.

*4 Capital expenditure only.

Table A.8.1 Major Projects For Ilocos Norte

Project Title	Location	Lead/Support Agencies	Funding Source	Status
Primary Sector Development Projects Philippine Forest Development Program in Ilocos Norte	2nd District of Ilocos Espiritu, Marcos, Nueva Era, Piddig, Sarat and Solsora	DENR/LGU/NGO	ODA/GOP	Funded under ADB/OECF Loan II Survey, Mapping and Planning on-going
High Value Commercial and Cash Crop Industrial Sector Development Projects	Provincial Wide	DA/LGU/NGO/PO	ODA/GOP/Private	
Currimeo Industrial Area Development Cement Plant	Currimeo Pimili	DT/LGU/NGO/PO DT/DENR/LGU/ NGO/PO	Private Private	Preliminary Design being done BOI Promotion with Taiwanese investors on-going
Ceramics Plant	Pasquin	DT/DENR/LGU/ NGO/PO	Private	BOI Promotion with Taiwanese investors on-going
Garlic Processing Plant	Paoy	DT/LGU/NGO/PO	Private	No F/S as yet
Tourism Sector Projects Pagudpud-Bangui Tourism Estate Laoag-Paoy Tourism Circuit and Sports Complex	Bangui & Pagudpud Laoag City & Paoy	DOT/LGU/NGO/PO DOT/LGU/NGO/PO	Private Private	F/S on-going / Negotiation with investor on-going Some facilities are in place
Infrastructure Development Project Currimeo Port Improvement Laoag River Basin Development Laoag International Airport Expansion and Development	Currimeo Laoag River Basin Laoag City	PPA/LGU/NGO/PO DPWH/DENR/LGU ATO/LGU	BOT ODA BOT	For funding/ F/S on-going M/P on-going Construction on-going
Laoag Substation Expansion Ilocos Norte Irrigation Project (Stage II) Rosario-Laoag Road (Badoc-Laoag) Small Water Impound Project	Laoag City Nueva Era North Manila Road Provincial Wide	NAPOCOR NIA/LGU DPWH/LGU DA/LGU	NAPOCOR ODA/GOP ODA ODA/LGU	Land acquisition on-going Detailed Engineering to be conducted Portion rehabilitated For funding

Source: Provincial Planning and Development Office, Ilocos Norte

Table A.8.2 System Profile of National Irrigation Systems in Laoag River Basin

Name of System	Source of Water Supply	Official Opening of System	Current status	Town Served	Furmed up Service Area (ha)	Designed Service Area	Potential IA Area	No. of IA with Contract	Diversion Type
1 Dingrass RIS	Bongo River	1930	Operational	Marcos, Dingras	1,018	1,106	1,106	2	Run-off the river
2 Bonga Pump No.1	Laoag River	1976	Operational	Sarrat San Nicolas	298	298	298	1	Electric Pump
3 Bonga Pump No.2	Laoag River	1976	Operational	San Nicolas Laoag	674	699	699	1	Electric Pump
4 Bonga Pump No.3	Laoag River	1976	Operational	Laoag	202	202	202	1	Electric Pump
5 Cura RIS	Barbaqued River (Cura River)	1972	Operational	Carasi, Solsona Piddig	431	676	676	1	Run-off the river
6 Laoag Vintar RIS	Vintar River	1932	Operational	Vintar, Bacarra Laoag, Sarrat	(2,377) 370	2,536	2,536	3	Run-off the river
7 INIP, Phase I	Nueva Era, Papa, Madongan, Solsona Labuganon R.	1986	Operational	Nueva Era, Espiritu, Marcos, Dingras Solsona	9,212	10,200	10,907		Run-off the river
Total					12,205				

Source: Office of Ilocos Norte Irrigation System, NIA (NIA-INIS), Laoag, Ilocos Norte

Note: Irrigation service Area of Laoag Vintar RIS within the Laoag River Basin is estimated by JICA Study Team

Table A.8.3 Road Inventory

Description	Project Area	Ilocos Norte	Region I	Philippines
1 Total Road Kilometerage	1,790.58	3,338.03	12,532.95	160,947.73
By Type of Administration				
National	128.90	417.38	1,499.81	26,658.74
Provincial	219.39	422.10	1,783.47	29,156.25
Municipal/City	144.46	425.52	1,247.18	16,768.76
Barangay	1,297.83	2,073.00	8,002.50	88,363.98
By Surface Type				
Concrete		319.92	769.30	13,586.02
Asphalt		153.87	1,356.04	13,116.71
Gravel		2,685.62	9,966.36	125,743.18
Earth		178.62	441.25	8,501.83
Percentage of Pavement (Concrete and Asphalt)		14.2%	17.0%	16.6%
2 Road Density (km/sq.km)				
Per Total Area	1.34	0.98	0.98	0.54
Per Arable Area	2.85	2.3	1.55	1.14
3 Road Population Ratio (km/1,000 population)	9.48	7.23	3.44	2.59
4 Total Bridge Inventory (LM)				
Permanent Structure				
Temporary				
5 Area (sq.km)				
Total Land Area	1,332.10	3,399.34	12,840.19	300,000.00
Alienable and Disposable Land	629.34	1,449.48	8,100.62	141,172.44
6 Population				
1990 Census	188,782	461,661	3,647,933	62,049,229
1996 Projection	209,245	511,000	4,107,377	71,899,136

Note: Road length of National Roads in Project Area is excluding the length in mountain area.
Source: Road length of Ilocos Norte, Region I and Philippines, DPWH as of Dec. 1994.
Area and population of Ilocos Norte, Region I and Philippines, 1995 Philippine Statistical Year Book, NSO.
Road length, area and population of Project Area are estimated by JICA Study Team.

Table A.8.4 Existing Roads in Project Area

Province/City Municipality	Area excluding Forest Land (sq.km)	National Roads		Provincial/City Roads		Municipal R./City Street		Barrangay Roads		Total	
		Length (km)	Density (km/sq.km)	Length (km)	Density (km/sq.km)	Length (km)	Density (km/sq.km)	Length (km)	Density (km/sq.km)	Length (km)	Density (km/sq.km)
Laoag City	49.07	25.27	0.51	17.55	0.36	14.80	0.30	151.14	3.08	208.76	4.25
San Nicolas	39.52	12.51	0.32	16.18	0.41	34.07	0.86	80.35	2.03	143.11	3.62
Sarrat	53.66	16.03	0.30	14.00	0.26	17.59	0.33	62.96	1.17	110.58	2.06
Dingras	89.32	13.05	0.15	91.19	0.70	13.29	0.15	191.40	2.14	308.93	3.46
Solsona	118.38	16.07	0.14	30.68	0.26	7.96	0.07	101.84	0.86	156.55	1.32
Piddig	90.92	10.12	0.11	25.19	0.28	12.60	0.14	233.47	2.57	281.38	3.09
Marcos	41.05	6.60	0.16	*****	0.70	11.51	0.28	153.25	3.73	171.36	4.87
Banna (Espiritu)	64.99	28.25	0.43	23.23	0.36	8.84	0.14	158.45	2.44	218.77	3.37
Nueva Era	50.74	1.00	0.02	0.00	0.00	5.27	0.10	113.04	2.23	119.31	2.35
Carasi	17.81	0.00	0.00	0.00	0.00	0.98	0.06	21.00	1.18	21.98	1.23
Vintar	13.88	0.00	0.00	18.96	1.37	0.00	0.00	30.93	2.23	49.89	3.59
Total	629.34	128.90	0.20	236.98	0.38	126.91	0.20	1297.83	2.06	1790.62	2.85
Ilocos Norte	1,412.09	484.13	0.34	677.36	0.48	362.12	0.26	2284.33	1.62	3807.94	2.70

Note: Each road length are estimated by JICA Study Team based on gotten data and boundary of Laoag River Basin determined.

Length of national and provincial roads are excluding the length locating in the mountain area.

Length of provincial roads in Dingras is including the length of provincial roads in Marcos.

Areas excluding forest land are estimated based on the existing land use data gotten from PPDO, Ilocos Norte and municipalities. Source:DPWH-INED, PPDO-I.N., Provincial Engineer's Office, Laoag City Engineer's Office and Office of Municipal Engineer's Offices.

Table A.8.5 Existing Roads in Project Area by System Classification and Pavement

Unit : Km

(1/3)

Name of Road	Type of Road (Pavement)				Total Length (km)
	Concrete	Asphalt	Gravel	Earth	
I. National Roads in Ilocos Norte Province					
1-1. DPWH-INED, Region I					
Manila North R.	1.85				1.85
Laoag Airport R.	6.90				6.90
Laoag - Sarrat R.	2.87	1.60			4.47
Ilocos Norte - Apayao R.	6.15		16.00	41.01	63.16
Laoag - Sarrat - Piddig - Solsona R.	22.59	1.00			23.59
Los Martires Delta Patria R.	0.29				0.29
Bonifacio-Calipulaco-Pasion R.	1.64				1.64
Bonifacio - Ablan Castro St.	0.60				0.60
Laoag - Paoay - Balacad R.		9.17			9.17
Sub-Total	42.89	11.77	16.00	41.01	111.67
1-2. DPWH-INED, Region II					
Manila North R.	7.08				7.08
Ilocos Norte - Apayao R.	5.43				5.43
Batac - Espiritu R.	2.50			7.25	9.75
Ilocos Norte - Abra R.	26.97			45.90	72.87
Darrat Junction Pinili - Nueva Era R.	7.40				7.40
Sub-Total	49.38	0.00	0.00	53.15	102.53
TOTAL OF NATIONAL ROADS	92.27	11.77	16.00	94.15	214.19
II. Provincial Roads					
2-7 DINGRAS-MARCOS					
41. Dingras-Mangitayag-Tonoton	0.15	0.25	6.10		6.50
42. Dingras-Padong	0.06		9.96		10.03
43. Dingras-Marcos	4.69		2.80		7.49
44. Road around Dingras Market	0.08	0.19			0.27
45. Dingras-Tabtabagan			16.00		16.00
46. Biding-Natayag			3.20		3.20
47. Tungal-Casubsuban			13.81		13.81
48. Lanas-Elizabeth-Ver-Pacifico			8.50		8.50
49. Mabuti-Capariaan			8.10		8.10
52. Pacifico-Escoda-Santiago			11.40		11.40
53. Bacsil-Capasán-Espiritu	0.30		5.60		5.90
Sub-total (11 Lines)	5.28	0.44	85.47	0.00	91.19
2-8 ESPIRITU					
54. Espiritu-Binacag	0.10		1.90		2.00
55. Espiritu-Caestebanan-Tunged			8.59		8.59
56. Espiritu-Mangearmay	0.05		1.15	0.20	1.40
57. Espiritu-Sto. Nino			3.20		3.20

Table A.8.5 Existing Roads in Project Area by System Classification and Pavement (Continued)

(2/3) Name of Road	Type of Road (Pavement)				Total Length (km)
	Concrete	Asphalt	Gravel	Earth	
58. Pinili-Espiritu	0.10	0.25	7.29		7.64
59. Roads around Espiritu Market		0.40			0.40
Sub-total (6 Lines)	0.25	0.65	22.13	0.20	23.23
2-12 PIDDIG-CARASI					
82. Piddig-Lamin-Carasi	0.20		6.30	5.17	11.67
83. Piddig-Sunsuken			1.13		1.13
84. Roads around Piddig Market		0.20			0.20
85. Piddig-Calambeg			4.83		4.83
86. Piddig-Maab-abucay			7.36		7.36
Sub-total (5 Lines)	0.20	0.20	19.62	5.17	25.19
2-14 SAN NICOLAS					
94. Roads around San Nicolas Market		0.17	0.03		0.20
95. San Nicolas-Bugnay Similla	0.04		3.01	0.35	3.40
96. San Nicolas-Darayday	0.15		1.77		1.92
97. San Nicolas-Payas Road	1.10		2.98		4.08
98. San Nicolas-Nalundasan			2.50	1.50	4.00
99. San Nicolas-Sarrat	0.50		2.08		2.58
Sub-total (6 Lines)	1.79	0.17	12.37	1.85	16.18
2-15 SARRAT					
100. Roads around Sarrat Market	0.20				0.20
101. Sarrat-Parang	0.32		1.60	0.25	2.17
102. Sta. Rosa-Pandan Pariir	0.15	0.35	10.04		10.54
103. Sta. Rosa-Similla Hill			0.40		0.40
104. Vintar-Sarrat Road #24			0.70		0.70
Sub-total (5 Lines)	0.67	0.35	12.73	0.25	14.00
2-16 SOLSONA					
105. Roads around Solsona Market	0.20				0.20
106. Solsona-Karingking		0.30	3.40		3.70
107. Solsona-Talugtog	0.16		6.39		6.55
108. Capitol Driveway	0.08				0.08
109. Solsona-Baghbago Sur			14.26		14.26
110. Piddig-Solsona-San Julian			5.85		5.85
Sub-total (6 Lines)	0.44	0.30	29.90	0.00	30.64
2-17. VINTAR					
111. Laoag-Vintar-Bacarra	0.76				0.76
112. Pallas School-Namoroc-Mabanbanag	0.10		6.40		6.50
114. Vintar-Pallas-Piddig	1.06		4.84		5.90
117. Vintar-Sarrat Road	0.38		5.42		5.80
Sub-total (4 Lines)	2.30	0.00	16.66	0.00	18.96
TOTAL OF PROVINCIAL ROADS	10.93	2.11	198.89	7.47	219.39

Table A.8.5 Existing Roads in Project Area by System Classification and Pavement (Continued)

Unit : Km

(3/3)

Name of Road	Type of Road (Pavement)				Total Length (km)
	Concrete	Asphalt	Gravel	Earth	
III. City Roads/Streets					17.55
Laoag City (City Roads)					14.80
Laoag City (City Streets)					
Total of City Roads/Streets					32.35
IV. Municipal Roads					34.07
San Nicolas					17.59
Sarrat					13.29
Dingras					7.96
Solsona					12.60
Piddig					11.51
Marcos					8.84
Banna (Espiritu)					5.27
Nueva Era					0.98
Carasi					0.00
Vintar					
Total of Municipal Roads					112.10
V. Barangay Roads					151.14
Laoag City					80.35
San Nicolas					62.96
Sarrat					191.40
Dingras					101.84
Solsona					233.47
Piddig					153.25
Marcos					158.45
Banna (Espiritu)					113.04
Nueva Era					21.00
Carasi					30.93
Vintar					
Total of Barangay Roads					1,297.83

Note: Each road length are estimated by JICA Study Team based on the gotten data and boundary of Laoag River Basin determined, but these figures are not exact due to lack of clear boundaries of municipalities.

Source: National Roads; DPWH-INED, Region I & II Offices, as of April 1996
 Provincial Roads; Provincial Engineer's Office, Ilocos Norte, as of 1996
 City Roads/streets, Municipal Roads and Barangay Roads; Laoag City Engineer's Office and Municipal Engineer's Offices as of 1995 - 1996.

Table A.9.1 Existing Land Use by Land Classification (City and Municipalities)

LAND CLASSIFICATION	ILOCOS NORTE PROVINCE	Laoag City	Sun Nicolas	Suetat	Ddingras	Solsoma	Piddig	Marcos	Banna	Nueva Era	Carasi	Vintar
I. Built Up Areas	9,610.73	528.25	1,123.92	608.26	344.00	997.00	979.92	69.35	1,061.21	47.01	59.12	322.14
1. Residential	479.02	33.37	264.01	1.38	0.85	3.30	0.00	1.00	8.91	0.63	1.75	2.40
2. Commercial	1,553.36	259.31	148.42	22.02	15.25	30.00	0.00	17.00	49.18	7.31	24.50	73.43
3. Institutional												
II. Agricultural Areas	84,567.11	7,109.61	1,800.99	4,179.34	6,645.00	7,134.00	7,906.50	2,818.00	4,380.38	3,332.07	451.50	2,256.00
1. Cropland	10,957.16	1.00	0.00	0.00	60.00	5.00	0.00	305.99	7.49	0.00	384.50	4,118.69
2. Tree Farm	267.65	36.05	30.40	0.00	12.00	22.00	0.00	131.98	0.00	0.00	5.00	0.00
3. Piggery/Poultry	965.87	81.00	0.00	0.00	32.80	25.00	0.00	7.00	5.47	1.00	1.00	0.00
4. Fishpond												
III. Forest Areas	151,799.29	262.29	500.00	2,205.21	1,000.00	3,611.61	4,752.01	3,448.00	872.00	56,025.37	7,010.51	21,104.24
1. Timber/Woodland	46,925.80	0.00	478.29	499.13	88.45	900.00	4,125.65	388.00	79.27	833.02	3,398.12	22,861.98
2. Grass Land/Pasture												
IV. Industrial Area	352.81	1.32	215.34	6.58	0.00	0.00	0.00	22.02	1.76	0.00	2.00	0.47
V. Bodies of Water	8,376.37	932.00	53.39	430.98	270.35	249.00	69.92	132.00	348.35	4,055.31	390.00	0.00
VI. Tourism Areas	227.02	0	2.66	1.50	1.20	7.32	0.00	3.00	0.00	0.00	0.00	0.00
VII. Roads & Bridges	3,340.42	312.00	91.85	106.60	204.30	126.72	84.06	154.24	218.70	114.23	100.00	171.36
VIII. Open Spaces/Playground	845.03	1.03	0.00	2.50	115.40	274.05	0.00	45.00	28.24	2.00	10.00	3.39
IX. Mineral Land	1,362.97	0.00	0.00	0.00	3.00	10.00	0.00	2.00	0.00	0.00	0.00	0.00
X. Cemetery	115.89	12.50	18.34	6.50	2.50	0.00	0.00	4.00	8.76	2.00	1.00	4.91
XI. Dumpsite	12.40	2.00	4.00	0.00	1.50	0.00	0.00	0.00	1.57	0.00	0.00	0.05
XII. Barren/Land Areas	2,357.07	725.00	0.00	0.00	60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1. Sand Dunes	307.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Beach Sand	5,295.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Rocky/Coralis	5,125.64	0.00	198.39	0.00	1,013.40	2,955.00	0.00	0.00	378.71	0.00	0.00	370.94
4. River Wash	5,090.19	454.27	0.00	0.00	150.00	0.00	51.94	392.42	0.00	50.05	351.00	0.00
5. Barren/Idle Land												
TOTAL	339,934.00	10,751.00	4,930.00	8,070.00	10,020.00	16,350.00	17,970.00	7,941.00	7,450.00	64,470.00	12,190.00	51,290.00

Source: PPDO, Ilocos Norte (as of October 1994)

Note: The land areas mentioned on this table are not official issue because of no completion of cadastral surveys of some municipalities.

Table A.9.2 Area of Laoag River Basin by Drainage Blocks

(Unit: Ha)

Block No.	Total Area	Mountainous Area	River Bed	Low Land	Breakdown of Low Land Area						
					Cultivated	Residence	Tree	Brush/Grass Land	River Wash	Road/Canal and Creek	
BO1	5,700.0	5,700.0	0.0	0.0							
BO2	4,520.0	3,093.5	163.0	1,263.5	978.1	29.3	96.6	22.5	85.2	51.7	
BO3	2,450.0	308.8	267.2	1,874.0	1,455.1	44.3	59.8	92.5	146.0	76.5	
BO4	6,810.0	6,810.0	0.0	0.0							
PA	5,140.0	5,140.0	0.0	0.0							
BO5	2,290.0	1,667.1	214.4	408.5	341.9	7.5	20.2	20.9	0.0	18.0	
BO6	8,560.0	1,525.5	787.6	6,247.0	3,709.8	148.2	253.6	216.2	1,723.9	195.3	
MA1	10,580.0	10,580.0	0.0	0.0							
MA2	4,230.0	4,230.0	0.0	0.0							
MA3	570.0	570.0	0.0	0.0							
SO2	1,070.0	1,070.0	0.0	0.0							
SO1	7,900.0	7,900.0	0.0	0.0							
SO3	5,720.0	1,698.3	241.1	3,780.7	2,798.7	60.7	281.6	103.5	388.9	147.3	
SO4	1,490.0	220.7	68.0	1,201.3	960.4	74.8	39.2	71.8	4.5	50.6	
CU1	6,950.0	6,950.0	0.0	0.0							
LB	10,050.0	10,050.0	0.0	0.0							
CU2	2,100.0	2,100.0	0.0	0.0							
CU3	8,370.0	2,245.8	1,552.5	4,571.7	3,525.1	281.3	271.3	307.1	1.5	185.4	
GU	17,830.0	13,552.4	349.7	3,928.0	3,224.1	216.7	200.4	117.0	0.0	169.7	
LA1	5,000.0	2,430.1	0.0	2,569.9	1,878.6	169.4	409.4	13.6	0.0	98.9	
LA2	3,810.0	1,607.6	724.2	1,478.3	1,127.4	113.2	170.2	8.0	0.0	59.3	
LA3	4,300.0	1,460.5	629.8	2,209.7	1,578.4	298.8	174.7	74.8	0.0	83.1	
R4	1,510.0	0.0	696.5	813.6	458.1	125.0	75.7	130.7	0.0	24.1	
LA5	6,260.0	2,652.1	0.0	3,607.9	2,629.3	500.3	181.3	158.6	0.0	138.4	
Total	133,210.0	93,562.4	5,694.0	33,953.8	24,665.0	2,069.5	2,234.0	1,337.2	2,350.0	1,298.3	
Laoag Drain	2,290.0	737.7	0.0	1,552.3	1,125.7	337.0	30.4	0.0	0.0	59.2	
Drainage area at Guilbert Bridge	125,440.0										
G-Total	135,500.0	94,300.1	5,694.0	35,506.1	25,790.7	2,406.5	2,264.4	1,337.2	2,350.0	1,357.5	

Source: Measured by JICA Study Team.

Note: Areas of Low Land and River Bed : Lands having less than 3% slope, but total area is not include the all arable land in the basin.

Mountainous Area: Land having more than 3% slope and a flat or gentle slope cropping land on the crown of hilly land or inner valley of tributaries.

Block No. and location of them are referred Fig. B.4.1

Table A.9.3 Damaged or Lost Land by floods during 1975 to 1995
along the Bongo River and its related tributaries

Flooding Zone of Each Tributaries	River Bed Area formed till 1995 (ha)	Washed out Cultivated land (ha)	Recovered cultivated Land during 1975-1995 (ha)	Washed out House Lots (Houses)
Bongo River	1,250	40	17	0
Dong-dong River	64	40	20	0
Lading Creek	85	14	0	0
Cabittauran Creek	26	5	0	0
Papa River	925	64	26	0
Madongan River	2,112	142	110	0
Cuyep-cuyep River	45	39	8	0
Solsona River	1,364	202	30	6
Cura River	1,253	334	0	11
Labugaon River	503	250	0	14
Total	7,627	1,130	211	31

Table A.9.4 Existing and Proposed Land Use by Land Classification (Province of Ilocos Norte)

LAND CLASSIFICATION	Existing Land Use		Proposed Land Use		Increase/ Decrease	Percent of Incr/Decr.
	Area (ha)	Percent(%)	Area (ha)	Percent(%)		
I. Built Up Areas						
1. Residential	9,610.73	2.83	12,099.82	3.56	2,489.09	25.90
2. Commercial	479.02	0.14	2,737.51	0.81	2,258.49	471.48
3. Institutional	1,553.36	0.46	2,206.77	0.65	653.41	42.06
II. Agricultural Areas						
1. Cropland	84,567.11	24.88	86,806.28	25.54	2,239.17	2.65
2. Tree Farm	10,957.16	3.22	17,198.17	5.06	6,241.01	56.96
3. Piggery/Poultry	267.65	0.08	314.28	0.09	46.63	17.42
4. Fishpond	965.87	0.28	1,099.39	0.32	133.52	13.82
III. Forest Areas						
1. Timber/Woodland	151,799.29	44.66	157,031.68	46.19	5,232.39	3.45
2. Grass Land/Pasture	46,925.80	13.80	37,063.80	10.90	(9,862.00)	(21.02)
IV. Industrial Area	352.81	0.10	2,592.17	0.76	2,239.36	634.72
V. Bodies of Water	8,376.37	2.46	8,376.37	2.46	0.00	0.00
VI. Tourism Areas	227.02	0.07	2,461.54	0.72	2,234.52	984.28
VII. Roads & Bridges	3,340.42	0.98	3,789.82	1.11	449.40	13.45
VIII. Open Spaces/Playground	845.03	0.25	885.84	0.26	40.81	4.83
IX. Mineral Land	1,362.97	0.40	3,364.54	0.99	2,001.57	146.85
X. Cemetery	115.89	0.03	200.89	0.06	85.00	73.35
XI. Dumpsite	12.40	0.00	44.33	0.01	31.93	257.50
XII. Bareland Areas						
1. Sand Dunes	2,357.07	0.69	385.14	0.11	(1,971.93)	(83.66)
2. Beach Sand	307.12	0.09	223.16	0.07	(83.96)	(27.34)
3. Rocky/Corals	5,295.08	1.56	303.46	0.09	(4,991.62)	(94.27)
4. River Wash	5,125.64	1.51	480.12	0.14	(4,645.52)	(90.63)
5. Barren/Idle Land	5,090.19	1.50	268.92	0.08	(4,821.27)	(94.72)
TOTAL	339,934.00	100.00	339,934.00	100.00		

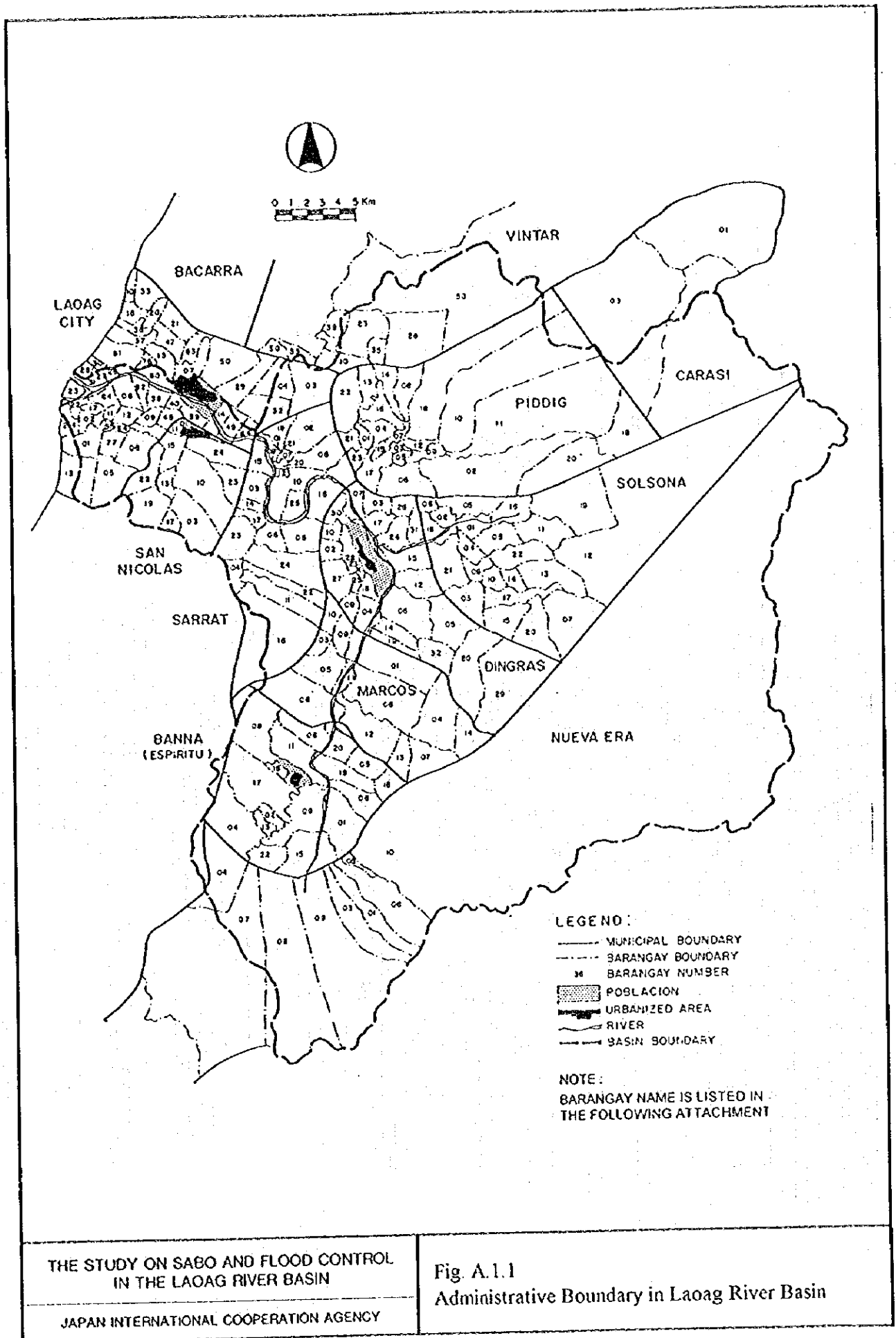
Source: Comprehensive Land Use Plan, Province of Ilocos Norte, 1996

Table A.9.5 Land Use of Convertible Area to Agriculturally Productive Area
(Unit : Ha)

Area	Not Usable	Grazing (A)	Grazing (B)	Upland Crops	Paddy	R/C/C	Total
Papa Left	0.0	11.9	105.1	11.8	0.0	7.5	136.3
Papa Right	0.0	30.4	115.2	0.0	0.0	7.7	153.3
Madongan Left	44.6	276.3	354.2	267.3	227.8	138.8	1,309.0
Madongan Right	9.9	36.6	5.9	23.9	0.0	4.9	81.2
Solsona Left	68.5	171.4	47.9	0.8	42.4	25.8	356.8
Solsona Right (Upper)	10.9	52.6	9.2	0.0	0.0	3.3	76.0
Solsona Right (Down)	9.5	0.0	0.0	0.0	20.5	6.8	36.8
Cura Left	70.1	144.8	171.0	141.4	139.8	78.9	746.0
Cura Right	0.0	28.6	10.3	67.4	71.0	33.2	210.5
Total	213.5	752.6	818.8	512.6	501.5	306.9	3,105.9

Effective Land Use (Grazing(B), Upland Crops and Paddy) = 1,883 ha
R/C/C : Roads/Canals/Creeks area

FIGURES



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.1.1
Administrative Boundary in Laoag River Basin

Attachment of Fig. A.1.1

List of Barangay Name (1)

Code	Name	Poblacion	Code	Name	Poblacion
CARASI (9)			14	54-b Camangaan	
01	Angset		15	58 Casili	
02	Barbaqueso	*	16	61 Catabon	
03	Virbira		17	43 Caviti (4)	
DINGRAS			19	49-a Darayday	
01	Albano	* +	20	59-b Dibua North	
02	Bacsil		21	59-a Dibua South	
03	Bagut		22	34-b Gabu Norte East	
04	Bangay		23	34-a Gabu Norte West	
05	Baresbes		24	35 Gabu Sur	
06	Barong		26	32-c La Paz East	
07	Bungcag		27	33-b La Paz Proper	
09	Cali		28	32-b La Paz West	
10	Capasan		29	54-a Lagui-sail	
11	Dancel	* +	30	32-a La Paz East	
12	Foz		31	33-a La Paz Proper	
13	Guerrero	* +	32	52-b Lataag	
14	Lanas		33	60-b Madiladig	
15	Lumbad		34	38-a Mangato East	
16	Madamba	* +	35	38-b Mangato West	
17	Mandaloque		36	62-a Navotas North	
18	Medina		37	62-b Navotas South	
19	Ver		38	46 Nalbo	
20	San Marcelino (Padong)		39	51-a Nangalisan East	
21	Puruganan	* +	40	51-b Nangalisan West	
22	Peralta	* +	41	24 Nstra Sra De Consolacion	* +
23	Root (Baldias)		42	7-a Nstra Sra De Natividad	* +
24	Sagpatan		43	7-b Nstra Sra De Natividad	* +
25	Saludares		44	27 Nstra Sra De Soledad	* +
26	San Esteban		45	13 Nstra Sra De Visitacion	* +
27	Espiritu		46	3 Nstra Sra Del Rosario	* +
28	Sulquiano		47	57 Pifa	
29	San Francisco		48	49-b Raraburan	
30	Suyo (3)		49	53 Rioeng	
31	San Marcos		50	55-b Salet-bulangun	
32	Elizabeth		53	6 San Agustin	* +
ESPIRITU (BANNA)			54	22 San Andres	* +
01	Baliocog		55	28 San Bernardo	* +
02	Bangsar		56	17 San Francisco	* +
03	Barbarangay		57	4 San Guillermo	* +
04	Bomitog		58	15 San Guillermo	* +
05	Bugasi		59	12 San Isidro	* +
06	Caestebanan		60	16 San Jacinto	* +
08	Caribquib		61	10 San Jose	* +
09	Catagtaguen		62	1 San Lorenzo	* +
11	Crispina		63	26 San Marcelino	* +
12	Hilario	* +	64	52-a San Mateo	
13	Imelda		65	23 San Matias	* +
14	Lorenzo	* +	66	20 San Miguel	* +
15	Macayepyep		67	21 San Pedro	* +
16	Marcos		68	5 San Pedro	* +
17	Nagpatayan		69	18 San Quirino	* +
18	Valdez		70	8 San Vicente	* +
19	Sinamar		71	9 Santa Angela	* +
20	Tabtabagan		72	11 Santa Balbina	* +
21	Valenciano	* +	73	25 Santa Cayetana	* +
22	Binacag		74	2 Santa Joaquina	* +
LAOAG CITY			75	19 Santa Marcela	* +
01	42 Apaya		76	30-b Santa Maria	
02	36 Aramiw (4)		77	39 Santa Rosa	
03	56-a Bacsil North		78	14 Santo Tomas	* +
04	56-b Bacsil South		79	29 Santo Tomas	* +
05	41 Balacad		80	30-a Suyo	
06	40 Balatong		81	31 Talingaan	
07	55-a Barit-vira-pandan		82	45 Tangid	
08	47 Bengcag		83	55-c Vira	
09	50 Buttong		84	44 Zamboanga	
10	60-a Caaocan		MARCOS		
11	Cabungaan 43-a North		01	Pacifico (Agunit)	
12	Cabungaan 43-b South		03	Imelda (Capariaan)	
13	37 Calayab		04	Elizabeth (Culbo)	

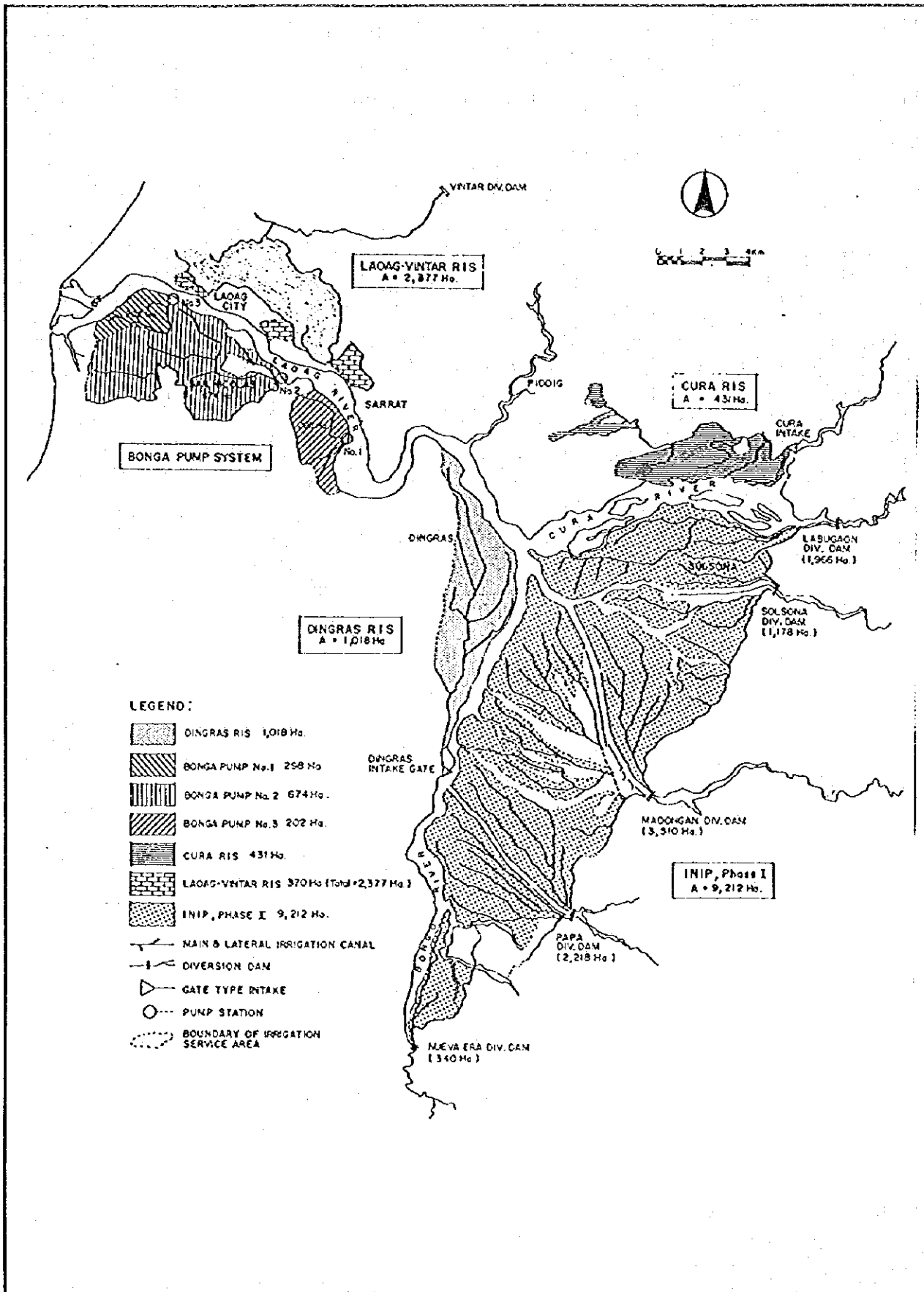
Attachment of Fig. A.1.1

List of Barangay Name (2)

Code	Name	Poblacion
05	Daquioag	*
06	Escoda	*
07	Ferdinand	*
08	Fortuna	*
09	Lydia	*
10	Mabuti	*
11	Valdez (Biding)	*
12	Tabucbuc (Ragas)	*
13	Santiago	*
14	Cacafean	*
NUEVA ERA		
01	Acnam	*
02	Barangobong	*
03	Barikir	*
04	Bugayong	*
05	Cabittauran	*
06	Caray	*
07	Garnaden	*
08	Pagpagong	*
09	Poblacion	*
10	Santo Nino	*
11	Uguis	*
PIDDIG		
01	Ab-abut	*
02	Abucay	*
03	Anao	*
04	Arua-ay	*
05	Bimmanga	*
06	Boyboy	*
07	Cabaroan	*
08	Calambeg	*
09	Callusa	*
10	Dupitac	*
11	Estancia	*
12	Gayamat	*
13	Lagandit	*
14	Libnaoan	*
15	Loing	*
16	Maab-abaca	*
17	Mangitayag	*
18	Maruaya	*
19	San Antonio (6)	*
20	Santa Maria	*
21	Sucsuquen	*
22	Tangaoan	*
23	Tonoton	*
SAN NICOLAS		
01	1 San Francisco	* +
02	San Hdefonso (Bo.3)	* +
03	21 San Agustin	* +
04	San Baltazar (Bo.2)	* +
05	San Bartolome (Bo.4)	* +
06	San Cayetano (Bo.12)	* +
07	San Eugenio (Bo.13)	* +
08	San Fernando (Bo.11)	* +
09	San Gregorio (Bo.14)	* +
10	22 San Guillermo	* +
11	San Jose (Bo.15)	* +
12	San Juan Bautista (Bo.6)	* +
13	San Lorenzo (Bo. 19)	* +
14	San Lucas (Bo.9)	* +
15	16 San Marcos (Payas)	* +
16	San Miguel (Bo.7)	* +
17	San Pablo (Bo. 20)	* +
18	San Paulo (Bo.10)	* +
19	18 San Pedro (Bingao)	* +
20	San Rufino (Bo.8)	* +
21	San Silvestre (Bo.5)	* +
22	17 Santa Asuncion (Samac)	* +
23	23 Santa Cecilia (Barabar)	* +
24	24 Santa Monica(Nagrebean)	* +

Code	Name	Poblacion
SARRAT		
01	San Agustin	*
02	San Andres	*
03	San Antonio	*
04	San Bernabe	*
05	San Cristobal	*
06	San Felipe	*
07	San Francisco	*
08	San Isidro	*
09	San Joaquin	*
10	San Jose	*
11	San Juan	*
12	San Leandro	*
14	San Lorenzo	*
15	San Manuel	*
16	San Marcos	*
17	San Nicolas	*
18	San Pedro	*
19	San Roque	*
20	San Vicente	*
21	Santa Barbara	*
22	Santa Magdalena	*
23	Santa Rosa	*
24	Santo Santiago	*
25	Santo Tomas	*
SOLSONA		
01	Aguitap	*
02	Bagbag	*
03	Bagbago	*
04	Barcelona	*
05	Bubuoes	*
06	Capurictan	*
07	Catangraran	*
08	Darasdas	*
09	Juan	*
10	Laureta	*
11	Lipay	*
12	Maananteng	*
13	Manalpac	*
14	Mariquet	*
15	Nagpatpotan	*
16	Nalasin	*
17	Puttao	*
18	San Juan	*
19	San Julian	*
20	Santa Ana	*
21	Santiago	*
22	Taluglog	*
DOOSVINTAR		
10	Bulbulala	*
23	Ester	*
28	Mabanbanag	*
30	Atejo Malasig	*
33	Margaay	*
35	Namoroc	*
39	Parparoroc	*
58	Visaya	*

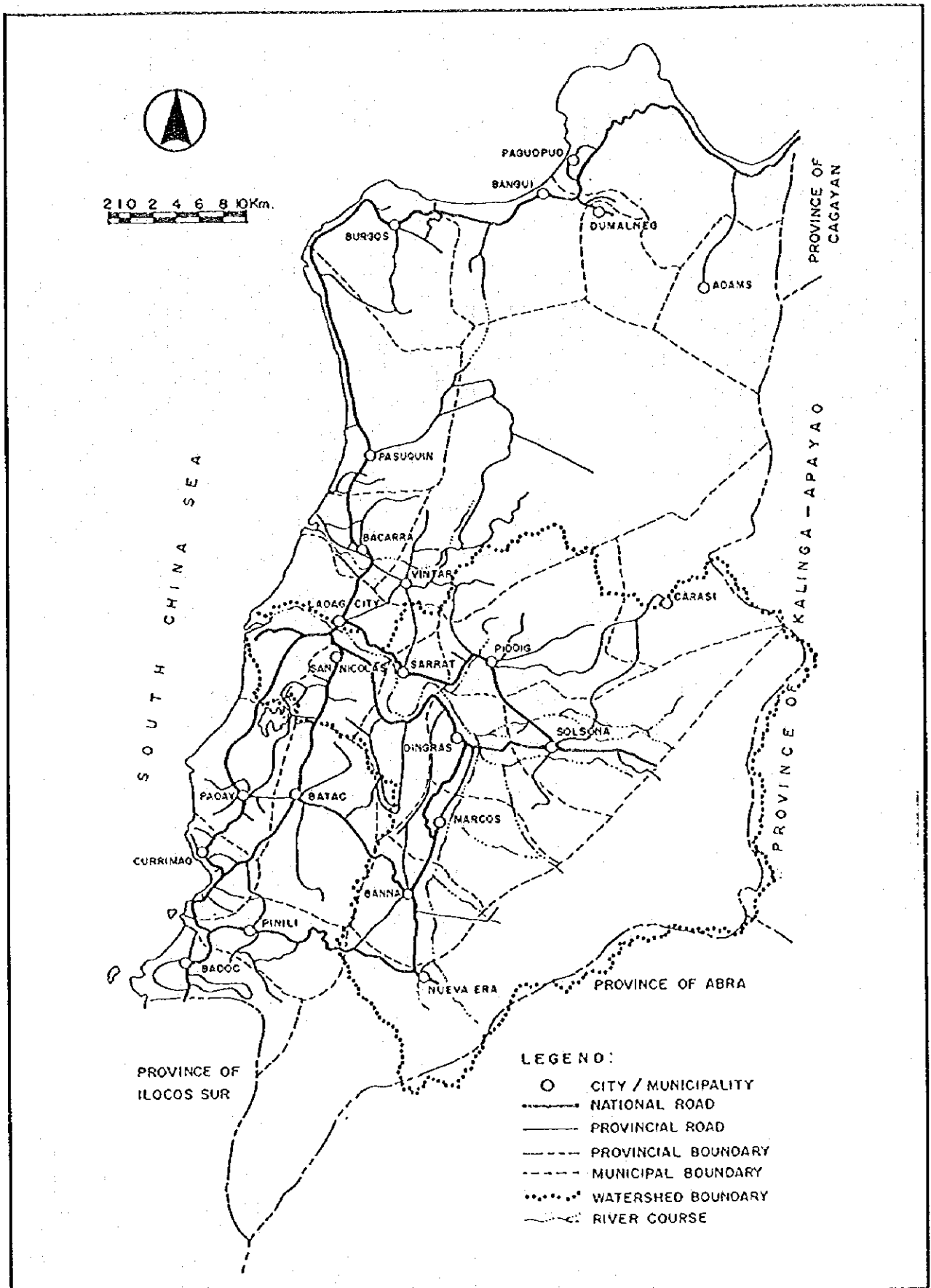
Note: "*" means a barangay of "Poblacion".
 "+" means that a poblacion barangay is located in an area of "Poblacion" marked in the map. Its administrative boundary is not clear in the poblacion area.



THE STUDY ON SABO AND FLOOD CONTROL
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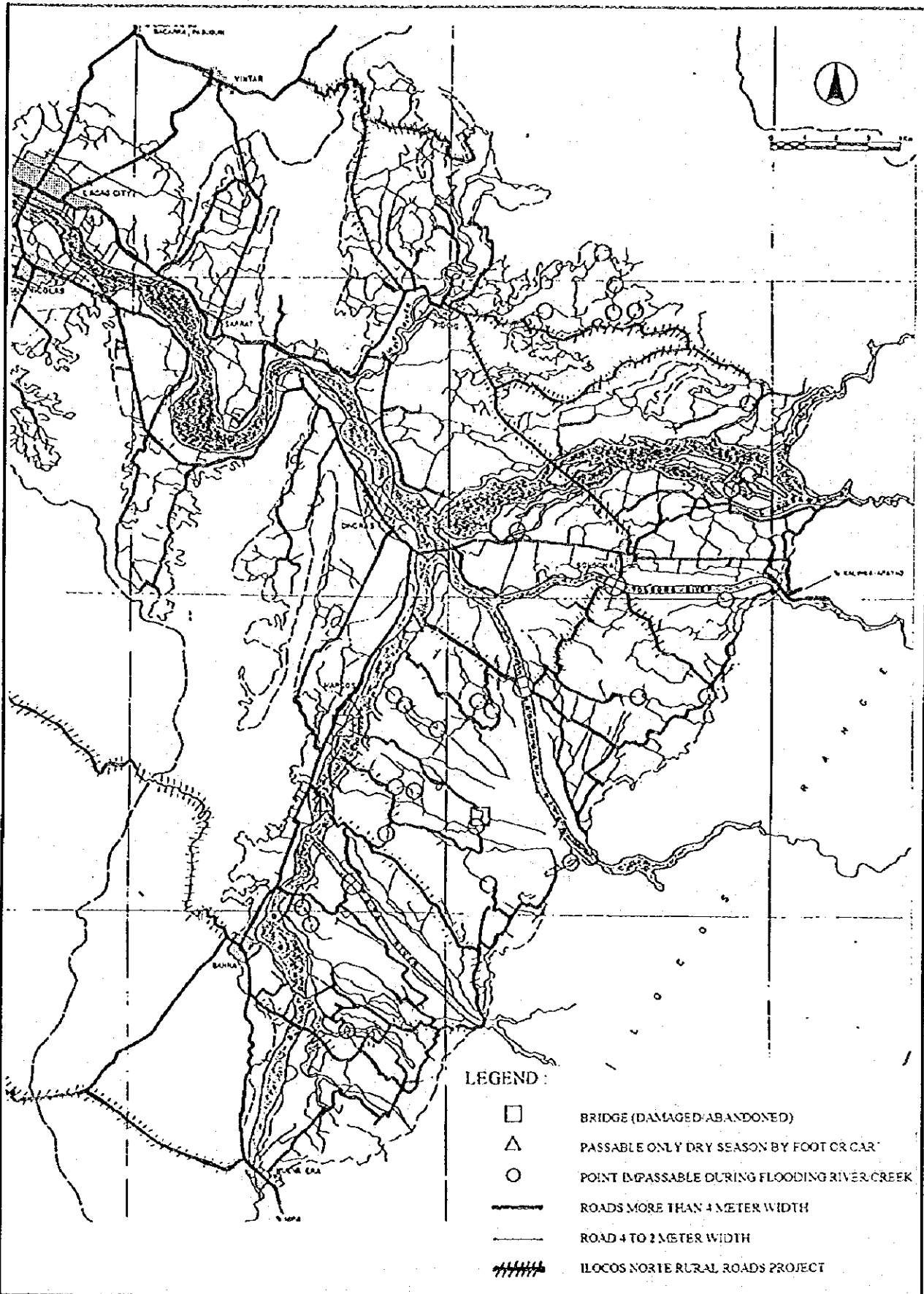
Fig. A.8.1
Location of National Irrigation Systems



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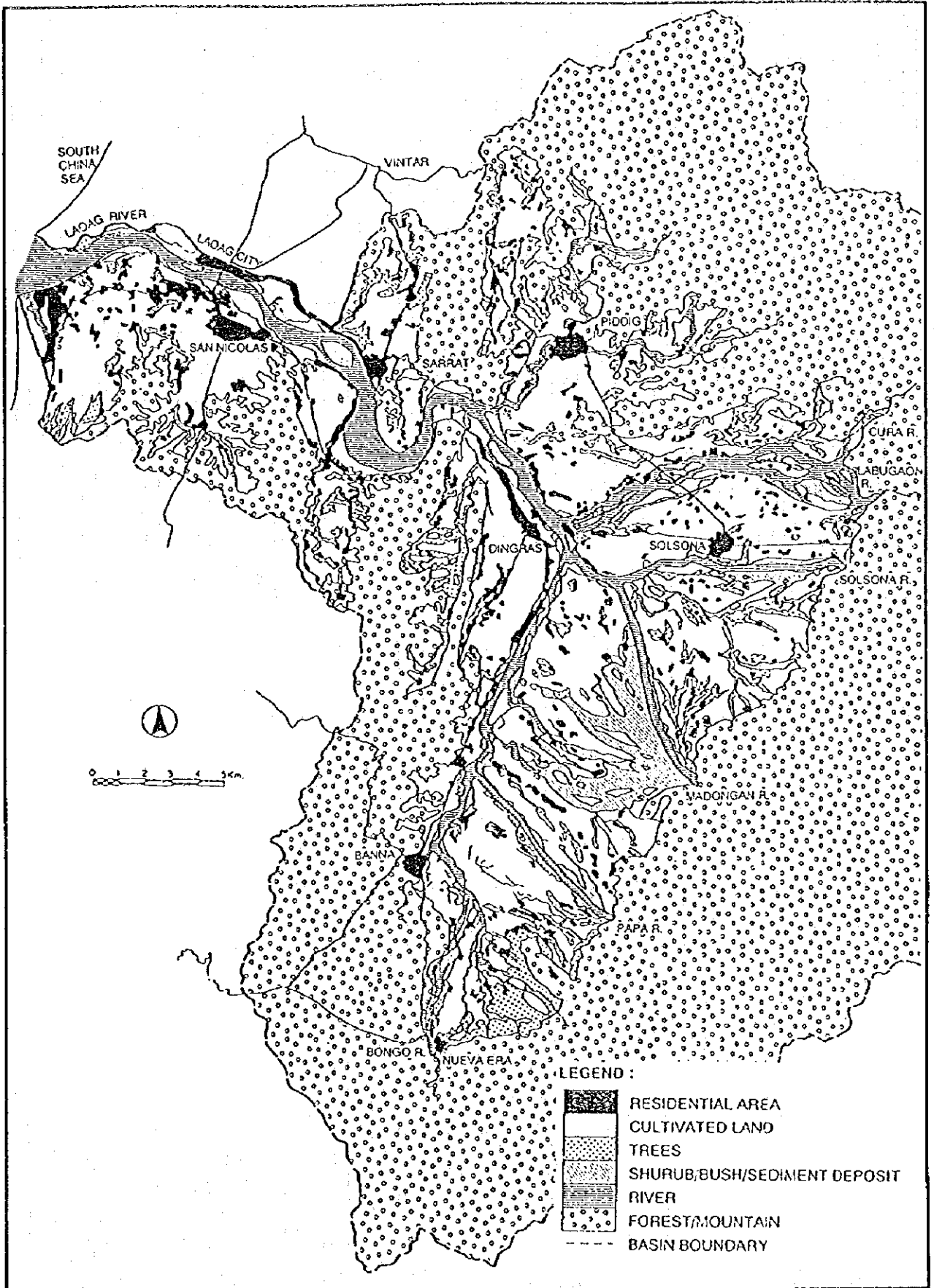
Fig. A.8.2
National and Provincial Roads Network of Ilocos Norte



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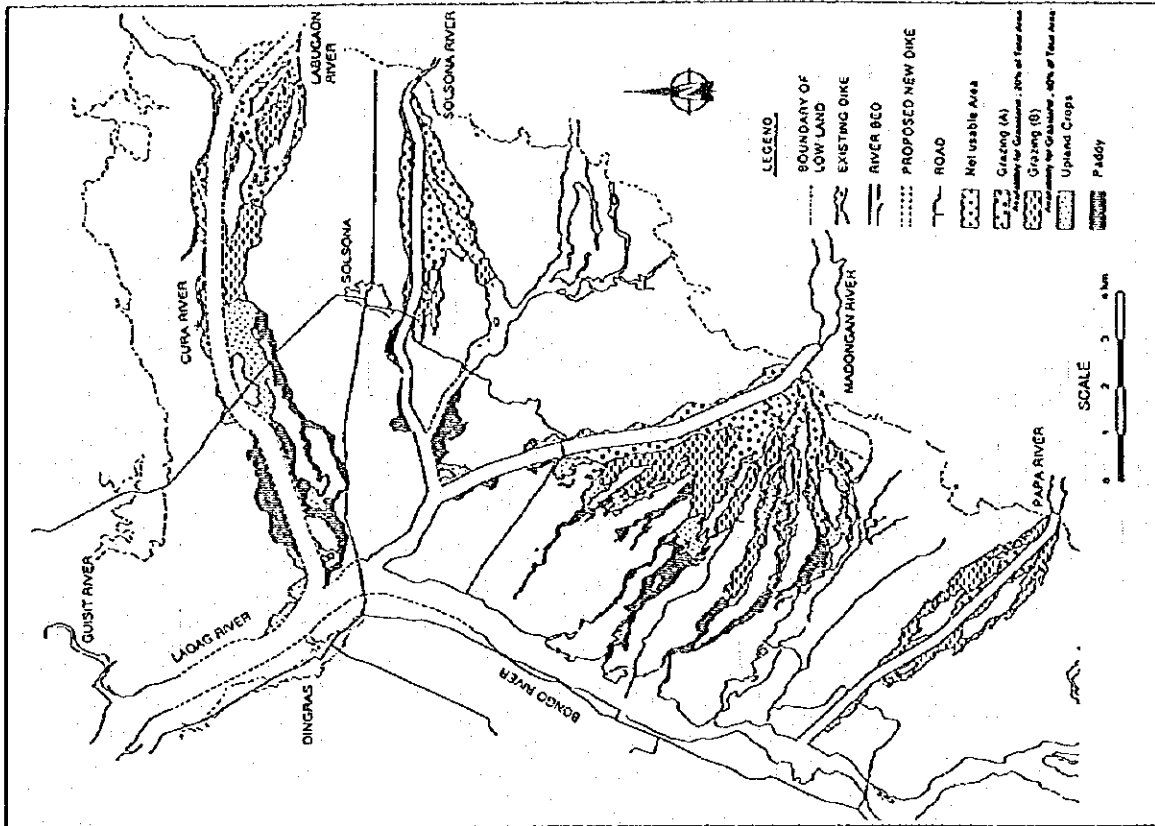
Fig. A.8.3
Existing Road Networks



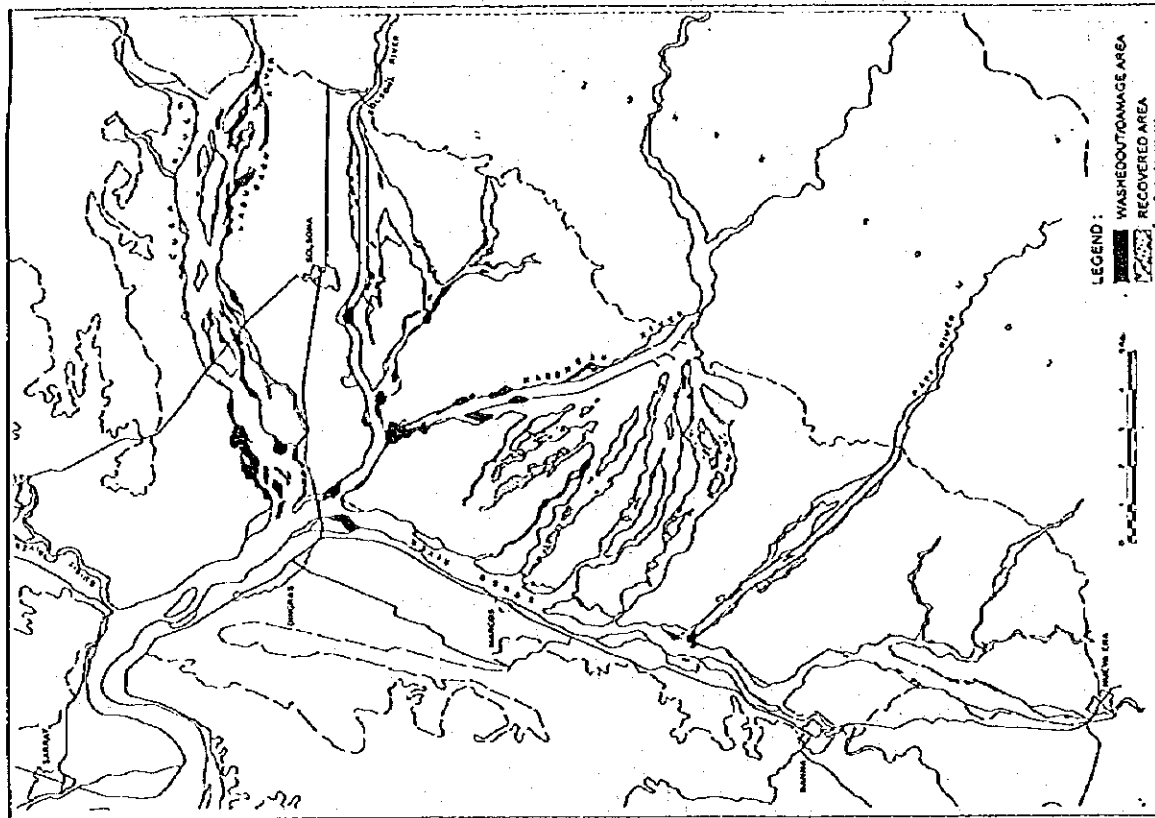
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Fig. A.9.1
Existing Land Use



Potential Restorable Farm Land



Past Land Loss by Floods (1975 - 1995)

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Fig. A.9.2
Past Land Loss and Future Restorable Land