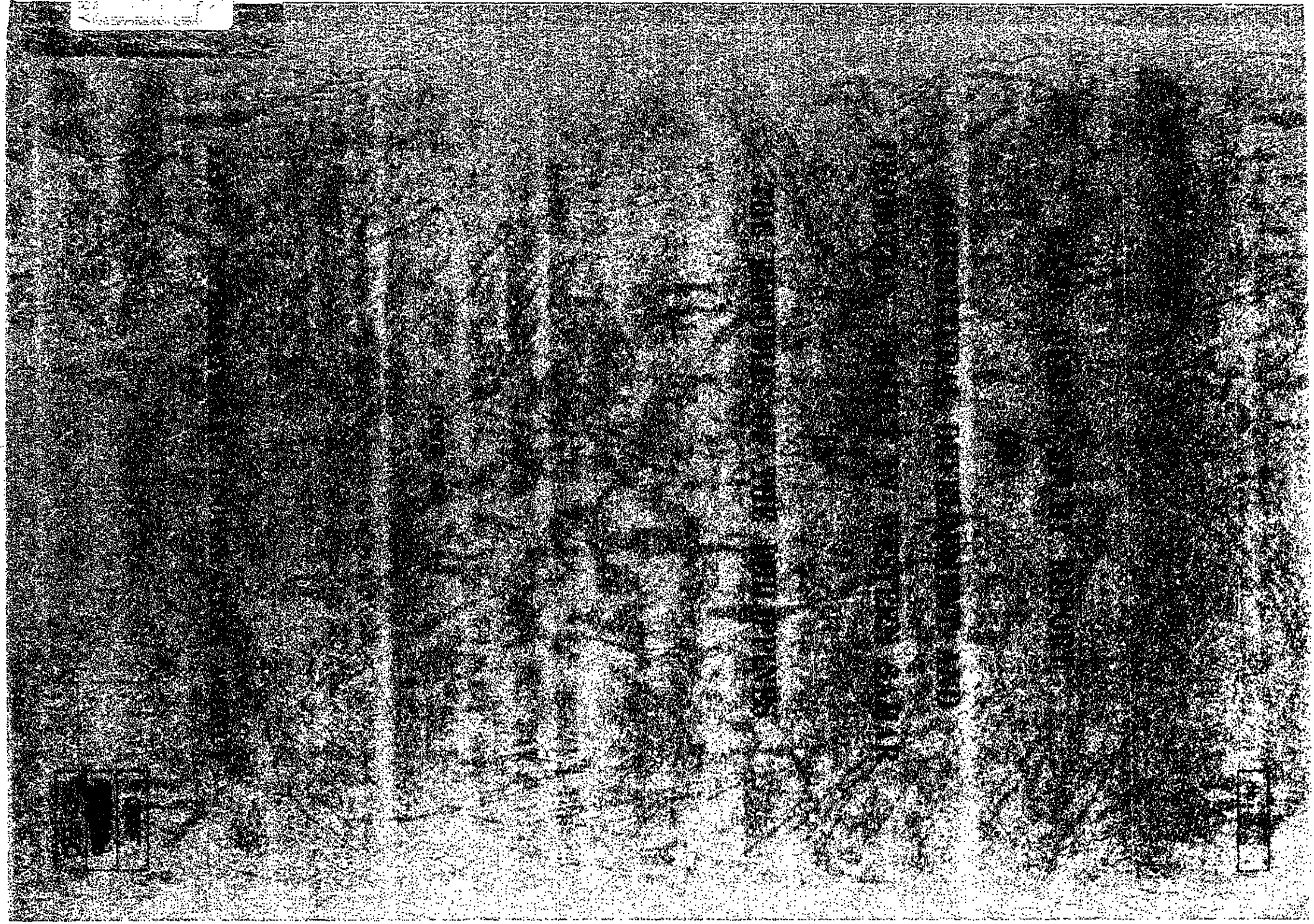


BASIC DESIGN STUDY REPORT
ON
AGRICULTURAL DEVELOPMENT AND
PROMOTION PROJECT IN WESTERN SAMAR
IN
THE REPUBLIC OF THE PHILIPPINES

JUNE 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan has decided to conduct a Basic Design Study on the Project for the Agricultural Development and Promotion in Western Samar and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Philippines a survey team headed by Mr. Osamu Tsuji, Manager of Water Use Division, Construction Department, Tohoku Regional Administration Office, Ministry of Agricultural, Forestry and Fisheries (MAFF) from January 29 to March 9, 1990.

The team exchanged views with the officials concerned of the Government of the Philippines and conducted a field survey in Manila and Samar province. After the team returned to Japan, further studies were made. Then, a mission was sent to the Philippines in order to discuss the draft report and the present report was prepared.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the teams.

June, 1990

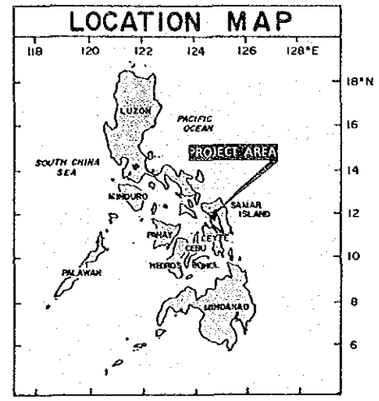
Kensuke Yanagiya

KENSUKE YANAGIYA
President
Japan International Cooperation Agency

GENERAL PLAN OF AGRICULTURAL DEVELOPMENT AND PROMOTION PROJECT IN WESTERN SAMAR

RECEIVING WELL
TOMOGBONG
BINOBUCALAN SPRING
INTAKE FACILITY
TOMOGBONG
BLANCA AURORA
BLANCA AURORA - BUENAVISTA ROAD
BUENAVISTA
BLANCA AURORA
VILLAGE WATER SUPPLY PIPELINE
BULAO - LA PAZ ROAD
GANDARA POB.
NGOSO
SAN MIGUEL
PUHAGAN
LA PAZ
BULAO PIP
BULAO
BUENAVISTA
HIMAY
SAN JUAN
MONBON
DAZ
SINIBARAN
SAN AGUSTIN
ERENAS
DISTRIBUTION RESERVOIR
SAPINIT
ANGUIANA
BULAO SOUTH PIP
JANIPON
SAN AGASTIN - POLONGON ROAD
ROSALIM
MALHARLIKA HIGHWAY
CANTAGUIC
RANERA
HINOGACAN
RAWIS
CANTAGUIC
QUEZON - CANTAGUIC ROAD
POLOGON
SAN JORGE
MANCOL
AURORA
MABUHAY
SAN ISIDRO
AURORA CIS
QUEZON CIS
CANYAKI
QUEZON
PAJO
TO CATBALOGAN

LOCATION MAP



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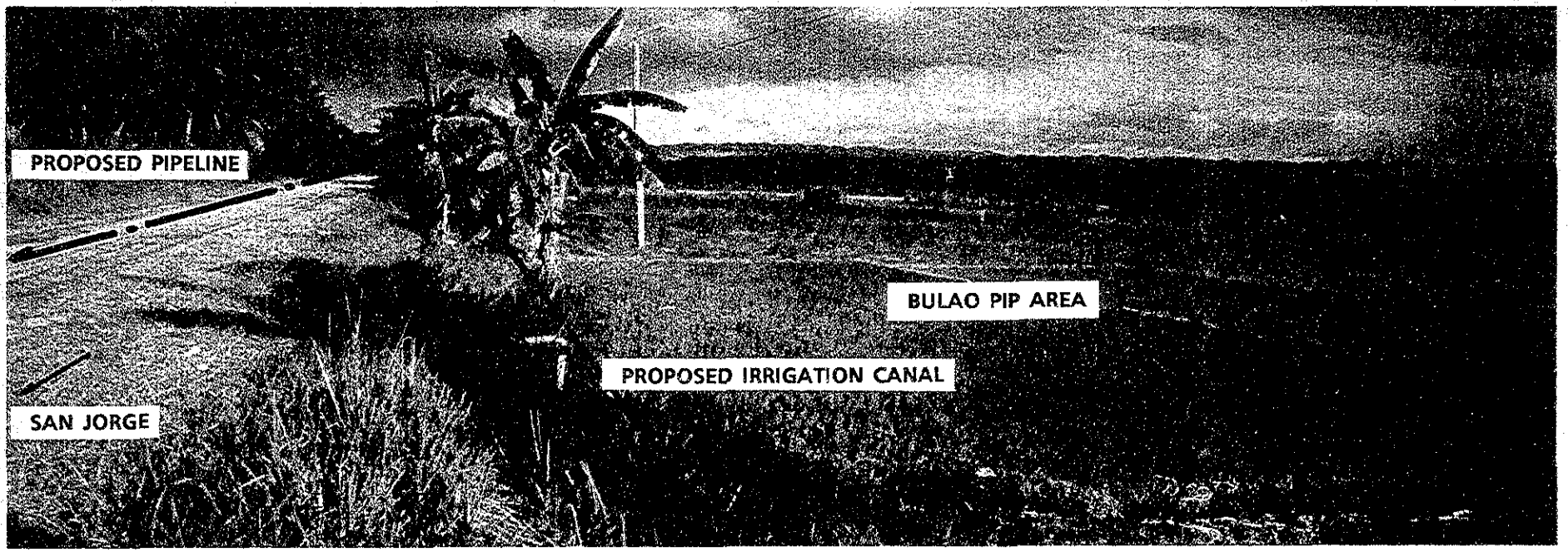
SCALE

LEGEND

- BOUNDARY OF ADPP AREA
- MUNICIPALITY BOUNDARY
- BARANGAY BOUNDARY
- INTAKE FACILITY
- IRRIGATION CANAL
- PUMP FACILITY
- IRRIGATION AREA
- PIP — PUMP IRRIGATION PROJECT
- CIS — COMMUNAL IRRIGATION SYSTEM
- PROPOSED FARM-TO-MARKET ROAD
- IMPROVEMENT OF FARM-TO-MARKET ROAD
- VILLAGE WATER SUPPLY PIPELINE
- INTAKE FACILITY OF VILLAGE WATER
- TOMONGBONG RECEIVING WELL
- SAN JORGE DISTRIBUTION RESERVOIR

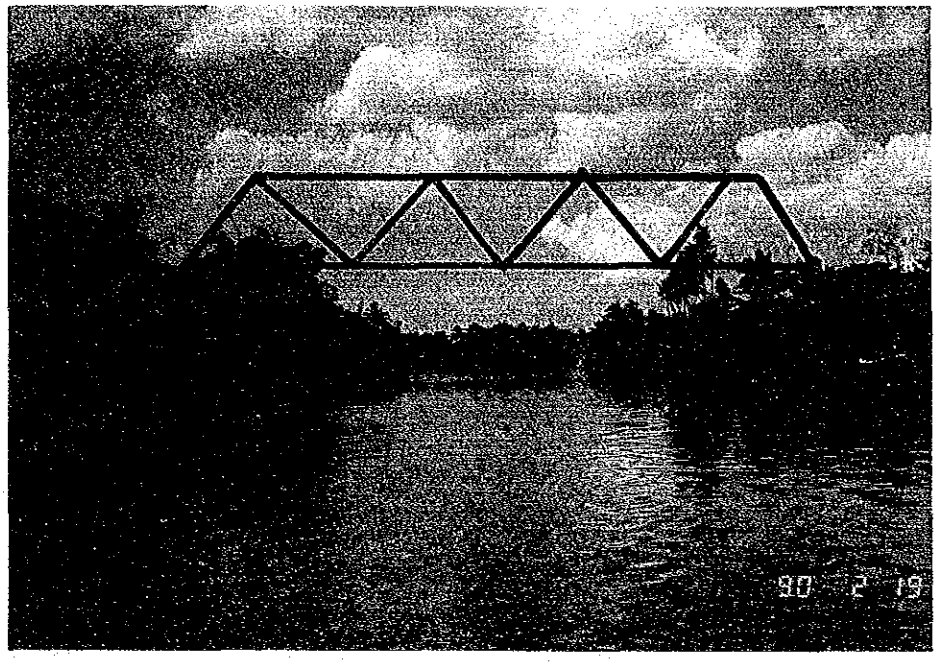


PANORAMIC VIEW OF BULAO PIP AND ALIGNMENT OF PROPOSED PIPELINE

ブラオポンプ灌漑地区全景と営農飲雑用水パイプライン路線

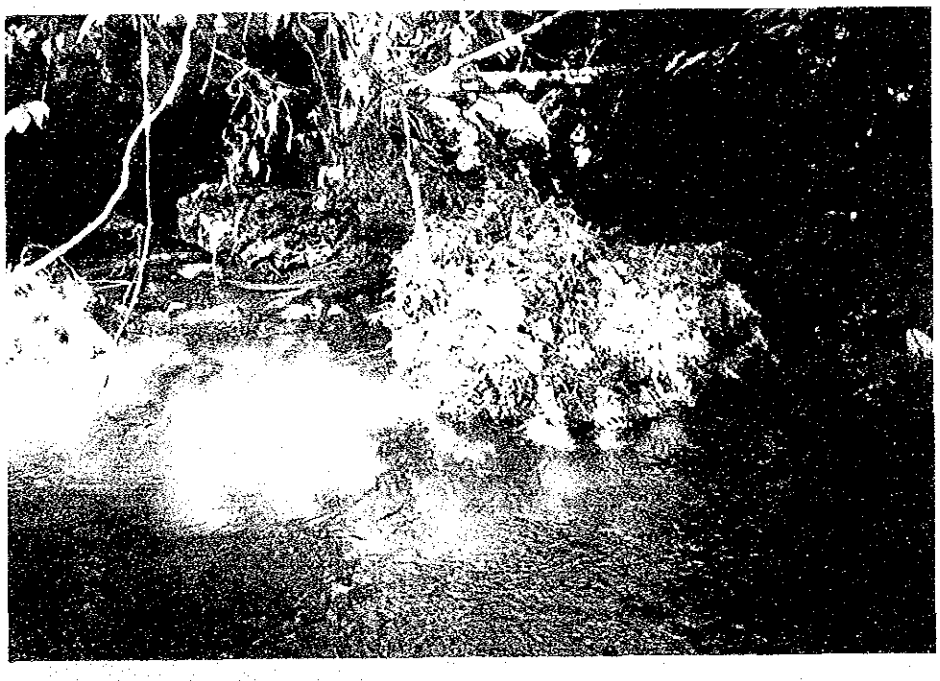
PANORAMIC VIEW OF QUEZON CIS AREA AND PROPOSED ROAD
(QUEZON ~ CANTAGUIC LINE)

ケソン 共同灌漑システム地区全景と農道・ケソン～カンタギック線



PROPOSED LA PAZ BRIDGE

ラ・パス橋計画地点



PROPOSED INTAKE FOR VILLAGE WATER SUPPLY AT BINOBUCALAN SPRING

営農飲雑用水計画取水地点　(ビノブカラン湧水池)

SUMMARY

Agriculture in the Philippines including forestry, and fishery employs about half of the country's labor force, provides the main source of livelihood to about 70 percent of the population and contributed about 30 percent of Gross Domestic Product in 1986. Even during the economic crisis period of 1983-85, agriculture played a pivotal role in Philippine socio-economic development, and maintained an annual increase in production. However, the supply of rice, as the staple food, has been unable to meet the demand of the increasing population and it is currently necessary to import rice, though production has reached self-sufficiency in some crop years (e.g. in 1981-82).

The agricultural land area of the Philippines is about nine(9) million ha, corresponding to an average farm size of 2.63 ha, of which the arable land area is about 4.5 million or 1.31 ha per farm household (1980). The average production yield of palay (1987) is about 2.6 tons/ha, while the average yield in irrigated land is reported to be about 3.8 tons/ha. Total production of palay is about 8.54 million tons with a growth rate of 2.2 percent per annum (1980-87). These low yields and growth rate are brought about by sluggish development/improvement of irrigation facilities and farm roads, which are basic facilities indispensable to agricultural production, and inactive extension of advanced agricultural techniques.

The current National Development Program is endorsed in the Medium-Term Philippine Development Plan for 1987-1992. The development efforts are directed towards the following goals: (a) alleviation of poverty, (b) generation of more productive employment, (c) promotion of equality and social justice and (d) the attainment of sustainable economic growth. As indicated, as a target of socio-economic growth during the Plan period, real Gross National Product (GNP) is expected to be increased by an annual average of 6.8 percent, resulting in an annual increase of per capita income of 4.4 percent. The unemployment rate will decline from 11.8 percent (1987) to 4.5 percent (1992) and the

incidence of poverty is targeted to fall from 59 percent (1987) to 45 percent (1992).

The strategy taken to attain these development objectives, in the short term, will provide more income and employment opportunities, particularly in the rural areas, through the construction of small-scale and labor-intensive infrastructure projects such as feeder roads, communal irrigation systems, school buildings and rural water supply. In the medium term, an employment-oriented, rural-based development strategy will be implemented to directly address the goal of poverty alleviation and equitable distribution of benefits.

Regarding the Regional Development Plan, Region-VIII (Eastern Visayas) is beset by a relatively high incidence of poverty. This is aggravated by the high rate of underemployment, low labor productivity, overdependence on traditional crops, and the imbalance in infrastructure development with other provinces. Efforts will therefore be directed toward expanding economic benefits and employment opportunities particularly in the rural area. Agriculture will be accorded the highest priority, and implementation of the National Productivity Program, which is geared toward increased agricultural productivity and maximizing the net income of the farmers, shall be strongly pursued.

Samar province is located in the south-west of Samar island within the eastern part of Visaya in the middle of the Philippine Islands. In Samar province, 78 percent of total employed persons engage in agriculture with low productivity due to the shortage of capital, under-development of agricultural infrastructures/facilities, lack of distribution and marketing facilities and deficiency of appropriate technology. Their incomes from agriculture are low. The annual income per family is 18,253 pesos or 58 percent of the national average, and 88 percent of the population are below the poverty line. Moreover, the high rate of unemployment due to fewer opportunities for employment in productive jobs other than agriculture and inadequate living conditions due to sluggish development of social infrastructures have resulted in the outflow of population.

Under the above circumstances, the Government of the Philippines has made a request to the Government of Japan for technical assistance to implement the development project survey in order to formulate a definite development plan in the less-developed western Samar area. In response to the request, JICA conducted the Master Plan Study for the Integrated Agricultural/Rural Development Project in Western Samar from April 1987 to December 1988. As a result, a priority project (Agricultural Development and Promotion Program in San Jorge and Gandara Area), with comparatively small investment for effective short-term development has been recommended to be urgently implemented for the purpose of satisfying basic human needs.

In compliance with the above recommendation, the Government of the Philippines has requested the Government of Japan to implement a priority project under Japan's Grant Aid Program, due to the financial constraints in the Philippines. In reviewing the request's contents, both governments have agreed in principle that the Project aims to alleviate poverty and generate productive employment opportunities in the remote rural area, and provide it with (a) irrigation systems, (b) farm-to-market roads, (c) village water supply, and (d) the procurement of equipment for operation and maintenance as minimum requirements for improving rural infrastructures and uplifting the living standard of local farmers.

In response to the above request, the Government of Japan decided to conduct a Basic Design Study on the Project. JICA, representing the Japanese Government, dispatched a study team composing of six (6) experts from January 29 to March 9, 1990 and conducted the field survey (see Annex 2).

The field survey was conducted to confirm the requested components, study the technical feasibility of the Project, conceive the appropriate cooperation plan, and collect data and information necessary for the basic design. In particular, the executing agency in the Philippines and the work to be undertaken by each government for the requested project components have been reconfirmed in the Minutes of Discussions of the meeting held on February 6, 1990, through the field

survey in the project site and discussions with the officials of the respective agencies concerned.

During the course of the field survey, various surveys necessary for the basic design, involving profile and cross-section surveys for the farm-to-market roads and village water supply with a total length of about 23 km, and topographic surveys for the design of major structures with a total area of about 6,800 m^2, have been carried out. After conducting the field survey and compiling/reviewing the data collected in Japan and the Philippines, the outline of the Project, a basic plan and implementation plan, as well as cost estimates, have been worked out; hence, the draft final report has been prepared as a result of the studies mentioned above.

JICA sent a draft final report explanation mission to the Philippines from May 21 to 26, 1990. Through a series of discussions with the officials concerned, the results of the examination of the request have been agreed upon by the Philippine Government and incorporated into the Minutes of Discussion signed on May 25, 1990 by both government.

The executing agency for the Project is the Provincial Government of Samar, which will be responsible for managing, monitoring and supervising the implementation of the Project through technical assistance with the line agencies such as DPWH, NIA, DA and NEDA. The work undertaken by the Government of the Philippines will be directly dealt with by NIA for the irrigation component and by DPWH for farm-to-market road and village water supply components. NEDA will take care of the overall coordination for smooth implementation of the Project. For the operation and maintenance of the completed facilities, the executive agency will be responsible for coordinating the work among the agencies and associations concerned. The irrigation systems will be directly managed by the Irrigator's Association and/or Irrigator's Service Association with the assistance of NIA and DA. DPWH will be responsible for maintenance of roads and technical assistance to the San Jorge Integrated Rural Water and Sanitation Association which will directly deal with the operation and management of village water supply facilities.

In the Project area, there are three (3) run-of-the-river irrigation systems constructed in 1977-78; namely, La Paz, Quezon and Aurora Communal Irrigation Systems and the Bulao pumping irrigation system (FSDC), but they are not operational because these facilities were devastated by floods due to typhoons and heavy rain after the completion of the systems. These areas are presently unirrigated and remain as rainfed paddy land with low production yields because the mentioned systems have not been rehabilitated due to financial constraints. Among them, only the La Paz irrigation system started reconstruction work in 1987. (This system is expected to be completed by 1990.)

The request contained the improvement and/or construction of the above four (4) irrigation systems and the Bulao South area to be developed. The La Paz system would be provided with the renovation of its diversion facilities, lining of irrigation canals and improvement of drainage canals, service roads and other related structures. The Quezon and Aurora systems would reconstruct diversion facilities and improve/construct lined canals and other related structures/facilities including service roads. The Bulao area would construct pumping facilities, lined canals, drainage canals, service roads and other related structures. The Bulao South area would be provided with pumping facilities, suction and delivery pits and lined canals including service roads and other related structures.

The summary of the request and results of its examination are tabulated below:

Name of Area	Improvement /Construction	Requested (ha)	Examined (ha)	Notes
La Paz	Improvement	145	-	Excluded, expecting rehabilitation work by NIA
Quezon	- do -	30	22	Area decreased, verified
Aurora	- do -	10	18	Area increased, verified
Bulao	Construction	130	130	
Bulao South	- do -	120	120	
Total		435	290	

Through the improvement/construction of irrigation facilities, it is expected to enhance the productivity of agricultural land and increase and ensure crop production. Based on those expectations, the farm income will increase and the living standard of farmers will be enhanced through the increase of disposal income. From this standpoint, the increase of agricultural products is urgently necessary in the areas where agriculture is the main industry; the improvement of irrigation facilities is particularly essential in Samar province.

The outline of the basic design for major structures is presented as follows:

Name of Area	Proposed Area (ha)	Major Structure: Diversion (place)	Major Structure: Pump	Major Structure: Irri. Canal (m)	Major Structure: Drain. Canal (m)
Quezon	22	1	-	1,090	-
Aurora	18	1	-	1,655	-
Bulao	130	-	300 mm x 2 units x 1 station (Vertical Mixed Flow Pump)	4,720	1,100
Bulao South	120	-	125 mm x 2 units x 8 stations (Portable Volute Pump)	5,260	-
Total	290	2		12,275	1,100

As for the roads, in general, the delineation between farm-to-market roads and provincial/barangay roads in the Philippines is not defined. However, most provincial/barangay roads currently serve the function of farm-to-market roads in the rural areas. The traffic in the Project area depends on two (2) key roads, Maharlika highway and provincial roads branched off the highway at San Jorge town, and three (3) feeder roads branched off those key roads, and boats along the Gandara River and its tributary, the Buenavista River. Those existing feeder roads are muddy and impassable by car when it rains heavily. Bridges are scoured and have suffered collapsed piers and abutments. In addition, only small boats can be used because the rivers are shallow.

The request consisted of construction of 11.6 km of new roads and improvement of 13.6 km of existing roads and totalled 25.2 km in length. These roads will be used for daily farming and the distribution

of agricultural products to the market. However, in examining the request, priority has been given to the road which will be used by a larger number of beneficiaries and existing roads to be improved, taking into account the system of Japan's Grant Aid Program. The roads requested and selected are summarized as follows:

Name of Roads	Construction /Improvement	Requested (km)	Examined (km)	Notes
Bulaonca ~ La Paz	Construction	0.1	0.5	Increased, with approach to La Paz Village
Blanca Aurora ~ Buenavista	Improvement	4.0	4.1	Increased by survey
San Agustin ~ Pologon	- do -	4.7	3.7	Decreased by survey
Quezon~ Janipon	Construction	11.5	6.1	Decreased, assessed up to Cantaguic
Buenavista South	Improvement	1.2	-	Assessed by number of users
La Paz ~ Mongbon	- do -	1.7	-	- do -
La Paz ~ Puhagan	- do -	2.0	-	Excluded as a service road of irrigation canal
Total		25.2	14.4	

The road width will be 3.5 m for the roadway and 4.5 m in total, taking into account the width of vehicles to be used, minimum width necessary for proper maintenance and other engineering points. Pavement will be provided with low-cost gravels, obtained easily in the area and which will make it passable in the rainy season.

The length and major structures for each selected road are tabulated below:

Name of Road	Length (km)	Major Structure
New roads		
Bulao-La Paz	0.5	Bridge L = 70 m (Const.)
Quezon-Cantaguic	6.1	
Sub-total	6.6	
Roads to be improved		
Blanca Aurora-Buenavista	4.1	Bridge L = 23 m (Improv.)
San Agustin-Pologon	3.7	Bridge L = 40 m (Const.)
Sub-total	7.8	
Total	14.4	

The village water supply consists of farming water and domestic water. In the project area, the water sources for farming water are the rivers, creeks and stagnant water. The Gandara River is tidal and saline in its downstream reaches. The creeks and stagnant water are standing and brown in color and acid due to decomposition of grass and trees. These waters are unsuitable for domestic animals, nursling care and pest control as well as for washing of agricultural products and machinery. In addition, in the project area, the Gandara Seed Farm which is playing a leading role in nursling and seedling propagation throughout the jurisdiction of Region-VIII, and the Samar National Agricultural School which is a center of agricultural education in the northern part of Samar province are limited in their activities due to an insufficient water supply.

The request also contained the provision of a village water supply which involved the intake facilities to divert the raw water from Binubucalan spring, as a water source, and a transmission pipeline from the receiving well built in Tomongbon to the San Jorge reservoir through eight (8) villages for a length of 14.2 km. However, the request included the quantity of water to serve the Gandara area in the future expansion plan but not the provision of a transmission pipeline.

The supply of farming water in the Project area will be effective for the promotion of diversified farm management. In addition, the water will be served to the Gandara Seed Farm and the Samar National Agricultural School. Therefore, it is expected that the Project will contribute to the strengthening of agricultural support services, especially in the experiments, research, education and training related to the extension of horticulture and fruit tree culture not only for Samar province but also throughout Samar island. On the other hand, domestic water has been provided, mainly by the Level-I supply system (one well for communal use). However, those wells are insufficient in quantity and quality under the project conditions. Only eight (8) wells are properly operated out of 28 wells already installed in the area. Improvement of the above conditions is a minimum requirement which is urgently necessary.

Name of Structures	Requested	Examined	Notes
Transmission pipeline	14.2 km	13.9 km	Decreased by survey
Intake facilities	1 place	1 place	
Distribution reservoir	1 place	1 place	

The water service will cover 15 barangays along the Gandara River and in the Gandara area. The service population will be 11,259 persons and 1,920 farm households projected by the year 2007. The average daily water demand will be 833 m^3 /day for domestic water. Major structures are as follows:

Name of Structures	Quantity	Notes
Transmission Pipeline	ø 200 mm x 12.8 km	Ductile & FRPM pipe
Intake Facilities	1 place	Intake, intake pipeline (ϕ 250 mm x 1.1 km) & receiving well.
Distribution Reservoir	1 place	Concrete-made (260 m^3)

Proper daily maintenance and prompt repair work after flooding are ultimately required to maintain the irrigation systems' functions. Therefore, the equipment to be procured have been determined taking into account the size of project facilities, equipment already on hand and the items requested as follows:

Name of Equipment	Necessary Specifications	Purposes	Examined	Quantity
For Irrigation Facilities				
Bulldozer	6-ton class	Pushing&compaction	Exist. Eq.overaged	1
Backhoe	0.6m^3class	Excavation&loading	- do -	1
Dump truck	6-ton class	Hauling materials	- do -	1
Pick-up	1-ton class	Hauling small quantities	Insufficient in quantity	2
Tractor shovel	0.4m^3class	Piling up & loading	Exist.Eq.Overaged	1
Motor grader	3.1m blade length	Leveling	Require	1
Hand breaker (W / Generator&Compressor)		Rock excavation	Exist.Eq.Overaged	1
Station wagon	4WD	Investigation	Require	1
Survey equipment		Survey	Insufficient in quantity & Exist. Eq. Overaged	1

Name of Equipment	Necessary Specifications	Purposes	Examined	Quantity
For Farm-to-market Roads				
Bulldozer	15-ton class	Pushing&compaction	Exist.Eq.Overaged &use multipurposes	1
Motor grader	3.1m blade length	Leveling road surfaces	Needed for daily maintenance	1
Dump truck	6-ton class	Hauling materials	Exist.Eq.Overaged	2
Road roller	100ps	Compaction	Substituted by Bulldozer	-
Pick-up	1-ton class	Hauling small quantities	Needed for daily works	1
Generator	Not specified	Lighting in night	Non urgent works	-
Submergible pump	4-inch	Dewatering	Needed for repair works	4
Vibrating roller	Portable type	Compaction for small areas	Needed for repair works	3
Backhoe	0.6m^{3}class	Excavation & loading	Exist.Eq.Overaged & Insufficient in quantity	1

The improvement of farm villages and farm land, as a part of the agricultural development program, will not only bring about the increase of agricultural production, farm incomes and employment opportunities from an economic point of view but also is expected to create active communities and healthy living from the social point of view. These effects are expected to be greatest where the investment is put into areas left behind in economic development, such as the San Jorge and Gandara areas.

The benefits from the provision of irrigation systems have been estimated as the increased production of about 1,380 tons of palay over the about 560 tons produced at present for a total of about 1,940 tons in the future as a result of the Project's four (4) systems; this amount more than achieves self-sufficient rice production in the Project area. According to the Master Plan Study report, the annual income of farmers in the irrigated land area will be increased from about 12,900 to 23,400 pesos which is about double the present level on average. The farm-to-market roads will serve the approximately 6,600 inhabitants in the

transport of agricultural products such as rice, corn, copra, vegetables, etc., and daily commodities, and will also be utilized as a farming road. The village water supply will serve as domestic water for the approximately 11,300 inhabitants of the Project area and as farming water for the breeding of domestic animals and poultry including about 1,900 cows/carabao, about 3,800 pigs, about 19,200 domestic fowl, etc., and for the experiments, research and training in the Gandara Seed Farm and the Samar National Agricultural School.

The project benefits which will be brought about by the organic relationship between each component will result in increased agricultural production as the direct benefit and other non-quantified benefits to alleviate poverty and generate productive job opportunities as well as upgrade the standard of living.

The proposed project, as a result of the previously mentioned examination, has been confirmed in its appropriateness, necessity, organic role and the effets of the respective components as well as the capability of the Philippine Government to effect its implementation. In addition, its effects are compatible with the Japanese Grant Aid Program. Consequently, this project is appropriate to be implemented under Japan's Grant Aid Program.

The cost for the work undertaken by the Government of the Philippines has been estimated to be about 16.27 million pesos excluding import taxes and charges for equipment and materials to be procured from Japan.

CONTENTS

LIST OF FIGURE

CHAPTER 1. INTRODUCTION

CHAPTER 1. INTRODUCTION

The Government of the Republic of the Philippines (the Government of the Philippines) has requested the Grant Aid Project to the Government of Japan for the implementation of the Agricultural Development and Promotion Project in Western Samar, as a priority project, based on the result of the Study on the Master Plan for Integrated Agricultural/Rural Development Project in Western Samar carried out by the technical cooperation of Japan International Cooperation Agency (JICA) for the period of April, 1987 through December, 1988.

In response to the above request, the Government of Japan decided to conduct the Basic Design Study on the Project and entrusted the study to JICA, according to the request which were composed of construction of irrigation, farm-to-market roads and village water supply, and procurement of equipment for operation and maintenance for the completed irrigation and road structures/facilities, as agreed by the both Governments. JICA, whereupon, has dispatched a study team (see Annex 1) headed by Mr. Osamu Tsuji from January 29 to March 9, 1990 and conducted the field survey (see Annex 2).

The field survey has conducted to confirm the requested components, study a technical feasibility of the project, conceive an appropriate cooperation plan, and collect data and information necessary for the Basic Design. Especially, regarding to the requested project components, the executing agency in the Philippines and the works to be undertaken by each Government, the both parties have reconfirmed and made the Minutes of Discussion (see Annex 4) in the meeting held on February 6, 1990, through the field survey in the project site and discussion with the officials of respective agencies concerned (see Annex 3).

In course of the field survey, the survey necessary for the Basic Design, which involved profile and cross-section survey for the farm-to-market roads and village water supply in the total length of about 23 km and topographic survey for design of major structures in the

total area of about 6,800 m^2, have been carried out. Through collection and review of the up-to-date information and data and meeting with the field staff of agencies concerned (see Annex 3), the present conditions and problems in the Project area have been confirmed.

In the meeting held on February 22 and 23, 1990 with officials of DA, DPWH, NIA and NEDA, Regional offices concerned, respectively, before leaving the Project site, the component of requested works have properly been understood by collecting the current data and exchanging the information each other. In Manila, data collection and compilation have also been continued, and furthermore, the opinion of staff of central offices concerned and other agencies on the matter of discussion with regional office staff and others matters related to the Project have been incorporated. Finally, the component of requested works, organization and management of the executing agency, operation and maintenance system and other matters necessary for coordination among inter-agencies concerned have been discussed in the meeting with staff of NEDA on March 9, 1990.

After the field survey, by compiling and reviewing the data collected in Japan and the Philippines, outline of the Project, the basic plan and implementation plan as well as cost estimates have been worked out. The draft final report has been prepared as a result of studies above-mentioned.

JICA has sent a mission headed by Mr. Tadashi Hashimoto to the Philippines to explain the draft final report involving the result of examination on the request from May 21 to 26, 1990. A series of discussion with officials concerned have been incorporated into the Minutes of Discussion signed on May 25, 1990.

CHAPTER 2. BACKGROUND OF THE PROJECT

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2-1. BACKGROUND OF THE PROJECT

Economy in the Philippines had progressed with an annual growth rate of 6.3 percent in 1970's, in terms of Gross National Product (GNP), but depressed after 1980 due to oil crisis, depression of mining and manufacturing industries, products, capital out-flow, etc. However, since 1986, the climate is becoming bright in terms of economic recovery.

Agriculture, including forestry and fishery, employs about half of the country's labor force, provideds the main source of livelihood to about 70 percent of population and contributed about 30 percent of Gross Domestic Product in 1986. Even during the economic crisis period of 1983 to 85, agriculture played a pivotal role in Philippine socio-economic development and maintained an annual increase in production. However, the supply of rice, as the staple food, have insufficiently met the demand of the population and consumption increase and it is currently necessary to import rice though production has reached the self-sufficiency in some crop years (e.g. in 1981 - 82).

The current National Development Program is endorsed in the Medium-term Philippine Development Plan for 1987 - 1992. The development efforts are directed towards the following goals: (a) alleviation of poverty, (b) generation of more productive employment, (c) promotion of equity and socio-justice and (d) the attainment of sustainable economic growth. As indicated as a target of social economic growth during the Plan period, real GNP is expected to be increased by an annual average of 6.8 percent, resulting in an annual increase of per capita income of 4.4 percent. The unemployment rate will decline from 11.8 percent (1987) to 4.5 percent (1992) and the incidence of poverty is targeted to fall from 59 percent (1987) to 45 percent (1992).

The strategy to attain the development objectives, for the short term, will provide more income and employment opportunities,

particularly in the rural areas, through the construction of small scale and labor-intensive infrastructure projects, such as feeder roads, communal irrigation systems, school buildings and rural water supply. In the medium term, an employment-oriented, rural-based development strategy will be implemented to directly address the goal of poverty alleviation and equitable distribution of benefits.

Regarding the Regional Development Plan, Region-VIII, Eastern Visayas, is beset by a relatively high poverty incidence. This is aggravated by the high rate of underemployment, low labor productivity, overdependence on traditional crops, and the imbalance in infrastructure development among provinces. Efforts will therefore be directed toward expanding economic benefits and employment opportunities particularly in the rural area. Agriculture will be accorded the highest priority, and implementation of the National Productivity Program, which is geared toward increased agricultural productivity and maximizing the net income of the farmers, shall be strongly pursued.

To come up with the development of Samar island, the Samar Integrated Rural Development Project (SIRDP), as one of Integrated Area Development Program, involving various sectoral components, such as (a) agricultural support facilities and services, (b) irrigation, flood control and drainage, (c) transportation development, especially in roads and seaports and (d) health, education, water supply and electrification facilities, was formulated in 1977.

In line with the Development Program, the project focused on Northern Samar Province, of which components included roads construction, seaport rehabilitation, agricultural development, rural electrification, etc., was implemented in 1979 through 1988 with financial assistance of the Australian Government. In parallel with the above, the project under the assistance of World Bank, placed for the development of Eastern and Western Samar provinces, completed in 1984, included major feeder road construction, seaport improvement, communal irrigation program, schistosomiasis control measure, rural water supply for small villages.

2-2. OUTLINE OF THE REQUEST

Samar province is located in the south-west of Samar island within the eastern part of Visaya in the middle of the Philippine Islands. In Samar province, 78 percent of total employed persons engage in agriculture under low productivity, due to shortage of capital, under development of agricultural infrastructures/facilities, lack of distribution and marketing facilities and deficiency of appropriate technology. Their income from agriculture are low. An annual income per family is 18,253 pesos or 58 percent of its national average, in which some 88 percent of people live in under the poverty line. Moreover, high rate of unemployment because of less-opportunity of employment to the productive job other than agriculture and insufficient improvement of living conditions due to social-infrastructures left behind in development are resulted in the out-flow of population.

Under the above circumstances, the Government of the Philippines has made a request to the Government of Japan, in order to formulate a definite development plan in the less-developed western Samar area, for technical assistance to implement the development project survey. In response to the request, JICA has conduct the Master Plan Study for the Integrated Agricultural/Rural Development Project in Western Samar from April 1987 to December 1988. As a result, a priority project (Agricultural Development and Promotion Program in San Jorge and Gandara Area) with comparatively small investment for effective short-term development has been recommended to be urgently implemented for the purpose of satisfying the basic human needs.

In compliance with the above recommendation, the Government of the Philippines has requested the Government of Japan to implement a priority project under Japan's Grant Aid Program, due to the financial constraints in the Philippines. In the result of reviewing the requested components, both governments have agreed in principle that the Project aimed to alleviate poverty and generate productive employment opportunities in the remote rural area, and provide it with (a) irrigation systems, (b) farm-to-market roads, (c) village water supply and (d) the procurement of equipments for operation and maintenance as

minimum requirements for improving rural infrastructures and up-lifting a living standard of local farmers.

The executing agency for the Project is the Provincial Government of Samar, which will be responsible for managing, monitoring and supervising the implementation of the Project through technical assistance of the line agencies such as DPWH, NIA, DA and NEDA. The work undertaken by the Government of the Philippines will be directly dealt with by NIA for the irrigation component and DPWH for farm-to-market road and village water supply components. NEDA will rest with the overall coordination for smooth implementation of the Project. For the operation and maintenance of the completed facilities, the executive agency will be responsible to coordinate the works among the agencies and associations concerned. The irrigation systems will be directly managed by the Irrigator's Association and Irrigator's Service Association with the assistance of NIA and DA. DPWH will be responsible for operation and maintenance of roads and technical assistance to the Rural Water and Sanitation Association which will directly deal with the operation and management of village water supply facilities.

2-3. OUTLINE OF THE PROJECT AREA

2-3-1. Location and Socio-economic Condition

(1) Location

The Project area is located in Samar province which is situated in the western part of Samar island within the eastern part of Visaya island group spread over the middle of Philippine islands. As for a means of transportations, the area is accessible on land in a distance of about 700 km from Manila, by crossing the strait between Matnog in Sorsogon and Allen in Northern Samar, or by air to Tacloban city, Leyte and/or on land from Tacloban city in a distance of about 140 km to the North, and/or on land from Catbalogan, a capital town of Samar province, in a distance of about 40 km to the north. In the administrative area, the area, within Eastern Visaya (Region-VIII), extends the bulk of the San Jorge municipal area and a part of the Gandara municipal area and covers two (2) towns and 22 villages.

(2) Socio-economic Condition

1) Population and Employment

The population in the Project area is projected at about 12,400 persons in 1987, of which about 80 percent depend on agriculture. The average population growth rates in the San Jorge and Gandara municipal areas are 0.94 and 1.98 percent during 1985 to 1987, respectively. The lower growth-rates are due to populations discharge to other area, as indicated as a negative net migration rate of 3.13 percent in Eastern Visaya during the period between 1975 and 1980. The family size is 5.8 person, which is more than 5.4 person per family in the provincial average. The labor force between 15 and 64 years old is about 8,500 persons, of which 70.8 percent or about 6,100 persons are employed, and, conversely, unemployment rate extends to 29.2 percent.

2) Economic Conditions

In the area, agriculture is the principal industry and others are scarcely available. Gandara town is a center in terms of marketing in the Project area. The inhabitants endure under the conditions that are unable not only to improve their labor productivity but also to upgrade their livelihood at all, due to lack of marketing and distribution facilities, shortage of financial support and insufficiency of social services. Owing to such lower living conditions, the rate of under nourished family and poverty incidence is considerably high.

2-3-2. Physical Features

(1) Climate and Hydrology

The climate in the area belongs to Type IV of Coronas climate classification system, which falls rain throughout the year. The mean annual rainfall is about 2,640 mm, according to the records of the Catbarogan synthetic meteorological station, rainfall are comparatively little during the months of January through June with mean monthly rainfall of about 110 to 234 mm and the smallest in April, in turn large

rain falls in the remaining months (July to December) with mean monthly rainfall of about 218 to 315 mm and the largest in November. The rain distribution are tropical shower. Annual mean temperature is 27.6°C. May is the hottest month (28.9°C) in mean monthly temperature and January is the cold month (25.8°C). The difference of mean monthly temperature among the months is small about 3°C. The mean monthly maximum temperature is 33.6°C and the minimum one is 21.7°C. The annual mean relative humidity is about 80 percent.

The river water discharges in the vicinity of the Project area are observed to be a daily average water discharge of about 2.7 $m^3/sec/100\ km^2$ in May and 10.5 $m^3/sec/100\ km^2$ in December and vary largely by the season. The Gandara River, running from the east to the west in the north of the Project area, conveys a water all the year round and never drys up, but its tributaries have no water in some extent is April and May. The water level gaging station, installed by JICA in the course of the Master Plan Study, recorded that the water stages little varied throughout the year but rose up suddenly in one to two times a year and recessed to the ordinary water level within three(3) to five(5) days.

(2) Topography, Geology and Soils

Topography in the area is associated with the alluvial plain expending along the middle reach of the Gandara River, hilly land (30 to 50 m in an elevation) in the south and west and mountainous area (50 to 150 m in an elevation) in the east. The plain land is extended along the both side of the Gandara River and paddy field area between the hills with an average slope of below three (3) percent and four (4) to five (5) meters in the elevation above the mean sea level.

Geology in the Project area is composed mainly of the Catbalogan group of the upper Miocene-Pliocene layers and Daram group of Oligocene-Miocene layers. Those layers, having folding axis almost in NW-SE direction, present synclinal and anticlinal structures. In the east, the lime stone layer in Neogene-Pleistocene distributes in the mountainous area.

Soils in the plain land of the Project area are a river deposit soil, classifying in loam and clay loam, fertile and classified into the Class-A which is "very good land" for cultivation. These soils are expected to gain high agricultural productivity with well-drainage and irrigation facilities completed.

2-3-3. Social Conditions and Services

(1) Transportation and Communication

In general, it is said that Samar island is composed of numerous island. This simply translate that boats through the river are major transportation, in spite of island formed as one, due to insufficient road networks as a basic infrastructure for traffic. In the Project area, the transportation, without exemption from the above-mentioned, is mainly by boat passing the Gandara River and its tributaries which are tidal, despite the area is situated far from the seashore. The provincial road with gravel pavement runs along the Gandara River. Tricycles are traveling on the road with less frequency. The agricultural input materials and production are distributed by a small banca boat driven by engine. However, in the upstream of the Gandara River and its tributaries, the boat is available to serve only at high tide depending on the water depth in the River.

On the other hand, the transportation between villages in the south of the Project area, where is far from the Gandara River and its tributaries and national road is only by foot and/or carabao.

The communication facilities such as telephone, telegram etc. are not available in the Project area.

(2) Water Supply and Sewerage

The domestic water is available from shallow and/or deep well but insufficient in its quantity and quality. The many people take the water from the rivers and/or springs.

The sewage disposal facility is not furnished in any towns and villages in the Project area. The sewage is disposed by percolating

into the soils and/or directly to the river and/or agricultural land without treatment.

(3) Health Services

As for health services, Municipality Health Center (MHC) in the poblacion of San Jorge and Barangay Health Stations in the barangay Buenavista and Janipon exist in the area. The services are provided by one physician, one nurse, one dentist, three midwives and support staff. The health manpower population ratio to a physician is very high (1 : 13,400) in Samar. The most common cases of disease are respiratory tract origin. The loading cases of mortality are pneumonia, gastroenteritis and TB in order.

In addition, the area is infected with schistosomiasis. According to the annual report of MHC, in 1989, 252 cases were positive for schistosomiasis, a prevalence rate was 8.8 percent of population and 238 cases were under treatment. The prevalence rate is on the upward trend. In the municipality of San Jorge, in turn, Region-VIII reported that 6,269 cases were positive or prevalence rate is about 70 percent of total population in 1987.

(4) Education

In the municipality of San Jorge which covers a bulk of the Project area, fourteen (14) elementary schools, one (1) high school and the Samar National Agricultural School (SNAS) are established. The enrollment in the elementary school is in San Jorge/Matuguinao district about 2,150 people (1984 - 85) but the percentage of school attendance is very low reportedly. The number of agricultural school attendance is about 450 students. The illiteracy rate to the private household population with ten (10) years old and over is high, 37 percent (1980, NCSO) in the province.

2-3-4. General Outline of the Sector

(1) Present Agriculture

1) Farm Size and Land Tenure

An average farm size is 2.3 ha (1.0 ha for paddy field, 0.5 ha for corn and 0.8 ha for coconuts). According to the Master Plan Study report, about 78 percent for owner-operator and part owner-operator, in the total number of monitored farmers, 22 percent for tenant. The land owners stay mostly in the towns in the province and have a land area of some 30 ha in the biggest owner. Such that, there is no big landowner in the Project area. A land rent is different in each tenancy agreement according to the report. Some 40 percent of farmers share by a rate of 75 percent for the tenant and 25 percent for the land owner in kind, but in general, distribute in a rate of 50 percent to each others in kind. In either case, the costs of agricultural inputs such as seeds, fertilizers, chemicals, hired labor, etc. are shouldered by the tenant.

According to the DAR field office, about 1,200 ha of paddy field is identified as the land transfer operation areas under the land reform program. However the area of only 6.8 percent was operated by the program as of May 1987. In the area, about 300 ha of paddy fields and 130 ha of upland fields have been programed as the area of land transfer operation to be undertaken in the coming stage.

2) Land Use and Production

According to the JICA Master Plan Study report, more than half of the Project area is classified into an uncultivated and/or uncultivable land area. A cultivated land area of some 2,380 ha consists of paddy land of some 1,000 ha, upland crop land area of some 540 ha, coconuts land area of some 800 ha and abaca land area of some 40 ha. The lowland in alluvial plain is prevalently cropped with paddy during the rainy season (July to December), while paddy and diversified

crops, like corn, are planted as the dry season (January to June) crops in the area less than the rainy season crop land area. The elevated land is planted with corn, peanut, mungbean during the dry season and corn during the rainy season in the small area due to drainage problem. In the mountain area, land clearing by burn method is still prevailing.

The unit yields of crops are low, as reported 1.6 ton/ha for paddy, 1.0 ton/ha for corn 0.4 ton/ha for coconuts etc. Major constraints are poor drainage and absence of irrigation facilities and in-effective operation of pump, in-sufficient extension services on agricultural technique, time of planting, etc., difficulty in the supply of fertilizers and chemicals in time, lack of animal draft and machinery.

The present crop production is estimated at about 1,900 tons of paddy, about 800 tons of corn, and about 130 tons of peanuts and other upland crop and 220 tons of coconut (copra) on the basis of the cropping intensities and unit yields.

3) Agricultural Support Services

The field office of DA for agricultural extension services in the San Jorge municipal area is located at Sapinit, San Jorge. The extension officers for crops, animals, etc., composing of nine (9) staff in total, serve the guidance on supply of fertilizers, time of transplanting and pests and diseases control for crops, etc. However, due to inadequate means of transport, in addition to insufficient road network, the service area is very limited.

The Gandara Seed Farm is also located in Sapinit, San Jorge, which equips with a farm area of some 40 ha and produces a registered seed of lowland rice, upland rice, root crops, legume, assorted vegetables, white and yellow corns. The farm is planned to produce about 30 tons per annum for the registered seed of lowland rice and distribute to seed

growers. In addition, the farm has a plan to supply nurseries of coconuts and fruit trees.

4) Farm Income

The average farm family income a year, according to the JICA Master Plan Study report, is about 17,180 pesos, which is about 60 percent of poverty line estimated to be 28,548 pesos of average family income a year in the national average or equivalent to about 69 percent of the average which is a value of 24,729 pesos in the rural area. About 65 percent of income is used only for foods in the Project area.

(2) Infrastructures

1) Irrigation

In the Project area, there are three (3) irrigation systems (La Paz, Quezon and Aurora Communal Irrigation Systems) in the run-of-the river system and one irrigation system (Bulao System) in the pumping system constructed, but those systems are not operational at present due to the damages in the most of facilities from floods by typhoon and local strong storm.

a) La Paz Systems

This irrigation system was constructed as a communal irrigation project in 1978 by NIA, which was equipped with the diversion dam built on the Ganoy Creek and irrigation canal system for a land area of some 150 ha extended from the downstream of the said Creek to the west along the Gandara River. However, the fixed weir of the diversion dam, in the time of local strong storm in 1979, was washed out by initiating the side wall collapsed due to scour of the rear foundation. In addition, as for the irrigation canal system, the main canal, in a length of about 60 m, was also washed away by the flood due to the local strong storm in 1989.

The diversion dam is equipped with the fixed weir of 14.2 m in the length, a sluice way, and an intake. As requested by the beneficiaries-farmers, NIA has started the rehabilitation

work in 1988 and completed in the restoration of a fixed weir in 1989.

However, the bottom foundation of left side wall in the downstream of the diversion dam was washed out by flood in 1989, and a part of the riprap works was also washed out by flood. The sluice way is untouched in the improvement, in order to save expenditure, but it was verified that the stop-logs will not be well operational owing to improper construction in the quality, specially in the column of the sluice way. The restoration works programed by NIA are expected to be completed in 1990, which involve the rehabilitation of main canals in an earth canal, construction of cutoff extended from the fixed weir to the left side in the length of 163 m to use the left side berm for the high-water channel bottom, and construction of a flood protection dike with 2.5 m in the height along the hill in the left bank side.

The main canal is located passing the topographically depressed land in some extent, unavoidable. In this depressed land, the existing canal was constructed with an embankment height of about 1.0 m on an average. However, the canal was washed out at three (3) spots in a total length of about 60 m due to the flood of the Ganoy Creek by the local strong storm in 1989. In addition, the surface of road for operation and maintenance is unpaved so that the road has become to be muddy and impassable in the large rain season.

The irrigator's association responsible for the operation and maintenance of the system is in the process of organization and has completed in the selection of board directors up to now with effort of the NIA staff.

b) **Quezon and Aurora Systems**

The systems are located in the left and right side of Maharlika highway in symmetry. These systems were constructed as a communal irrigation system by NIA in 1977 to

78, which those equipped with diversion dam and canal system covering a paddy field area of some 30 ha for Quezon system and 10 ha for Aurora system. These diversion structures are not operational because the gate was damaged and the abutment in the right bank side was washed out by flood due to the typhoon after the completion. The diversion structures are located within the paddy field in the plain land where the paddy field in both the upstream and downstream of structures are the almost same in the elevation. Thereby the paddy field in both the upstream are inundated with water while the water level is dammed up for diverting the water for irrigation. These problems are caused by the inadequate location of diversion structure in the design stage.

c) **Bulao Area**

The area was developed by constructing pumping facilities to irrigate a land area of some 115 ha on August, 1978 by FSDC (Farmers System Development Corporation) and started the water supply for the beneficial area by using the water of the Gandara River. However, about 200 m of a main canal was washed out by the flood due to local heavy rain brought from typhoon on September, 1978. Subsequently, the pumping facilities have been not operational because the pumping equipment was submerged by the high water of the Gandara River, and the suction pipes and engines were damaged from the muddy water. In addition, the irrigation water could not be delivered up to the farm because of unlined main canal passing through the sandy soil area along the Gandara River. And then, a part of the canal was restored by the request of farmers but the system was again completely damaged by the flood in 1982.

The irrigator's service association was organized with 58 member-ships and registered to the Security and Exchange Committee. However, the activity of association established under FSDC is idle due to unoperational irrigation system. Therefore, the revitalization of the function of existing association will be required.

2) Farm-to-Market Road

In general, the classification between the farm-to-market roads and provincial/barangay roads have not been defined in the Philippines. However, the most provincial and barangay roads are practically used as farm-to market roads in the rural area in terms of the function.

The existing road network in the Project area consists of Maharlika highway (two-lane paved with concrete) traversed the western part of the area from north to south, the provincial road between San Jorge and Buenavista, (two-lane paved with gravel) as a key road in the area branching from the said highway at San Jorge and lying east and west in the south along the Gandara River, and three(3) lateral roads of the San Agustin-Pologan road, the Blanca Aurora-Buenavista road (one-lane paved with gravel partly), the Buenavista South road (Non-paved and impassable). The traffic between the barangays in the south and north (Bulao and La Paz barangays) crossing the Gandara River is performed by a ferry which is said as a banca accommodating three (3) passengers by pulling the oar. The traffic from Janipon and Kantaguic barangays situated on the south of the Project area to Sam Jorge and Gandara town is performed by a banca boat driven by engine accommodated good for ten (10) passengers through the tributary of the Gandara River. The people in Sinbaran barangay located in the middle reach of the said tributary move by the boat without using the Buenavista South road.

On the other hand, peoples inhabiting in San Isidro and Rawis barangays which are located at the south of the Project area move on foot taking more than one (1) hour over through foot pass to the west with up and down in a width of 50 to 60 cm to barangay Quezon along Maharlika highway or taking the same hour to barangay Kantaguic in the east on foot and on boat to San Jorge town.

However, the said roads, specially in the lateral roads, become muddy and impassable by car when meeting heavy rain,

and moreover the road between Buenavista and Blanca Aurora barangays are washed out and damaged in the abutment of bridges due to scouring by flood so that the road is currently passable only on foot. Due to the insufficient financial arrangement of the Government of the Philippines and geographical condition as said as a remote rural area. The feeder roads have not taken adequate measures and repairs. The disparity between the urban and rural areas in the social and living condition improvement become bigger.

3) Village Water Supply

In the Project area, the water used for the farming are currently supplied from rivers, creeks and stagnant water. The Gandara River is tidal and saline in it's downstream reach. The water of creeks and depression are stagnant, brown in color and acidic owing to grass and trees decomposed. Those water are unsuitable for domestic animal, seedling and pest control. Agricultural products and machineries are not washed at present. In addition, the Gandara Seed Farm, which is in the area, has played a leading role in extension of seeds and nurseries throughout the Region-VIII (Eastern Visaya) since 1930s and is expected to be expanded by provision of seed processing facilities in 1990, but has no facilities for the farming water. On the other hand, SNAS without 450 students is a center of agricultural education in northern part of Samar province, but its services are limited due to lack of the water necessary for farm training and practice.

For the purpose of ensuring a steady farm income, according to the JICA Master Plan Study report, improvement of coconuts variety, expansion of agricultural forest and fruits farm areas, and promotion of livestock and poultry breading have been proposed. Furthermore, the expansion of floriculture and horticultures are expected under the geographical condition which the Project area is close to the consuming urban area, Catbalogan town and Calbayog city.

The drinking and domestic water, on the other hand, have been supplied in principal under the Level-I system which is provided one (1) well with a hand pump for one barangay. However, the present condition of wells is badly deteriorated. In the cause of poor quality and in adequate quantity of the water, the wells in present use are only eight (8) out of 28 wells constructed. The some inhabitants are forced to take the water from the source, over 1.0 km off.

The Government of the Philippines has made the Master Plan for the rural water supply and taken the effort to implement and plan, emphasizing on Level-I system to improve the ecological condition since 1982. However, in the area, the accomplishment of program has not reached to the target yet up to now. The national water service rate in the rural area is reported to be 62 percent in 1987. Therefore, it is understood that the water service rate of about ten (10) percent in the Project area is very low, as compared to the national rate.

CHAPTER 3. OUTLINE OF THE PROJECT

CHAPTER 3. OUTLINE OF THE PROJECT

3-1. OBJECTIVE

The Project area, which is located within the San Jorge and Gandara municipalities of Samar province, has been left far behind in economic development and is conspicuous particularly in terms of the high unemployment rate, large outflow of population and high infant mortality rate, etc. Most of the inhabitants live under the poverty line defined in the Philippines. In order to improve the lower standard of living and the above-mentioned conditions, the Project aims to improve the infrastructures/facilities for agricultural production by providing the construction of irrigation systems, farm-to-market roads and village water supply facilities, and the procurement of equipment for the operation and maintenance of completed structures, and to contribute to meeting the target of the Philippine Development Plan to alleviate poverty and generate productive employment opportunities.

3-2. STUDY AND EXAMINATION OF THE REQUEST

3-2-1. Appropriateness and Necessity of the Project

The Project, with the goal of agricultural development and promotion in the target area, was requested as a high priority project which is low cost and will yield quick results. Among others, the irrigation systems, farm-to-market roads, and village water supply were singled out as the major components. The implementation of such labor-intensive component work in the remote/rural area is expected not only to enhance agricultural productivity but also to provide an incentive to the inhabitants to improve their livelihood. In addition, the benefits through the Project's implementation are expected to be distributed not only in the Project area but also to other areas in the vicinity of the target area.

According to the Master Plan Study, the inhabitants have been concerned about roads, the domestic water supply, education and agricultural development; hence the improvement of the present low agricultural productivity, low incomes and poor living environment are urgent needs in the area. Therefore, since the inhabitants derive their income mainly from agriculture, the requested components, e.g., the improvement and construction of infrastructures for agricultural production such as irrigation facilities and roads, and improvement of the village water supply system to manage comprehensive agricultural production and maintain a healthy life, are in accord with the needs of the inhabitants and are the minimum requirements necessary in the Project area.

3-2-2. Examination of Executing Agency

The executing agency for the Project is the Provincial Government of Samar in compliance with Executive Order 363 regarding decentralizing the coordinative and management mechanisms for the implementation of integrated area development projects (Executive Order No.363). According to the Minutes of Discussions in the course of the field study, the executing agency will be responsible for implementation of the Project and will coordinate the activities of agencies concerned for the operation and management of the completed structures and facilities. As for the allotment of functions and duties between the Provincial Government and Implementing Departments, according to Executive Order No. 363, Section 7, the Provincial Government Office (OPG) shall be essentially responsible for policy-setting and overall direction, coordination and supervision. The management and actual implementation of operation, activities, and programs of special sectoral components shall continue to be the responsibility of the designated departments and agencies concerned, unless the project activities and duties are transferred to OPG by the lead agencies.

The expenditures of the Provincial Government of Samar were 22.28 million pesos in 1989, which involved mostly operating costs such as personnel expenses, etc., and showed an annual growth rate of about 3.6 percent for the latest five(5) years. In the organization of the Provincial Government, the governor is supported by 13 offices with a

staff of 534 persons at present. PPDO (Provincial Planning and Development Office) deals with technical assistance to the Governor, planning and coordination of development projects in the province, etc. PEO (Provincial Engineering Office) is responsible for planning, designing, programming construction and maintenance of provincial infrastructure projects including roads, bridges, water supplies, etc.

OPG will be called on for the assurance of the necessary staff and budget, and will receive assistance and strengthening of its management and engineering capabilities for executing the Project since OPG has little experience in large-scale project implementation. As mentioned above, DPWH, DA and NIA, Region-VIII Office, will deal with the project implementation, including the work undertaken by the Government of the Philippines, as well as operation and maintenance, as they have had enough experience in the implementation of projects. In addition, with the strong support given to OPG by the coordinating body organized by the staff of NEDA and other line agencies, the Project will be operated smoothly.

3-2-3. Examination of Relation to and Overlapping with Similar Projects and Other Assistance Projects

The development of Samar Island, as stated above, has included the development of Northern Samar, and main roads and other infrastructures on the island were provided in 1988 by the Northern Samar Integrated Rural Development Project (Australian Government assistance) and the Samar Integrated Rural Development Project (WB assistance). However, Samar province has been left behind in this economic development.

The requested project has been based on the recommendation in the study report for the Master Plan for the Integrated Agricultural/Rural Development Project in Western Samar conducted by JICA. The Agricultural Development and Promotion Program (ADPP), as a short-term development strategy, consists of five (5) components such as agricultural development, agricultural infrastructure development, post harvest and marketing service assistance, development of farmers' organizations and an agricultural development and promotion center. The

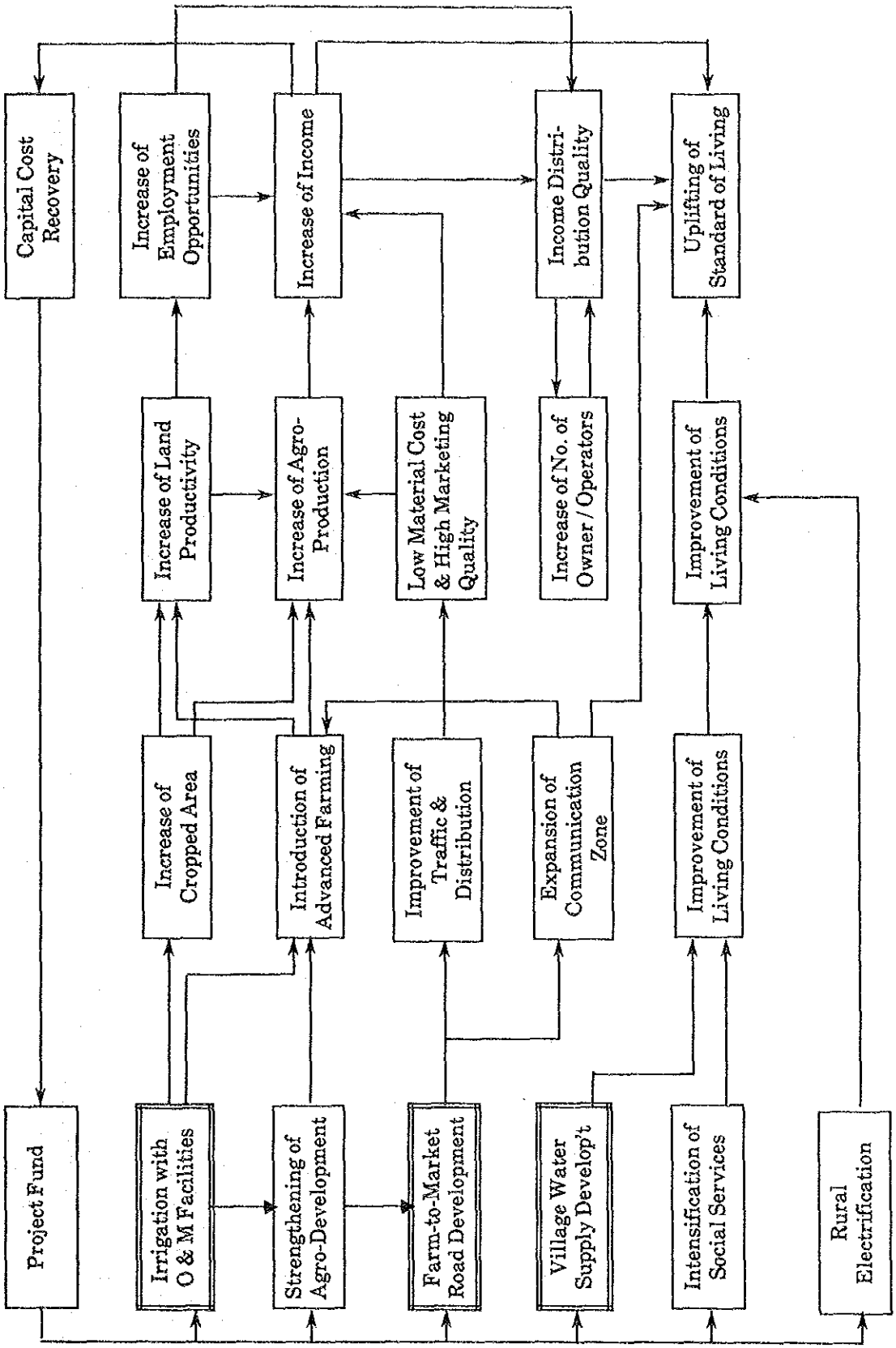
components agreed on by both the Philippine and Japanese Governments involve a part of the agricultural infrastructure development projects among those components mentioned above. thereby, the request has been initiated as a part of the ADPP suggested in the Master Plan study report, is expected to gain sufficient results, and will be further supported by the subsequent post-harvest and marketing assistance and agricultural development and promotion center construction projects expected in the future.

3-2-4. Examination of Project Components

The ADPP proposed in the Master Plan Study report can be illustrated as a development model shown in Figure 3-1. In this model, the factors of investment, that is, the projects and targets of development, are shown in the left and right columns, respectively. The factors enclosed with double lines in the left column are the components being requested now. The factor expressed as the strengthening of agricultural services includes the components of agricultural development, post-harvest and marketing service assistance, development of farmers' organizations and the agricultural development and promotion center proposed in ADPP. This strengthening of agricultural services will accelerate the introduction of techniques of advanced farming and agricultural production, thereby also stimulating the improvement of farm-to-market roads. In this respect, it can be easily understood that the strengthening of agricultural services will vitally contribute to the ultimate targets such as alleviation of poverty, the increase of employment opportunities and income distribution equality. In addition, the improvement and construction of irrigation and road facilities will be an incentive to call for further strengthening and acceleration of other agricultural support services.

The irrigation component will directly contribute to increasing the cropping area of agricultural products, especially for rice, enhance land productivity through promoting high cropping intensity and increase agricultural production. By the construction and improvement of roads, the transportation of the increased harvests to market will be facilitated. By accelerating the program of domestic animal propagation through the village water supply plan, it is expected that the farming

FIG. 3-1 DEVELOPMENT MODEL FOR ADPP



practice of irrigated agriculture, especially in land preparation, will be done effectively.

The road component will produce active agricultural extension services and enable farmers to bring very fresh products to market and reduce distribution losses and transport expenses; and furthermore, with the improvement of communications both in quantity and quality and proper operation of the village water supply system, will give incentives to farmers to seek advanced farm management techniques.

The village water supply component will contribute to active agricultural experiments and research, improvement of the rural living environment, the increase of farm incomes and stabilization of livelihoods through diversification of agricultural products and breeding of domestic animals and poultry, and is expected to improve the form of farm management on agricultural land improved by the irrigation and road components.

The work requested compose the minimum requirements necessary for rural development and are expected to result in benefits and attain the target of development by themselves, as stated above. In addition, with replenishment of Operation and Maintenance (O & M) equipment for the completed facilities, those components will tie up organically and form a steady basis of farm management.

3-2-5. Examination of Facilities and Equipment Requested

(1) Irrigation Facilities

The irrigation facilities which were requested by the Government of the Philippines have been included in three (3) run-of-the river systems, namely, the La Paz, Quezon and Aurora irrigation systems, to improve and restore those existing facilities/structures, and two (2) pumping irrigation systems to be constructed in the Bulao and Bulao South areas by pumping irrigation water up from the Gandara River and the Baga Oring Creek, which is a tributary of the Gandara River and its water level is influenced by backwater of the Gandara River, respectively. Those irrigation areas are summarized as follows:

Run-of-the river-system	3 areas - 185 ha in total
- La Paz area	145 ha
- Quezon area	30 ha
- Aurora area	10 ha
Pumping irrigation system	2 areas - 250 ha in total
- Bulao area	130 ha
- Bulao South area	120 ha
Grand Total	5 areas - 435 ha in total

As for the irrigation facilities in all the areas listed above, planning, design and construction of on-farm facilities (farm ditches, farm roads and farm drains) will be undertaken by the Government of the Philippines, as agreed between the basis design study team for the subject project and the Government of the Philippines. The construction of those facilities will be implemented by the farmers with the technical assistance of NIA.

The major work will be the improvement and restoration of the entire irrigation canal system including diversion structures for three (3) run-of-the river systems and construction of a pumping station, as a diversion facility, and an irrigation canal system for two (2) pumping irrigation systems.

1) La Paz Area

The restoration work for for a diversion dam was started in 1988 by NIA and is expected to be completed within fiscal year 1990. The facilities programmed for the diversion dam restoration have been excluded from this request. However, the restoration of this irrigation system, from the standpoint of the safety of the structures and facilities in operation and maintenance, will be required to improve the sluiceway, side wall and riprap downstream of the diversion dam, and reinforce the high water channel bottom and revetment work downstream from cutoff wall to be constructed on the left side of the dam. On the other hand, the irrigation canal system will call for lining of the main and lateral canals, construction of related structures and

improvement of the service roads for operation and maintenance.

The discharge in Ganoy Creek during the dry season was observed by NIA on April 19 and May 16, 1988. As the result of these observations, the runoff discharges from a drainage area of 20.25 km^2 were 103 and 106 lit/sec on the former and latter dates, respectively. These runoff discharges are converted into a specific discharge of 5.1 to 5.2 lit/sec/km^2. The water quality is no problem for irrigation, as verified in the field survey stage.

As a result of an examination of the design and progress of restoration work undertaken by NIA up to now and the condition of existing irrigation systems, though many technical problems may remain as pointed out above, it is expected that this area will be irrigated after completion of the restoration work in 1990 through the financial arrangements of NIA in 1990. Thereby, this area shall be excluded from the components of the present grant aid project.

2) Quezon Area

The improvement of existing diversion facilities in this request is not appropriate because the upstream area is affected by inundation and poor drainage. Therefore, the diversion facilities shall be constructed on an upstream site about 700 m from the existing one. The proposed diversion facility shall be placed downstream of the waterfall, taking into account operation and maintenance of the facilities and the influence of backwater from the structure on the upstream paddy fields. The main irrigation canal shall be located alongside the foot of a hill, which will convey the water on the fields through the lateral branched canal. The canals are proposed to be lined with concrete to reduce the water losses from the canal and limit the area inhabitable by the snail which is an intermediate host of schistosomiasis.

Major works will be as follows:

- Construction of diversion facilities
- Construction of main and lateral canals with concrete lining
- Construction of structures related to those above, such as road crossings, drainage canal crossings, turnouts, etc.
- Construction of service roads for operation and maintenance

3) Aurora Area

The improvement of diversion facilities at the existing location will involve some risk of bringing about poor drainage and inundation in the upstream paddy fields. Therefore, the diversion facilities shall be located about 1.0 km upstream from the existing one. In order to reduce the seepage of water from the facilities, divert the water effectively in the dry season and make the facilities safe, the diversion facilities will be built on a foundation of rock outcropping upstream of the water fall with a five (5) meter drop.

The main irrigation canal will be located alongside the foot of a hill and deliver water to the fields through the lateral branched canals. The concrete lined canals will be designed to make the water losses from the canal small and to limit the area inhabitable for the snail, an intermediate host of schistosomiasis.

Major works will be as follows:

- Construction of diversion facilities
- Construction of main and lateral canals with concrete lining
- Construction of structures related to those above, such as road crossings, drainage canal crossings, turnouts, etc.

- Construction of service roads for operation and maintenance

4) **Bulao Area**

The pumping station in the present location will be highly in danger of being washed out again by the flooding of the Gandara River because its floor elevation is lower than the flood mark. Therefore, the new pumping station shall be located about 250 m upstream along the Gandara River. The pump operation system will be determined not only by type of pump, location of available power source (transmission line), etc., but also by the economic alternative study taking construction costs and operation and maintenance costs into consideration.

The water stages of the Gandara River vary little during the dry season. However, in typhoons and/or local heavy rain, the water stage rises up to the peak level in about 12 hours and falls back down in two (2) to three (3) days. According to the records of the water stage station established in the upstream reaches of the Gandara River in the course of the Master Plan Study, the differencebetween the normal water stage and the highest water stage was seven (7) to eight (8) meters. The time of peak stage duration is short, being two (2) to three (3) hours. The watershed, which is nearly denuded land with little vegetation and poor capacity for retaining water, contributes to such rapid rising and falling of water stages. In addition, such variations of water discharge is also caused by tropical squalls with high rainfall intensity. The high water level occurs normally in the months of October through December with high frequency.

According to the Samar Electric Corporation Inc.-I (SAMELCO-I), a transmission line with 69 KV is provided up to barangay Bulao at present and has been planned to be extended up to barangay Blanca Aurora in 1990 (SAMELCO-I scheduled to be completed by September 1990). The arrangements for the budget have been proposed.

After completing this planned line, the line will be located within 50 m from the proposed pumping station and power supply will be available without large expenses. The electric charge is 2.5 pesos per kwh plus the basic charge.

The main canal is planned to be located along the provincial road running parallel to the Gandara River. Seeing that soils along the proposed canal alignment are sandy loam, a canal with concrete lining will be required to prevent seepage losses from the canal bottom.

Major works will be as follows:

- Construction of pumping station (suction tank, delivery tank, pump house, pump equipment, etc.
- Construction of main and lateral canals with concrete lining
- Construction of structures related to those above, such as road crossings, drainage canal crossings, turnouts, check structures, etc.
- Construction of service roads for operation and maintenance

5) Bulao South Area

The request is to construct irrigation facilities for a paddy area of some 120 ha extending along low-lying land along Baga Oring Creek. This area is very fertile, for flooding occurring once every two(2) to three(3) years brings fertile soil to this area. The farmers have reported that the production yield will be able to gain about 140 to

150 cavans (7.0 to 7.5 tons/ha) with adequate rain. As a matter of fact, the average production yield is now limited to 50 to 60 cavans (2.5 to 3.0 tons/ha) due to uneven and inadequate rain. When irrigation water is available, high yields are expected without fertilizers.

The creek meanders through the paddy fields in the low-lying valley bottom and runs down close to and far from the hillside. the creek is five (5) meters in bottom width and 1.5 m in depth and is influenced by backwater due to changes in the water level of the Gandara River. One cause of the drainage problems in this area is that the flow area is blocked by many fallen trees and driftwood. The farmers presently cross the creek on a log bridge, for there are no crossing structures.

The variation of the water stage due to tidal movements on the river limit the irrigation water supply to 12 hours a day but have the merit of draining well in the low water level time. As for the quality of the water, it is not saline and is good for cropping. It turned out during the field survey stage that the creek has an adequate quantity of water to irrigate the proposed land area.

As for the irrigation facilities, the suction tank will be planned to be built at the foot of the hill close to the creek and the delivery tank will be located on the comparatively elevated place near the foot of the hill. From the delivery tank, the water is distributed to the fields through a concrete lined canal. In the light of drainage conditions in this area, the pumps shall be carried to the elevated land during the rainy season in which flooding occurs with high frequency and installed at the designated places along the creek during the dry season in which irrigation water is necessary and the area is free from flooding. The average irrigation area is scheduled to be about 15 ha for one pumping station. Inasmuch as power supply lines and facilities are not available in or near the

station and the pump shall be portable as mentioned above, an operation system driven by a diesel engine is recommended.

Major works will be as follows:

- Construction of pumping station with suction tanks, delivery tanks
- Procurement of pumping equipment (portable pump driven by diesel engine)
- Construction of irrigation canal
- Construction of structures related to those above, such as road crossings, drainage canal crossings, turnouts, etc.
- Construction of service road for operation and maintenance

(2) Farm-to-market Roads

The request is for roads with a total length of 25.2 km as follows:

Bulao - La Paz	0.1 km to be constructed
Blanca Aurora - Buenavista	4.0 km to be improved
San Agustin - Pologon	4.7 km to be improved
Quezon - Janipon	11.5 km to be constructed
Buenavista South	1.2 km to be improved
La Paz - Monbon	1.7 km to be improved
La Paz - Puhagan	2.0 km to be improved

The new roads planned to connect barangays Quezon and Janipon, which branch off the Maharlika highway, pass through five (5) scattered barangays (Quezon, San Isidro, Rawis, Cantaguic and Janipon) and serve as farm roads for daily farming practices. The roads will contribute to distributing agricultural products to San Jorge and Catbalogan towns in the center of Samar province. The number of beneficiaries of the road between barangays Quezon and Cantaguic is estimated to be 2,345 persons in the target year of 2007, while the road between barangays

Cantaguic and Janipon will benefit 1,038 persons in the same year, which is a comparatively small number.

The new road between barangays Bulao and La Paz with the La Paz bridge will link the two (2) barangays located on each side of the Gandara River. The inflow of daily commodities and outflow of agricultural products, which currently depend on small boat traffic, will be accomplished in safety and for large quantities by providing the bridge and road. Furthermore, it is expected that the inhabitants on the right bank of the Gandara River, including the barangays scattered upstream along the Gandara River, will see improvements in their living conditions.

The La Paz - Monbon road will play a role as an agricultural road for the people in barangays La Paz and Monbon but the number of beneficiaries is small, only about 580 persons.

The Blanca Aurora - Buenavista road to be improved connects three (3) barangays (Blanca Aurora, Himay and Buenavista) and extends from the provincial road. The Gandara River, running parallel with the road, has many shallows and a fast current so that boat traffic is very limited. Therefore, to achieve maximan performance in this area, road improvement with a gravel pavement for the entire extend, improvement of crossing structures and restoration of bridges are imperative.

In addition, the Buenavista bridge, which is the existing bridge connecting the proposed road with the provincial road, has its right abutment and pier settled differently on the upstream and downstream sides, the support for its beam and foundation pile is cracked and the beams of two (2) spans are supported ineffectively by the pier. Therefore, heavy equipment is not able to pass over the bridge. Nevertheless, the restoration of the bridge has not been programmed in the budgetary arrangements. Under such circumstances, the restoration of the Buenavista bridge is urgently required not only for the implementation of this road component but also for the effective use of the improved the Blanca Aurora - Buenavista road.

The San Agustin - Pologon road, running through three (3) barangays (San Agustin, Hinogacan and Pologon), joins with the Maharlika highway and is the only traffic means in this area connecting with Gandara and San Jorge towns. As a matter of fact, this road is presently collapsed in many places and is not passable by car. Therefore, this road is awaiting improvement to be used for the distribution of agricultural products and daily commodities.

The Buenavista South road, which branches off the provincial road at barangay Buenavista, runs along the left bank of the Buenavista River, but is washed out at many places due to submergence of the entire road during flooding. The traffic by village people depends on boats taking about 15 minutes to the provincial road. The road would have to be about 2.2 km in length, which is longer than the 1.0 km length requested, so that the road could connect the scattered houses. This road is estimated to be costly in both construction and operation and maintenance and would be used by people in barangay Sinibaran only. Therefore, it is recommended to suspend this requested road from an economical point of view.

The La Paz - Puhagan road would be used mainly as a service road for operation and maintenance of the La Paz diversion dam and the main canal planned for the irrigation system and utilized only by people in two (2) barangays, Puhagan and La Paz. Therefore, this road may as well be suspended because of the small number of beneficiaries and because its purpose is to serve mainly for the irrigation system.

Under the above circumstances, by giving priority to the improvement of existing roads and construction of roads to be utilized by larger numbers of beneficiaries, the La Paz - Monbon road, the La Paz - Puhagan road and the Cantaguic - Janipon segment of the Quezon - Janipon road may not be appropriate for the purpose of Japan's Grant Aid Program. As a result, the roads selected for the program total about 14.6 km in length and are listed by road with the number of beneficiaries in the target year of 2007, as follows:

Name of Road	Length	Nos. of 5) Beneficiaries	Length per 1,000 people
Bulao - La Paz	0.5 km	1,789 1)	0.28 km
Quezon - Cantaguic	6.1 km	2,345 2)	2.60 km
Blanca Aurora - Buenavista	4.1 km	1,403 3)	3.05 km
San Agustin - Pologon	3.7 km	1,047 4)	3.53 km
Total	14.4 km		

Note : 1) La Paz, Monbon, Puhagan, Matalud, Cabugao, Gayundato and Cag-toto-og.
2) San Isidro, Rawis, Cantaguic, Janipon, Quezon, Cag-olo-olo, Bungliw, Hernandez, Guadalupe and Sinit-an.
3) Tomogbong, Blanco Aurora, Himay, Calundan, Bay-ang, Mabo-ob and Lincoro.
4) Hinogacan, Pologon and San Agustin.
5) Projected population in 2007 quoted from the Master Plan Study report (JICA).

(3) Village Water Supply Facilities

The village water supply consists of farming water and water supplies for daily living. As previously mentioned, the farming water supply is necessary to indirectly support the other components requested, irrigation and farm-to-market road indirectly components, and contribute to improving farming conditions. In general, the farming water supply furnishes the foundation to diversify farming as part of agricultural development. Farm management in this area, which particularly in the small depends on paddy, corn and coconut cultures in the small cultivable land area and breeding of a few domestic animals and poultry, relies greatly on non-agricultural income.

For the improvement of such present farming conditions, the farming water supply must be effective. In addition, the farming water supply, which will be provided to the agricultural support service facilities including the existing Gandara Seed Farm and the experimental farm of the Samar National Agricultural School (SNAS), is expected to contribute not only to the agricultural development and promotion program in this area but also to agricultural supporting services, especially in experiments and research, education and training, and extension services for horticulture and fruit cultures, covering the entire Samar island. Investment in such education, experiments and research is recognizable in its necessity and urgency but amounts to very little at present. It is understandable that this village water

supply component is requested due to financial constrains in the Philippines.

The request is to supply village water, providing a transmission pipeline of 14.2 km in length from the water source, Binubucalan Spring, to the San Jorge reservoir via gravity flow through eight (8) barangays after chlorinating at the Tomogbong receiving well. The request includes a sufficient quantity of water to extend a water supply to the Gandara area in the future but does not include the provision of transmission pipe for that purpose.

The village water supply facilities requested involve mainly facility work and village communal water supply faucets. The operation costs will be cheaper compared to the case of a pumping supply system, because spring water is the source and the water flows through gravity. Moreover, a considerable volume of water is expected. Towards this end, this component will contribute effectively to the improvement of farming and living conditions and the promotion of agricultural support services.

(4) Equipment for Operation and Maintenance

1) O & M Equipment for Irrigation

The equipment presently owned by the provincial office of NIA have exceeded their service life, e.g., over six (6) years or 6,000 hours of operation, although most of them have been used properly, making repairs and inspections. The following equipment, which are necessary for operation and maintenance for irrigation systems, have been requested. To maintain the requested equipment, NIA has agreed to acquire land for expansion because the existing motor pool has no space to accommodate the new equipment.

Types of Equipment	Specifications	Unit	Quantity
Bulldozer	6 ton	Unit	1
Backhoe	0.6 m^3	- do -	1
Dump truck	6 ton	- do -	1
Pick-up	1 ton	- do -	2
Tractor-shovel	0.4 m^3	- do -	1
Motor grader	3.7 m	- do -	1
Rock drill with generator & air compressor		set	1
Vehicle for survey & inspection	4WD	Unit	1
Survey & drawing equipment		set	1

The bulldozer and tractor shovel will be required for excavating, piling up and loading embankment materials, gravel for pavement, and aggregates necessary for the usual maintenance and disaster reconstruction of irrigation facilities. The dump truck and pick-up will be used for hauling construction materials and equipment, and the backhoe and rock driller are needed for excavation for common and rocky materials, respectively. In addition, the vehicle for surveys and inspections of the condition of completed facilities and estimates of damages to be restored due to disasters are required. To survey the damages and design the restoration work, survey and drafting equipment are necessary. The requested equipment are appropriate in scale and quantity for the purpose of Japan's Grant Aid Program from the standpoint of the scale and quantity of the requested facilities and the service life and maintenance conditions of equipment owned by the NIA provincial office.

2) O & M Equipment for Roads

In general, the roads branching off of the national roads and/or connecting two (2) municipalities are called provincial roads and are maintained by PEO under the Provincial Government. The farm-to-market roads planned within a municipality are called barangay roads and are maintained by the District Office of DPWH in Catbalogan. Nevertheless, the classification of provincial and barangay

roads has not been clearly defined and decided on by the related agencies for each case. In any event, O & M equipment are available both in the office of the Area Equipment Engineer of DPWH and PEO.

In either office, however, the equipment are very old, having been manufactured between the late 1970s and the first half of the 1980s and maintained under rather insufficient conditions. However, comparing conditions in PEO and DPWH, the latter is better in its maintenance performance and budgetary arrangements. Therefore, it is recommended for DPWH to maintain all the roads to be constructed and/or improved under the Project.

The following were requested from the District Office and Regional Office No.8, DPWH, while the equipment owned by the Office of the Area Equipment Engineer are attached in Annex 5.

Types of Equipment	Specifications	Unit	Quantity
Bulldozer	The same specifications of equipment available in DPWH, Catbalogan	Unit	1
Motor grader		-do-	1
Dump truck		-do-	3
Road roller		-do-	1
Pick-up		-do-	2
Generator	Not specified	-do-	1
Submerged pump	4 inch	-do-	Not specified
Vibrating roller	Portable type	-do-	-do-

A bulldozer can have multipurpose uses for repairing roads on a small scale, such as pushing materials, embankment work and compaction of soil with gravel for road fill, compression of gravel pavement, etc. The two (2) bulldozers owned by DPWH average 22 years of operation. Therefore, the procurement of a new bulldozer is imperative. On the other hand, a road roller only for compaction can be substituted for by the bulldozer.